



The Jalasayan Narayan Pokhari Restoration

Hanuman Dhoka Durbar Museum Development Committee
Kathmandu Durbar Square, UNESCO World Heritage Site

Historic Structure Report/ Conservation Notes

July 2013

Prepared For:
Government of Nepal
Ministry of Cultural, Tourism and Civil Aviation
Hanuman Dhoka Durbar Museum Development
Committee

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1.0. Introduction

Kathmandu Durbar Square is one of the seven Monument Zones of the Kathmandu Valley UNESCO World Heritage Site. In its present condition, the Kathmandu Durbar Square occupies a larger area and preserves more historic layers than its counterparts in Bhaktapur and Patan. After Nepal was conquered by the Shah kings from Gorkha, Hanuman Dhoka became the Royal Palace until the late 19th century. Rulers from every generation added some new sections or reconstructed older sections of the Palace. Renovations also occurred after major earthquakes. After the great earthquake of 1934, the open space of the Palace area was reduced, and large sections of streets and open spaces were privatized.

Narayan Pokhari and Nag Pokhari are the two ponds that exist in the Hanuman Dhoka Palace today. Nag Pokhari is deeper than Narayan Pokhari but smaller in area. Historically Narayan Pokhari is one of the most important monuments of the palace complex. Presently it is located on the North East corner of the Hanuman Dhoka Palace. Before the 1934 earthquake, the eastern boundary of the palace was at the Bishal Bazaar supermarket, meaning that the Narayan Pokhari would have had a more central location within the complex. At the center of the pond, a large stone image of sleeping Narayan with four hands is situated on a platform. The image is sleeping on a bed of 13 snakes. 11 heads of the snakes are around the head and 2 heads are on top of the sleeping Vishnu's head, higher than the others.

Like several other ponds throughout the valley, Narayan Pokhari dried out due to the diminishing water table. The pond traditionally and religiously requires water, and Jalasayan Narayan means sleeping narayan on the water. The beauty of the pond has been lost due to its drying out. Though feeding the pond from a natural source is almost impossible, feeding it from an artificial source would help bring back its lost beauty.

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The main sleeping Vishnu on the middle of the pond is laid on a platform built in brick work (10m x 7.4m). And sleeping Vishnu statue is measured 6.8m x 4.2m including snakes in oval shape.

2.0. Brief History

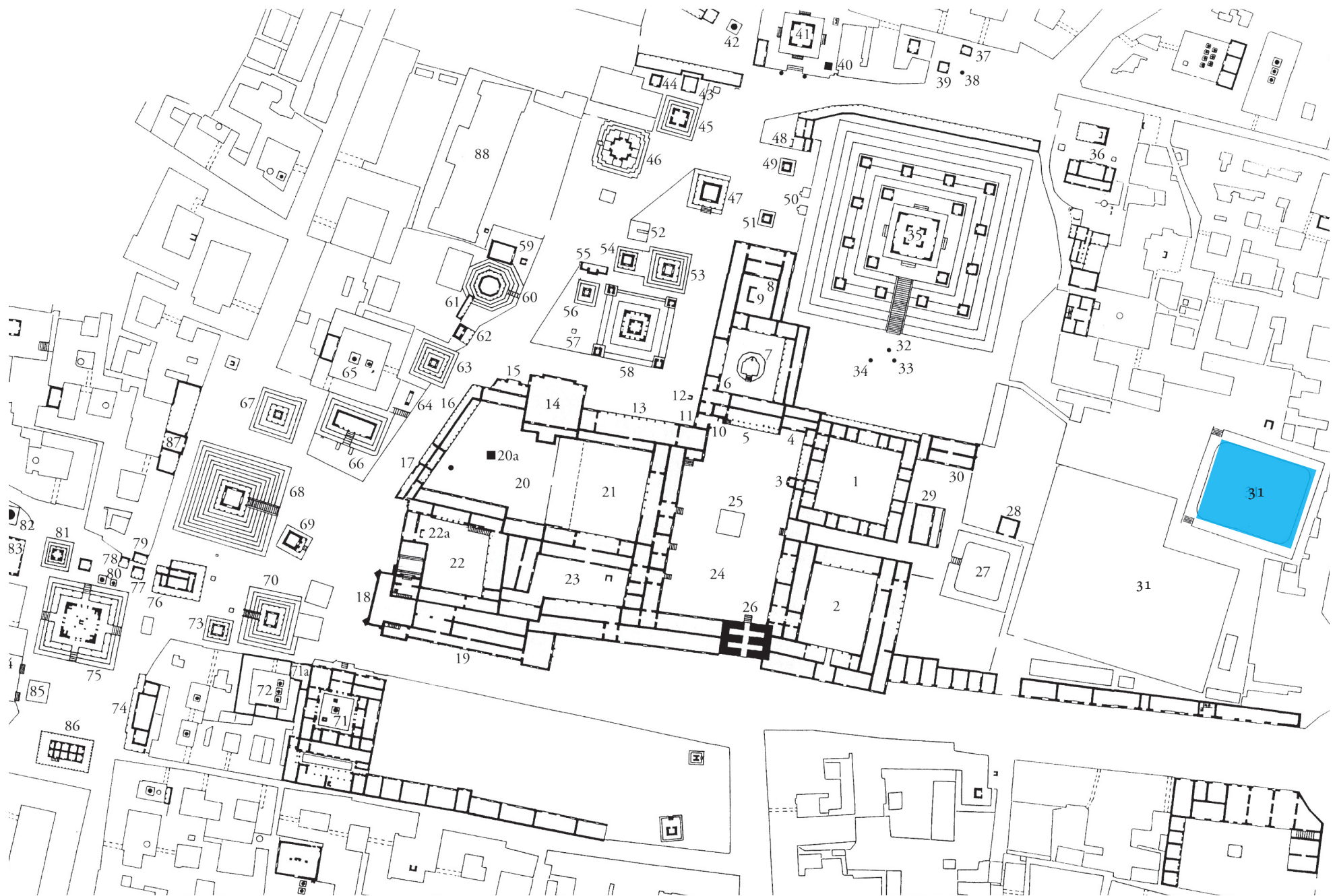
The image of Jalasayan Narayan in Hanuman Dhoka Palace is one of the three ponds featuring a sleeping Narayan, along with ponds in Budhanilkantha and Balaju. It was established by King Pratap Malla in the 16th century. According to Banshavali, King Pratap Malla wanted to build a new image similar to the Budhanilkantha Narayan, but in a dream God ordered him not to make a new one but to bring an image from a pond near Gyaneshwor.

Budhanilkantha Narayan was built in the 7th century by King Bishnugupt. According to Gautam B. Bajracharya, a sleeping Narayan existed even before this period in Hadigaon (which was inscribed by name "Bhumbhukkika Jalasayan Narayan"), which he suspects is the same one presently in Hanuman Dhoka. Similarly, the Garuda on the western side, on the same axis with Jalasayan Narayan, was also brought from the same place. Bajracharya explains that the artistic quality of the Narayan and Garuda is very much same.

The two stone Hitis on the North and East together with all surrounding plinth walls were probably built by Pratap Malla after installation of this Jalasayan Narayan.

The only access to the pond is through Trishul Chok (Taleju Temple courtyard). It has never been accessible to the general public, since it was of special importance to the royal family, as it represented the Budhanilkantha Narayan in the northern edge of the valley. Regular puja is still done by royal priest achhaju (Karmacharya).

There is no evidence of major repair or restoration, though several minor and often improper repairs have taken place over the past 30 years.



Kathmandu, Hanumāndhokā Palace and Darbār Square

1 The Mūcuka, 16th century, reshaped in 1708; 2 Lvaḥancuka, 1770s; 3 Shrine of Nāsāhdyah, 1650s; 4 Bhagavatī temple (usually named after Pañcamukhi Hanumān), five circular tiers, early 19th century; 5 Sisamahā, the hall of mirrors with the throne, 1826; 6 Mohancuka, ca. 1650, reshaped 1820s; 7 Sundhārā (step-well), 1652; 8 Sundaricuka, ca. 1650, reshaped in the 1820s; 9 Step-well with Kaliyādamana, 7th-century stone sculpture; 10 Triple-tiered esoteric shrine (āganchen) on top of the south-western corner of Mohancuka, 1650, with a Narasiṃha figure (1673) in ground floor arcade; 11 The gilded gate, guarded by a pair of lions (17th century) and a host of deities and painted symbols, 1810; 12 Hanumān on a pedestal, 1672; 13 The three-storeyed northern palace wing with ground floor arcade, 1860s; 14 Triple-tiered Degutale temple on three-storeyed base, ca. 1670; 15 A large face of Sveta Bhairava, dispensing beer on the occasion of Indrajātrā, 1795; 16 The western wing of the Malla-period palace with two ivory windows at the corner; 17 Triple-tiered Mahipatindra Nārāyaṇa temple (known as Kanelcok Bhagavatī), ca. 1720s; 18 The Gaḍḍi Baiṭhak, with large terrace on a high podium to inspect military parades, built in 1908 by Candra Śaṃser Rānā; 19 A long wing of Bhimsen Thāpā's palace extension; 20 Maśāncuka (also Karnelcuka), the place for royal mortuary rites; 20a A two-tiered Nāsāhdyah temple and deep well (tun); 21 Dakhcuka; 22 Nhuchencuka; 22a Bhagavatī shrine; 23 Lamocuka; 24 Nasalcuka, reshaped in 1826; 25 The coronation platform, reshaped in 1826; 26 Nine-storeyed Basantapur tower, 1770s; 27 Nāgpūkhū, 1660s; 28 Mahādeva temple, terracotta, reshaped 20th century; 29 Dasāinghar, space to grow barley, 20th century; 30 A house to receive the Caṅgu Nārāyaṇa kalāśa, 1975; 31 Bhaṇḍārkhāl

tank with Jalāsāyana Nārāyaṇa, monumental 7th century stone sculpture; 31 Dhukuti, treasure house (20th century); 32 Pillar bearing Pratāpamalla and his sons, 1670s; 33 Lion pillar; 34 Pillar bearing Parthivendramalla, 1670s; 35 Taleju temple on a platform of twelve tiers, first established in 1564, presumably enlarged by Pratāpamalla (1650s) and renewed by Jayaprakāśamalla (1730s), gate replaced after 1934; 36 Tanadevata; 37 Gaṇeśa, two-tiered temple, replaced in 1996; 38 Garuḍa figure, 6th century; 39 Nārāyaṇa, two-tiered temple, replaced 1996; 40 Gaṇeśa shrine and gate, erected 2008; 41 Mahendreśvara (1561), collapsed in 1934, reconstructed 1963; 42 A 17th-century caitya under a pipal tree; 43 Mahādeva, triple-tiered temple, early 17th century; 44 Nilvārāhī temple, one-storeyed makeshift structure; 45 Mahāviṣṇu, triple-tiered temple, 1720s, collapsed in 1934, reconstructed in 2002–2004; 46 Domed Koṭilingeśvara temple in stone, 1560s; 47 Bhuvanalakṣmīśvara (also Kāgeśvara), 1711, reshaped with a śikhara tower; 48 Domed Viṣṇu temple with pipal tree on top; 49 Two-tiered Mahādeva temple, 16th century; 50 Simhadvāra, lion gate with large double tympanum in stone, reshaped with pilasters in the 1820s, replaced after 1934; 51 Two-tiered Mahādeva temple, 16th century; 52 Platform with a hole to erect the pillar (yaḥsin) on the occasion of Indrajātrā; 53 Triple-tiered Nārāyaṇa, late 17th century, replaced in 2005; 54 Two-tiered Indrapura, 1660s, partly collapsed in 1934, restored in 2002; 55 Kālabhairava figure in stone, 1660s, restored in 2004; 56 Two-tiered Nārāyaṇa temple, 18th century, collapsed in 1934, restored and rebuilt in 2004; 57 Pratāpamalla pillar, 1670, bearing the king himself in the company of his two queens and his four older sons at the corners, his infant son in the centre; 58 Two-tiered Cārṇārāyaṇa temple, 1563, renewed in the 1660s; 59 Shelter for two large drums, donated in 1807;

60 Triple-tiered octagonal Kṛṣṇa temple, 1648, most probably replaced in a new style after the 1833 earthquake; 61 Arcade; 62 Sarasvatī, two-tiered temple, early 17th century, collapsed in 1934; 63 Viṣṇu temple with śikhara tower, late 17th century, collapsed in 1934; 64 The great bell on a high platform, 1797; 65 Lāyḱubahī with kvāpādyah shrine in the western wing; 66 Tārakeśvara temple with Aṣṭamātrkā (known as Śiva-Pārvatī temple), 1790s; 67 Nārāyaṇa temple, late 17th century; 68 Mahādeva temple (known as Mājudevala), 1690; 69 Ardhanārīśvara temple with śikhara tower, early 18th century; 70 Triple-tiered Trailokyamohan temple, 1680, in the eastern access Garuḍa, 1689; 71 Kumārībāhā, 1757; 71a A shed for parking the ceremonial chariots; 72 Sikhamūbāhā with two fragments of Licchavicaityas; 73 Bhīmalesvara, domed temple in stone, 1693; 74 Seven-storeyed Kavīndrapur tower, 1653, partly collapsed in 1934, dismantled and re-erected in 1986; 75 Triple-tiered Kāṣṭhamandapa, 12th century, reconfigured 16th century, restored in 1966; 76 Joṣī Āganchen, known as Lakṣmī Nārāyaṇa Sattal, late 17th century; 77 Aśok Vināyaka, single tiered Gaṇeśa temple; 78 Two-tiered Bhagavatī temple; 79 Arcade (phalcā), 19th century; 80 Two Sumerucaityas, 20th century; 81 Two-tiered Mahādeva temple, late 17th century; 82 Large caitya, early 19th century; 83 God-house (dyahchen) of Aśok Vināyaka; 84 Mahādeva śikhara temple, early 18th century, Viṣṇu figure at the back and Sumerucaitya; 85 Marudabu, dance platform for Indrajātrā; 86 Simhasattal with Rādhā-Kṛṣṇa shrine on second floor, 16th century, reshaped after 1934; 87 Joṣī Āganchen; 88 Police Headquarters; 89 Army compound, former Koṭ area. Map by A. and B. Basukala, 1993, on the basis of the cadastral map, scale 1:500, 1974

Site Plan: Kathmandu Durbar Square. Jalasayan Narayan shown in Blue. Source: Architecture of the Newars, N. Gutschow

3.0. Comaparative Study

There are three large sleeping Vishnus on the water in the valley; Budhanilkantha Narayan, in Budhanilkantha, Bala Nilkantha in Balaju and this one in Hanuman Dhoka palace complex. Budhanilkanthah and Bala Nilkantha Narayan were made of single piece of stone.

Comparative study was necessary because two of the standing snake heads did not seem original to the site. Two similar heads have been placed in the earth beside a small shrine just above the north side of the pond. The skin pattern detail and joints do not match those of the other pieces. Moreover, the body of these snakes were not interspined to the rest of the snakes. matching the other pieces. Such individual snakes do not exist in the original statues at Bala Nilkantha and Budhanilkantha either. In Bala Nilkantha there are nine heads and Budhanilkantha eleven heads, which are all interspined, forming the bed for the sleeping Narayan.



This page

Top: Budhanilkanth Narayan. Photo Source: <http://sacredsites.com>

Bottom: Bala Nilkantha Narayan in Balaju.

Next page:

Top left: Existing condition. Body of two standing heads in the periphery of the main shrine and the other eleven snakes.

Bottom left: Outer snake (from standing snake heads) body overlaps the body of main snake bodies, which does not seem logical. As in other two examples this one does not have full body as one can see on the other two. It is designed to be on the water. But it seems this one was designed to be on the platform (or chopped while it was relocated? it is mysterious to have incomplete body, because it should be on the water as named Jalasayan Narayan and historically it is supposed to be copy of Budhanilknatha as well mythologically also should be on the water) or platform supposed to be also underwater.

Top right: The standing snake does not match the joints with other small parts.

Bottom right: Standing heads have no proper link between the other snakes as well.



4. o. Existing Conditions

4.1. DECORATIVE ELEMENTS

Main Shrine of Sleeping Vishnu "Jalasayan Narayan":

The main shrine in the middle of the pond "Jalasayan Narayan" is made of many pieces of stone, but the main image is one large piece of stone and several pieces assembled in the periphery to complete the snakes. Since it is made of hard black stone, it is in an excellent condition despite being exposed to rain and sun for several centuries.

The image is not built on a proper base/ foundation. This is probably why the shrine was placed on timber lumbers to prevent settlement. There is no record of any repair or restoration work of this monument to date. Until a two decades ago, the whole platform was sunken under water. This means that the timber elements would have deteriorated slowly. After the pond dried out, the timber was exposed to seasonal variation of moisture and became damaged faster.





GARUDA:

As is typical in Vishnu temples and shrines, a Garuda is placed in front of the image in sitting position. The Garuda is located on a stone platform on the western side, aligned with the axis of the sleeping Vishnu. Garuda is sitting on the thick stone base, might be not a original base to the image. Normally this kind of base with *Jalahari* forms the base of shiva Lingas. It is likely that the base came from a different place after the original was lost. The base is almost completely sunk from three sides, only open on front.

The Sleeping Narayan and Garuda seem to have been occasionally oiled, as indicated by layers of dirt on the stone surface. In the main image, it appears that only the Narayan was oiled while the snakes were not.



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Top: Timber members were kept below the stone images to stabilize the weight of the stones from settlement. Almost all of the timber elements were in very bad condition and some of them were completely rotten. There was no proper base for the stone pieces. During excavation, only rubble was found beneath the stones.

Bottom: Surrounding snake parts were made from different pieces.

This page

Side and general view of Garuda located on the western side of the Jalasayan Narayan. The Garuda is in excellent condition, no damages were found in this statue.

Stone Hiti (North Side):

There are two hitis on north and east side of parapet walls, located at the centre of the wall. Stone pieces are in good condition, but there are big settlements in many places, especially on the center including miniature stone temple. The temple is not sitting on the center, which indicates sloppy maintenance or repair from past. A few stones from top edge are broken and one stone on the right corner has been replaced with brick.

There are no major damages on the stone wall surfaces. The miniature temple behind the hiti appears incomplete. Remaining elements indicate that it was a miniature shrine that stood on small pillars. Some of the sections are missing and they are stacked in the wrong configuration, most probably after the 1934 earthquake. The Shiva Linga beside the small shrine does not seem to be original to this place. The hiti has been dry for many decades, as reported by Hanuman Dhoka office.

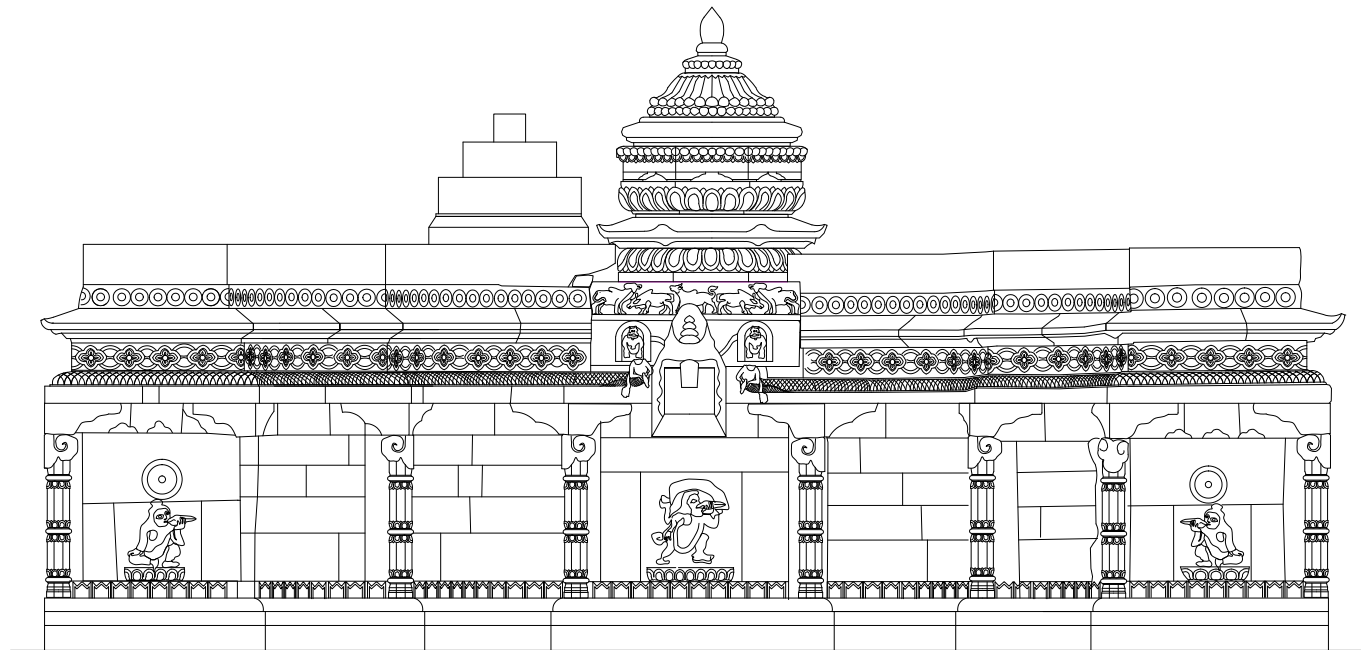
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Front facade and general view existing conditions

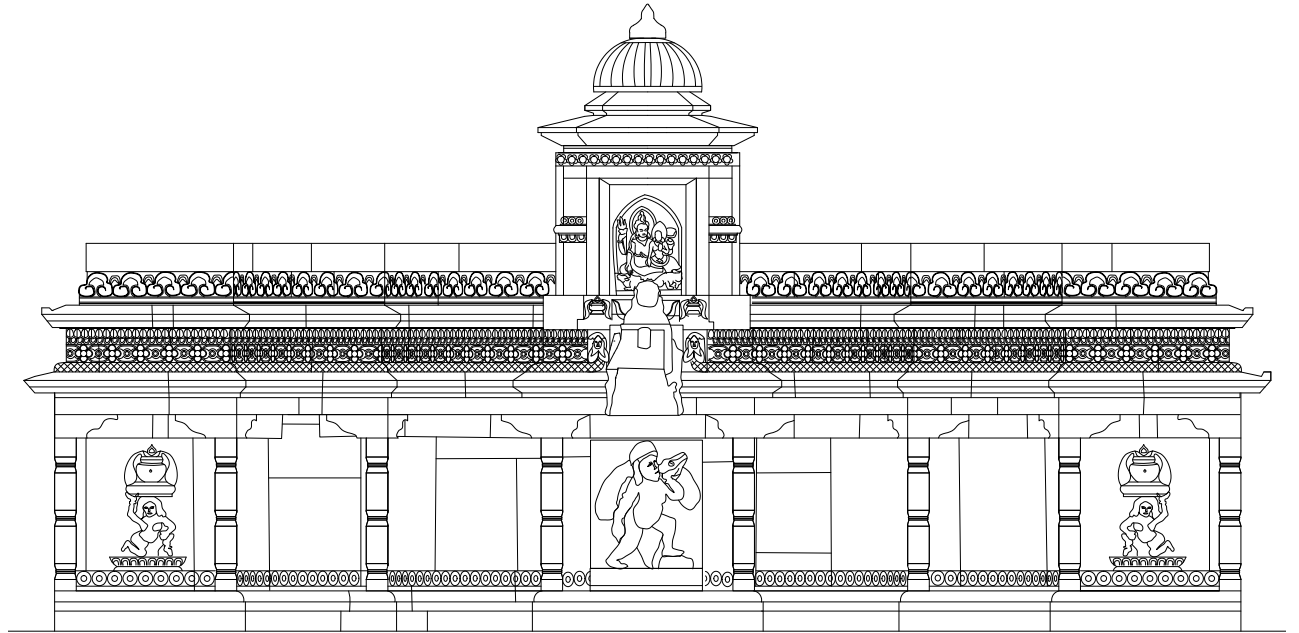
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Top photos: Heads of Nagkanya on both side of the hiti is broken. Some sections from the miniature shrine is missing. The stone pieces are not even stacked in the right order.

Bottom photos: One corner stone pillar on the left side is missing. Steps made from large brick are not built in its proper place, overlapping carved stone elements. But on other side still in proper location including drain for escape water from hiti.







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Front facade and general view existng conditions

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Bottom: Even rain water is not flowing to the pond, due to the lack of a proper drainage outlet. Almost all the stone pavement is missing on the hiti floor. Nagkanya on the right is intact, but left side is missing.

Bottom right: small miniature temple leans backwards.

Top right: Looks like miniature temple is sliced (?) at the back.



Stone Hiti (East Side):

The stone pieces of the eastern *hiti* are also in good condition. Big settlements have caused the miniature temple to lean backwards. Plinth floor just behind the temple is also sunk and missing flooring materials. Otherwise there are no major structural problems. Most of the stones are in good conditon too. No running water on this *hiti* as well. The stone flooring of sunken floor of the *hiti* was replaced with brickworks made worst by drainage problem.



4.2. PLATFORM

There is no major settlement visible on the periphery walls of the platform. However, many places have uneven surfaces and different types of bricks have been used in small patch works. The height of the platform from the pond base is eleven layers of brick. The top of the platform was finished with 6" x 6" floor tiles all the way up to the edge.

The floor of the platform was sunken in several places. Comparing two photographs, in 2010 there were small holes, which led to larger settlement in two years. Excavation was carried out to examine the existing situation of the platform. Foundation of the platform wall seems to have been improperly built with no real foundation and a mix of different types of brick. The foundation is about 5-6 bricks deep below the pond base level and built sloppily with bricks and stones. The brickwork of platform was also not built as a solid base. The middle core is built separately with brick bats and in some places with dirt infill. It was very urgent to examine condition and repair properly before having main stone sculpture settled. Hanuman Dhoka Palace Development Board took seriously the urgent need of repair and completed a proper foundation for the main shrine in June 2013.

From excavations on the pond floor, plinth wall and platform foundation, it seems quite likely that there was water in the pond when it was built. So it was almost impossible to drain out water to build a proper foundation. It would have made sense to fill the pond with debris and infill to raise the pond level high enough to a level in which the water could be drained out. The foundation was built on top of the debris, which is why there are large stones at the base of the foundation. Due to the infill area, there is a high possibility of settlement, so it makes sense to install the large stone image on the timber beams.

Top: Some settlement was already visible couple of years ago, before the study.

Photo source: ECS Nepal, Jul., 2010.

Bottom: Those settlements were developed more on lower photograph. Settling of floor tiles allowed rain water to penetrate inside, so the damage is rapid. Photo: Nov., 2012.





Left: The inner section of the platform was not properly built with brickwork, mostly filled with rubble. Photo: May, 2013
Bottom left: Excavation on south side of the platform.
Bottom right: Detail of excavation. Below the pond surface, there were no proper foundation walls, only rubble mixed with stones. Photos: Jun., 2013.





4.3. PLINTH WALLS

Foundation and Lower Plinth (1st Plinth):

Over all there was no major settlement visible on the plinth walls. In many places, uneven surfaces and different types of brick were used. Only six layers bricks are above the pond's base surface. The edge stones of the lower most plinth seem old, but most of them are loosely fitted. Most of the area flat brick was laid on the plinth floor, where stone is not enough to cover the width of the lower plinth floor.

Excavation was carried out on the south plinth to examine the foundation of existing plinth wall. The foundation of the plinth wall seems improperly built, a mix of different sized bricks and some stone boulders. The foundation is only about 5-6 bricks deep, the same as the central platform wall foundation.

Only the south side was excavated, but we assume similar conditions on all four sides, because visible parts of lower most plinth on all sides seems almost same kind of bricks were used.



Top: Lower plinth wall. When it was opened on South side, no proper foundation was found, only few layers of brick work. Photo: Jan., 2013.

Bottom: South East corner of lower plinth. Edge stones are fitted irregularly and corner stones are of different heights. Photo: May, 2013.

Plinth Wall in Three Levels (2nd - 4th Level):

All three levels of plinth wall were built in fish tail pattern with large terracotta edge bricks. There was no major damage and settlement in these sections. Most of the area seems sound, so it was not excavated to check the structural conditions.

On the 2nd plinth, the bricks used for fish tail pattern were shorter than the upper two plinths. There are six rows of bricks on 2nd plinth, 5 rows on 3rd plinth and 4 rows on 4th plinth (top most plinth). The top most plinth has an irregular pattern in some places.



Plinth Floors and Edges:

There is evidence of some repair within the last few decades on all levels. The traditional floor tiles are of different types and are not always perpendicular to the edge, as they were intended to be. Minor settlements were found in a few places, otherwise most of the plinth floor areas are in decent condition.

Right: Stone pavement in front of the hiti, lowered 2 steps from the 2nd plinth level.

Bottom Left: 2nd edge bricks are laid on header bond, whereas 3rd and 4th level are very irregular. On the 4th level most of the bricks are laid on stretcher bond.

Bottom Right: On the west side of the 3rd level a large area was settled on the joint between edge brick and tile pavement, allowing rainwater to penetrate the plinth structure. Similarly, on the west side of the 4th level, large edge bricks were settled in the wrong angle, accumulating rainwater. Photo: Jun., 2013.



In front of the two *hitis* on the East and North sides, the first plinth is stepped down two steps and the lowered area is paved with irregular stones. The lowermost plinth (1st plinth) was built with edge stones, whereas all the other plinths (2nd - 4th) were built with large terracotta bricks of various sizes. 2nd level is more regularly built on header bond, which seems original to the site. Edge of the bricks follow the angle of sloped parapet. 3rd plinth laid on stretcher bond with different type without angled edge. It is likely that these bricks were not original to this place. The 3rd plinth is more irregular with a mix of differently sized edge bricks. Most of the bricks on the top plinth are laid out in stretcher bond same as the 3rd level, except on South side few stones were used. On this level only the edge bricks are visible because this is where the plastered parapet wall is situated.



Stairs:

There are two stairs for going down to the main shrine on the South and North sides. They begin two steps lower than ground surface around the parapet wall. There are nine steps on each stairs landing on the 3rd plinth. Steps on both sides lead down to 2nd plinth on the bridge level.

Both of the stairs appear to have been rebuilt in the last couple of decades. They are both in good condition.



4.4. TOP PARAPET WALL

Top parapet wall was most probably built in 19th cen. during early Rana Period or just before the Rana Period, finished with stucco plaster works above the 3rd level of parapet wall of the pond/ boundary wall of pond.

There are cracks on several places. Some of them are only superficial cracks on plaster only, while a few cracks show evidence of structural damage.

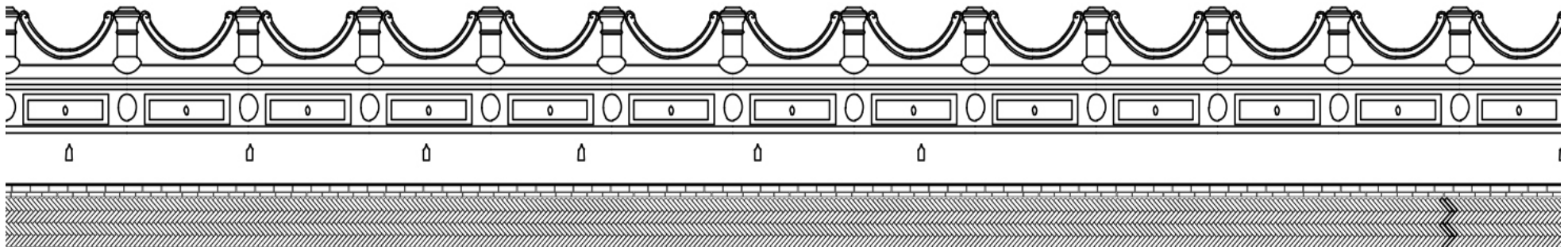
In some places the plaster work has fallen but instead of being repaired the damaged parts have just been whitewashed.





Left: Upper parapet, North. This is the only large section that is missing. Photo: Jan., 2013.

Right: North Entrance to the pond. Stucco plaster is broken off on the pillar and large vertical cracks are also visible. Recent repair work shows superficial beautification rather than the restoration of broken areas to increase the stability of the structure. The stucco plastered area was whitewashed and damaged elements were not replaced. Photo: Jul., 2013.



4.5. POND SURFACE & OUTLET

Until 40 years ago the pond was always full of water. Before the construction of Bishal Bazaar, 50 feet east of the pond, even the main shrine was often under water. When water was pumped out for underground construction of Bishal Bazaar, the water table of the pond went down. But after the completion of Bishal Bazaar, water returned to the pond, which suggests that the water table remained high for some time (based on interview with Hari R. Ranjitkar, engineer from DoA, retired).

Nowadays the pond does not retain water even during heavy rainfall. One senior officer from Hanuman Dhoka reports that there was water as recently as two decades ago, above the level of the sleeping Narayan. They had to make a drain outlet to reduce the water level, so that devotees could walk on the bridge, the link to the central platform, to worship the Jalasayan Narayan.



When the pond started drying about 12-13 years ago, the drain outlet became a problem. It was made to reduce the water level, but when the pond dried out sewage would enter the pond through the outlet. The outlet was thus closed.

The surface of the pond is paved with on-edge bricks without any solid base. This is insufficient to keep water trapped in the pond. It is thus likely that the water table was always higher in this area. Now a days the whole pond surface is covered with grass.





Brick on edge soling

thin layer of sand

Brick bats
(most probably from 1934 earthquake or
earlier earthquake dumped in the pond)

8"-9" of black soil, but mixed with brick
bats

Layer of sand

Mud
(not virgin soil, mixed with brick bats)



Trench was excavated to examine the condition of the pond. There was no virgin soil found up to 5 feet trench. About 2 feet was only rubble filling, and some soil was found below that, but again some brick bats are mixed with mud.

4.6. BRIDGE

The bridge to the central platform is the only link to the main shrine. The level of the bridge is the same as the 2nd level plinth and is built with large stone blocks on the North and smaller on South. The stone pavement of the bridge is merged with telia tile pavement of the western plinth and overlaps with the stone snakes on the platform.

The lower level of the bridge is the same as the lower most plinth but the width is different on the North and South side.

Right: Bridge from North side. Stone paved bridge aligned with the axis of the main shrine and the Garuda.

Bottom left: Stone pavement and telia tile pavement is merged on same level.

Bottom right: Bridge from South side. Upper level is fully built with stones and lower level which is an extension of the lower-most plinth, a brick wall with stone edges.



5.0. Recomendations

5.1. DECORATIVE ELEMENTS

Main Shrine:

Hanuman Dhoka Palace Development Board repaired the base for the main image during the course of the study period. All the rotten timber members were replaced with additional timber beams to protect them from further settlement.

The shrines are occasionally oiled, leaving a layer of dust stuck to the stone image. The natural stone should be properly cleaned rather than oiling, since oils create layers on the image which attract dust and reduce the visibility of carvings. The stone should be cleaned every 6 months using water.

Right: Many layers of oiling made thickness of dirt on stone surface, which after certain period peeling out from the stone surface. If stone is hard, might not make any damage on stone surface. It will be more of esthetical problem.

Bottom left: Top: Photo was taken just after oiling of the main stone image. This is ongoing tradition, might be since few generations or centuries, which is not easy to stop. But certainly due to hard stone this won't make damage in short period. Photo: Jan., 2013.

Bottom right: Oiling on top surface washed out quickly by sun and rain, compare to vertical sides. Photo: Jun., 2013.





Pools of water form on the sculpture after rainfall in few places, which might adds to the damage in the long run. The only way to solve this problem is to make a drill hole to drain water from these areas, but it is not recommended to make any such interventions to the historic image. But of course some one can take out water by some utensils/ jug as a maintenance measure and wipe it out.



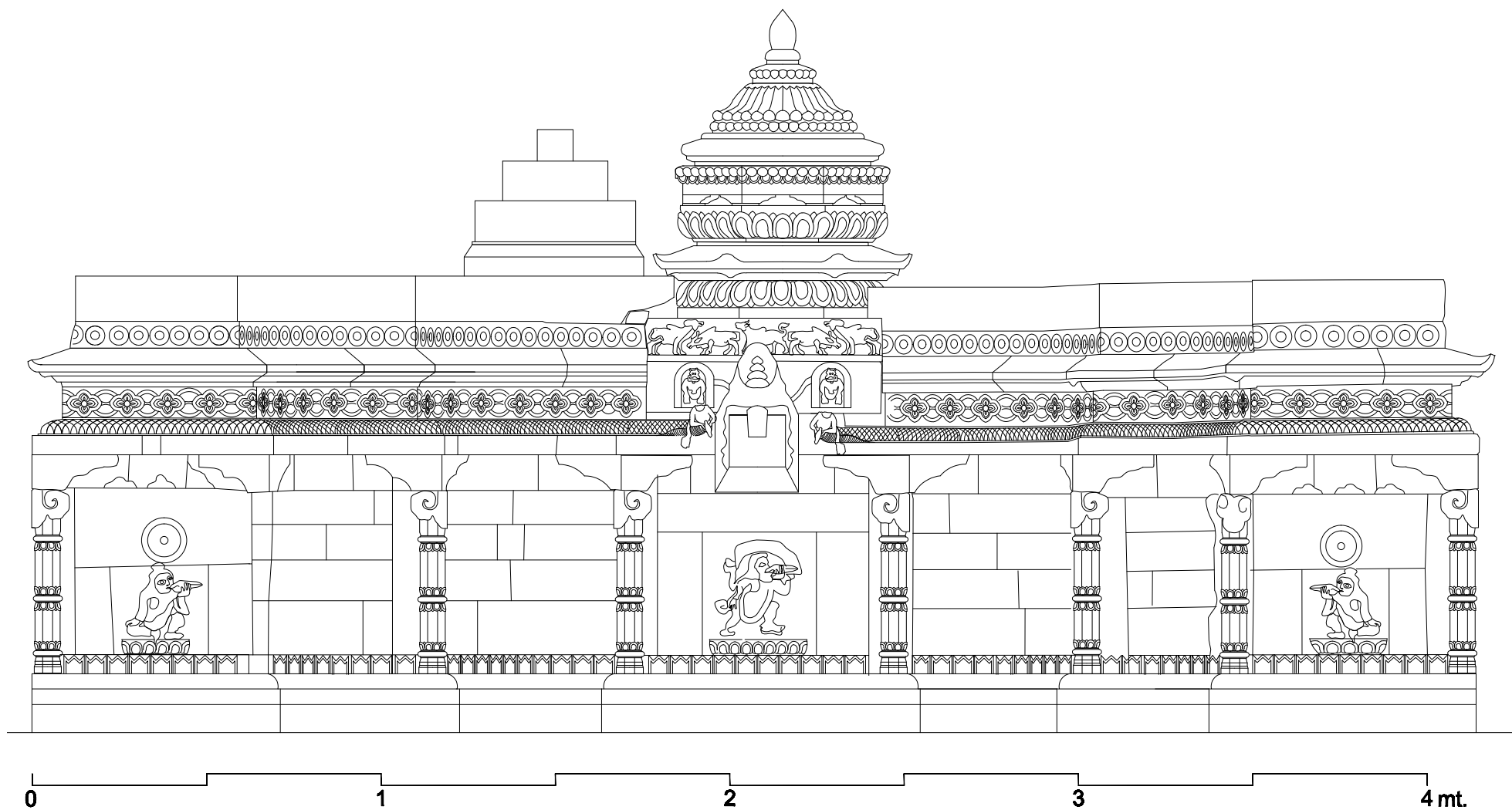
Top and right: Water was trapped in many places on main shrine, made from single stone, which dries out only by evaporation. Photo: Jul., 2013



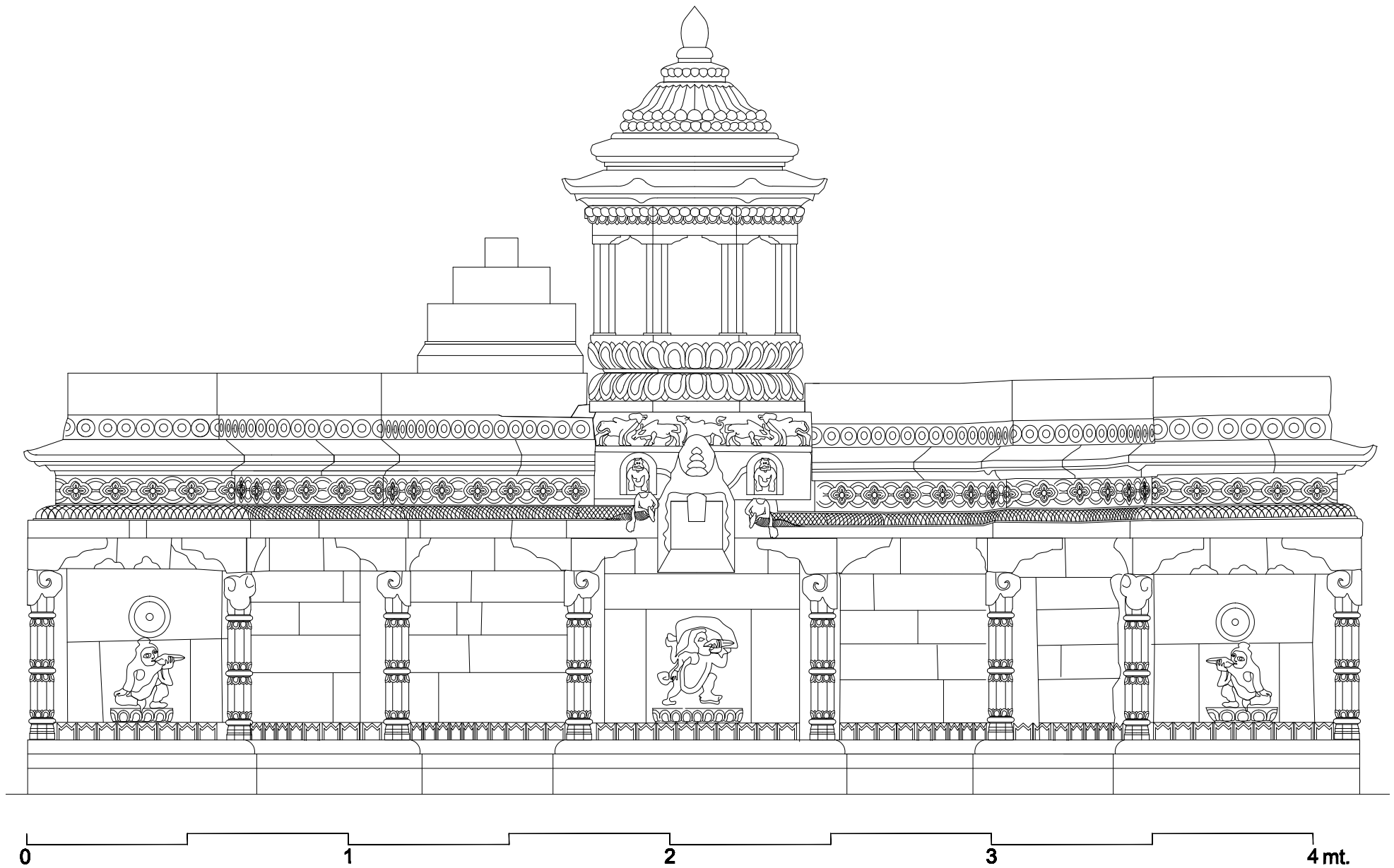
Top: Replacement of rotten timber beams beneath the main shrine, made from one large piece of stone. Photo: Jan., 2013.

Bottom: Brick work in lime surkhi mortar to make solid base for main shrine after installation of timber beam. Photo: Feb., 2013.

Top: Brick work in lime surkhi mortar continued on periphery for stable base for the small stone pieces (snake parts) around the main piece. Photo: Feb., 2013.



North Hiti. Existing elevation.



North Hiti. Proposed restoration, with rebuilding of lost central miniature shrine, based on existing stone elements and study of similar structures..

Stone Hiti (North Side):

It is clearly visible from existing elements that some of the sections are missing from the back shrine. There are pin holes for miniature octagonal pillars on the lower base and a large part with capital (*meth*) was just put on top. Even one of the big piece is not in right order. It is recommended to make eight new octagonal pillars to restore the miniature shrine and put back stone pieces in historic configuration.

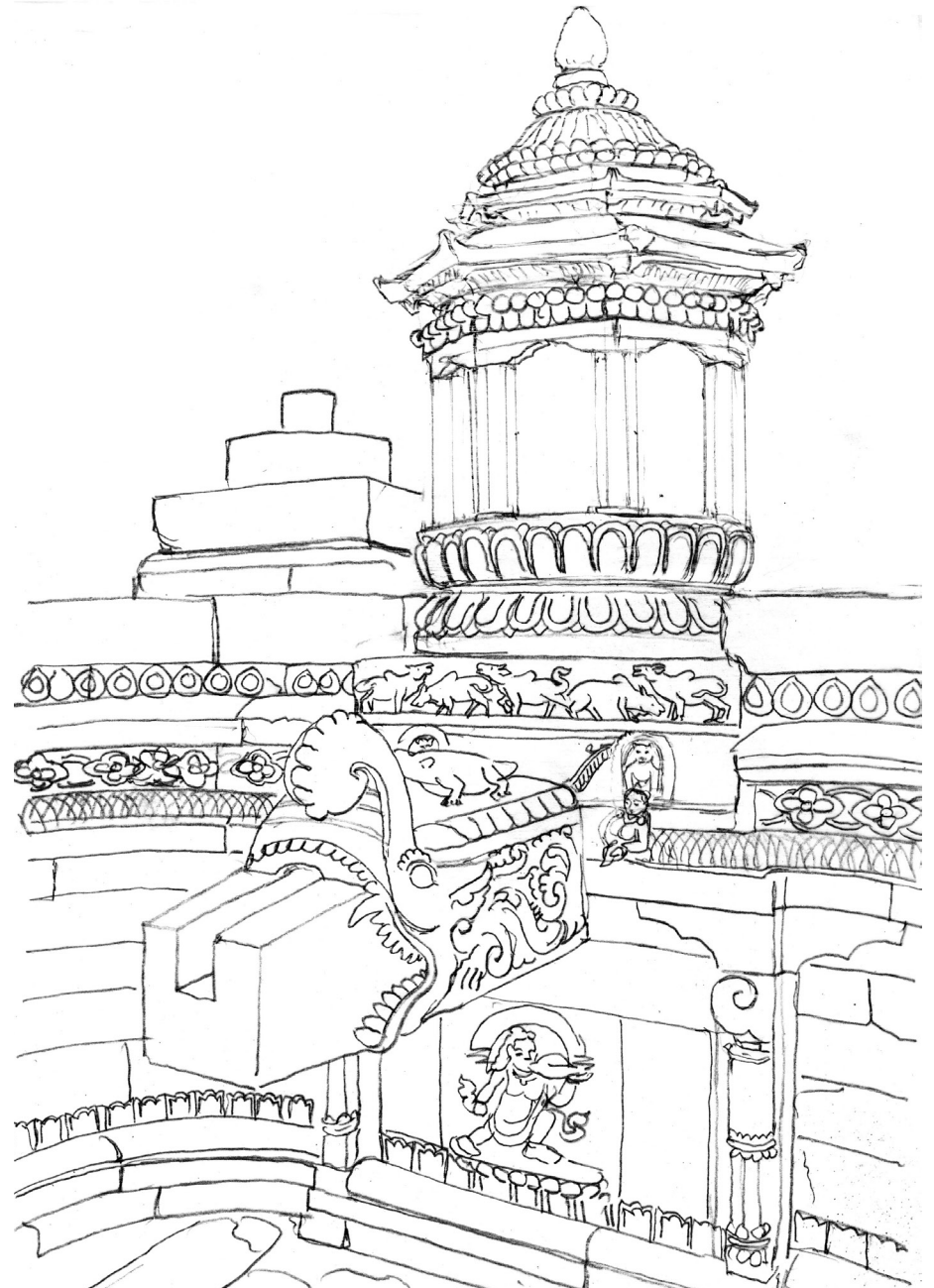
Some of the lost elements, such as one stone pillar from the wall can be easily replicated from the other side. Lost heads of Nagkanya can be left as it is, because they will be hard to join on old fragments.

It is very important to rebuild plinth steps on the left side, matching with right side, which overlaps the stone wall. The steps need to be set back in order to keep stone walls clear, not covered with flooring or steps. A drain should be built along the stone wall and step in proper slope to drain out water easily.

Stone Hiti (East Side):

Quite often small miniature shrines are located just behind, on the main wall, above the *hiti* level. All the elements on small shrine on eastern *hiti* still exist, but are inclined backwards. This needs to be sloped in the right direction to allow water to flow properly. It makes sense to also straighten the inclined back shrine to its right position, because it needs to be dismantled to straighten the *hiti*. Few small details are missing, such as one of the Nagkanyas, which can be replicated on the basis of the same one on the opposite side.

Flooring should be rebuilt with stone, as it is now replaced with brick soling without proper drainage. As usual damp is visible in the structure, because it is directly attached to the earth, requiring regular cleaning and removal of grass, especially during the rainy season. The back floor of the miniature temple urgently needs repair to prevent water seepage thru stone wall.



Right: Sketch showing general view of missing miniature temple.

5.2. PLATFORM

Below the stone image, all the infill on the platform was replaced with brickwork in lime surkhi mortar during replacement of damaged timbers to prevent from settlement, already executed as an emergency measure in May-June, 2013.

Walls of the platform need to rebuilt with proper foundations, if water proofing membrane introduced to retain the water. There is about 2' - 2'6" of space between the wall and newly built base of the stone image, which should also be filled with with brick wall infill structure to give solid base for the whole platform.

Tile pavement was done up to the edge of the platform as before, but it is suggestable to use edge stone as on lower plinth wall to give the sence of edge as is typical in our historic architecture.

Bottom left: Before the emergency works. Photo: Nov., 2012.

Top right: After building brick work below stone image. Photo: Feb., 2013.

Bottom right: After tile pavement on the platform. Photo: Jul., 2013.



5.3. PLINTH WALLS

Foundation and Lower Plinth (1st Plinth):

On this level, plinth walls need to be rebuilt to introduce a waterproofing membrane and black soil to prevent water leakage, since it is not possible to bring the water table back up. Historically the wall was obviously built in mud mortar, which lacks tight joints, allowing seepage to travel to the pond. But the situation is different now. Instead of catching water from the ground we have to seal the holes from leakage. It should be built in lime surkhi mortar with the proper foundation.

Plinth Wall in Three Levels (2nd - 4th Level):

Most of the areas on all three levels of plinth wall need only minor repairs. In some places, bricks are missing the fish tail pattern. It is recommended to put back missing bricks, which will prevent more bricks from falling. Bricks need to be matched depending upon the plinth level.

Plinth Floors and Edges:

The lower-most plinth floors and edges need to be rebuilt during the installation of a waterproofing membrane. They should be rebuilt with proper foundations and edge stones. 10-15% of the edge stones need to be replaced with stones of matching color and quality and some of the stones need to be dressed. The floor which cannot cover the width of the stone needs to match the telia tile on the upper plinth floors.

The 2nd and 3rd level floor and edge do not need to be rebuilt entirely. Only a few areas require repavement after packing the sunken areas, especially edge bricks and the row of sunken tiles on the western side of the 3rd level plinth.

There is no floor on the top plinth, only edge brick, just below the white stucco plastered wall. The western side, sunken towards the white stucco wall, should be rebuilt partially so that rainwater flows on to the next level instead of collecting in the corner. Some edge stones on the South should be replaced with matching large edge bricks too.



North Hiti. Few bricks in fish tail pattern were missing behind the centre of the hiti on 4th level, on the left side of the hiti on the 3rd level and just below the steps on 2nd level plinth. Photo: Jan., 2013.



A small section of 3rd level plinth was repaired recently in lime surkhi mortar on the right side of the Garuda. Lime surkhi mortar was rendered heavily on the joints and does not match the older sections, built in mud mortar. Three sides of the base is sunken on the 3rd plinth, which is logical to lift to make the stone base visible from all four sides. Photo: Jun., 2013.

5.4. TOP PARAPET WALL

The top parapet wall above the 4th plinth is finished with white stucco plaster. It looks like more than half of the height is sunken from outside ground level. The surrounding walkway of the pond is on the cornice level below the pillars from outside. Due to the rising surrounding ground level, it might be not feasible to bring back to the wall to the original ground level. It might be possible to drop the level down on the periphery of the parapet wall only. The ground level may also be excavated for the purpose of study.

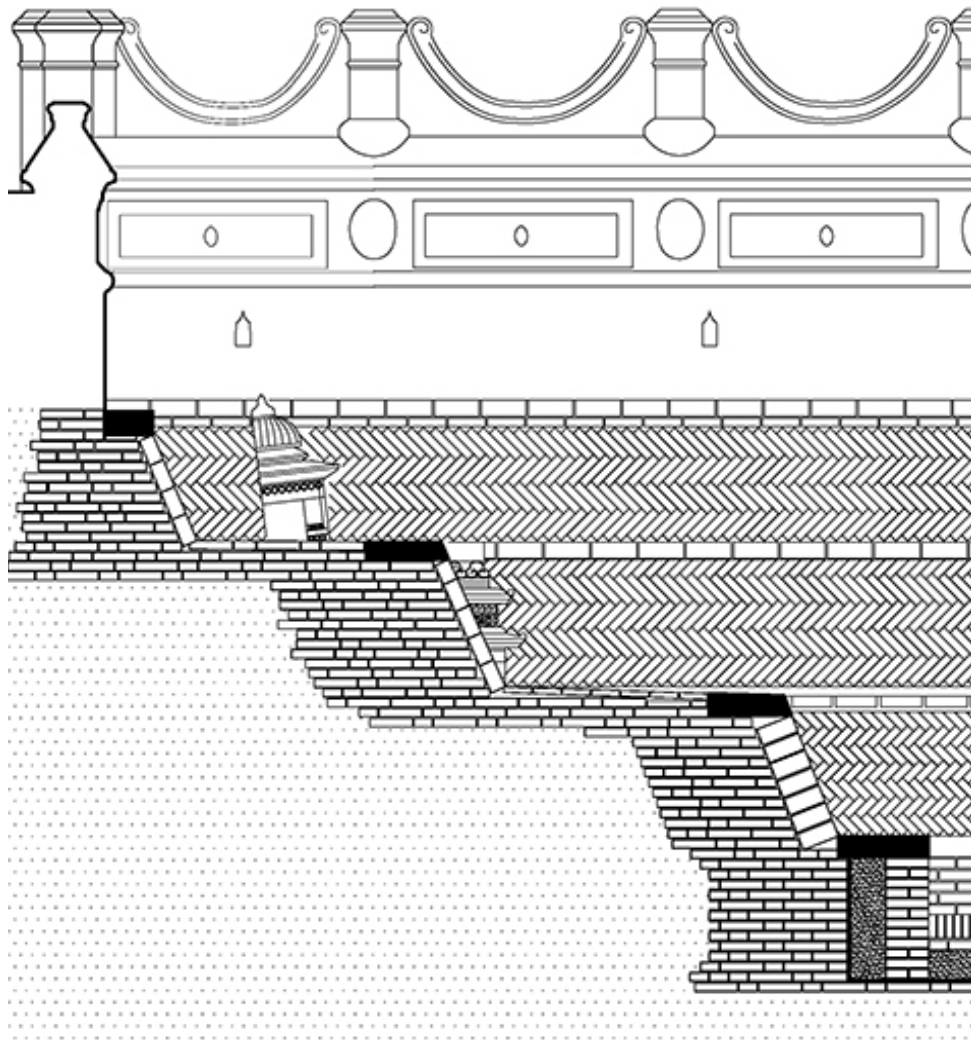
There are several cracks visible on the wall surface, but none of them indicate structural failure, so it is not necessary to rebuild the whole wall. Superficial cracks can be easily repaired by filling them with lime surkhi plaster. If some plastered area is not attached to the wall, those need be taken out and replastered, matching the surrounding surface.

Damaged bricks will need to be replaced in lime surkhi mortar. About 6 feet of the north parapet is lost, and will need to be rebuilt by craftsmen who are able to replicate the historic design. Few bricks are damaged in some places, which need to be replaced in lime surkhi mortar.

Some areas of the plaster work are broken. These areas need to be replastered in lime surkhi mortar to match the historic surface. It is strongly recommended to use the lime surkhi mortar as per the traditional technique. Lime stones need to soak in water at least for month to get proper strength.



One of the top of the pillar ornament on the south stair should be reproduced to match the existing pillar on the other side. Photo: Jul., 2013



Top: Section shows rebuilding of plinth edge with proper angle (in black) on different level. 1st plinth with straight edge stone as most of them are exist, 2nd and 3rd plinth with sloped large edge bricks as existis on 2nd level plinth and top most plinth retain existing with straight angled large brick as exist. Some of unusable bricks can be replced with unused from 3rd level.

Top right: 2nd level with angled edge brick still intact all around. Photo: Jun. 2013.

Bottom right: 3rd level with straight edge bricks, which need to replce as 2nd level.



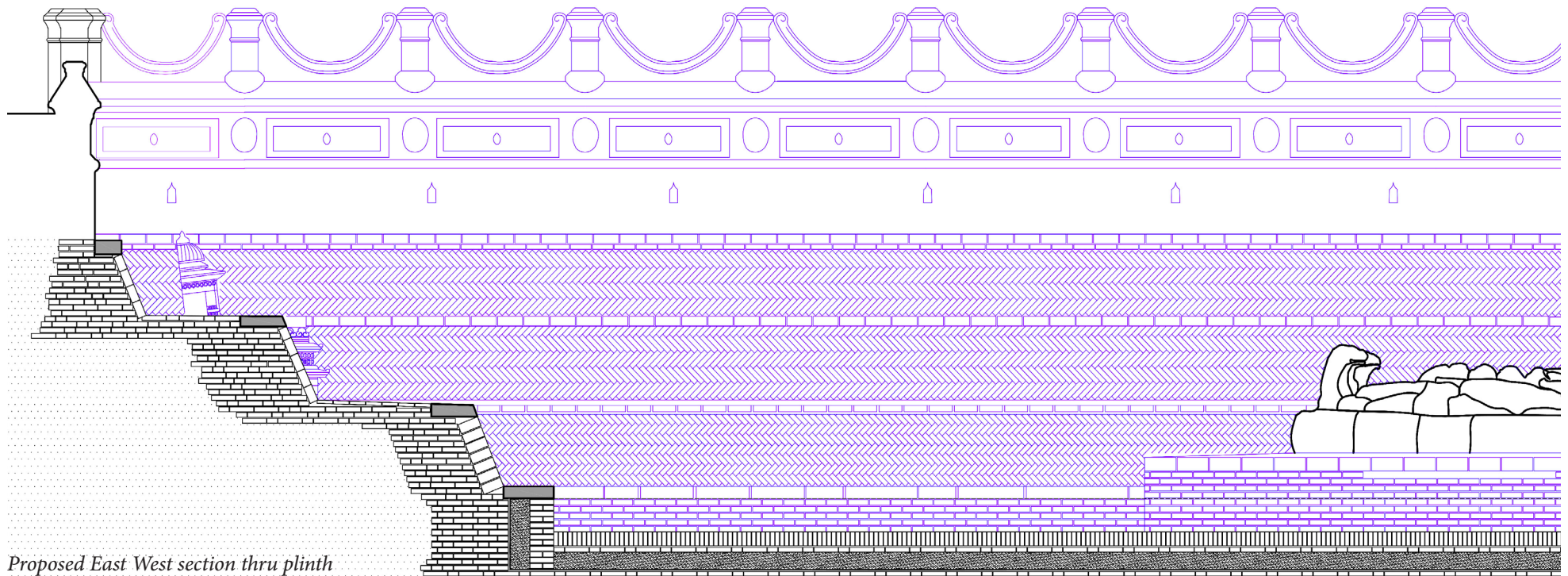
5.5. POND SURFACE & OUTLET

The main objective is to retain water in the pond. Today it might be almost impossible to track down original historic source to feed the pond. It is likely that there was a natural source in the vicinity which kept the water table high. Since the water table is dropping in the valley, naturally sourced ponds will continue to dry out. It is recommended to make pond water tight using water proofing membrane, which will prevent the water from draining out. There will be some loss of water to evaporation, which will require the pond to be refilled occasionally during the dry period, but it is possible to collect rainwater during the monsoon.

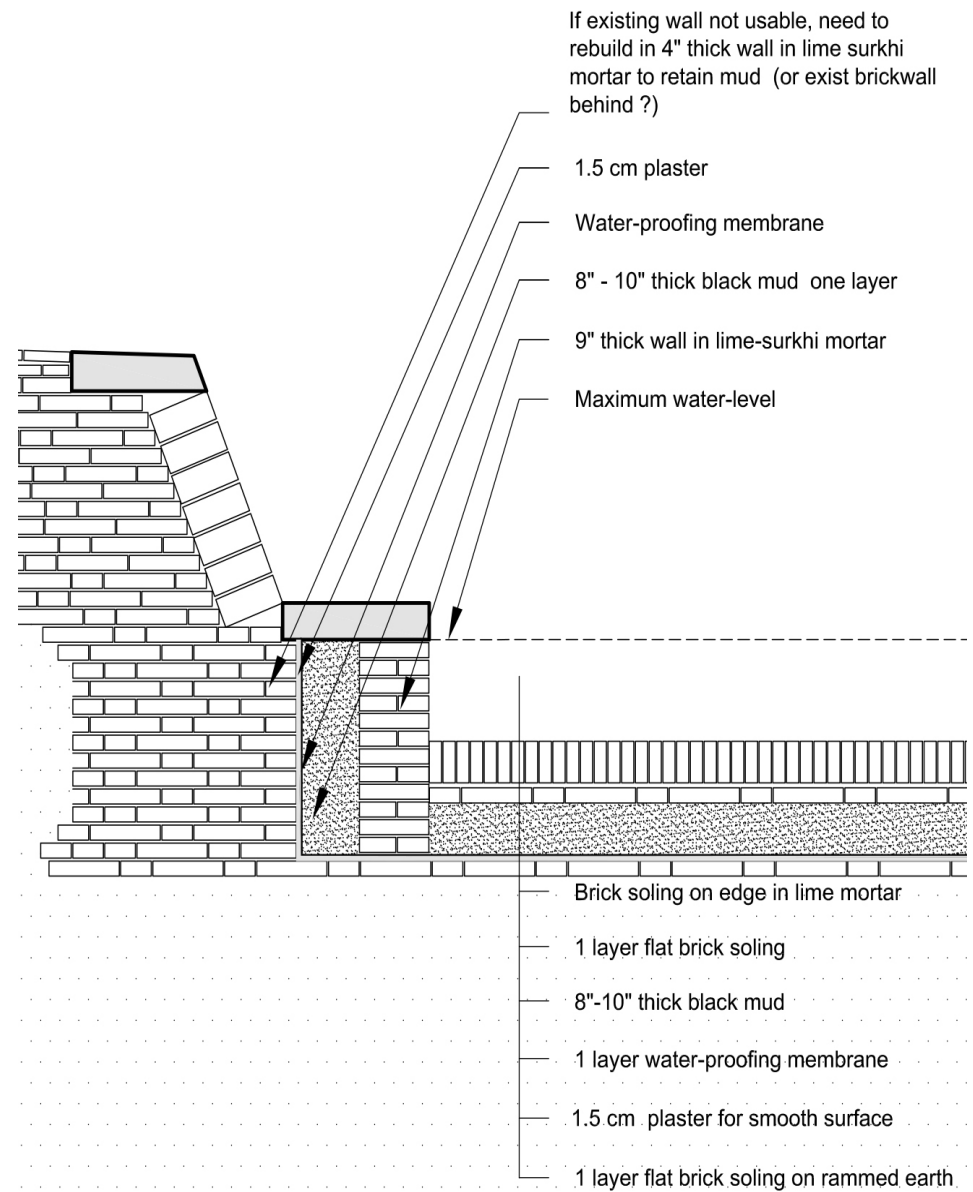
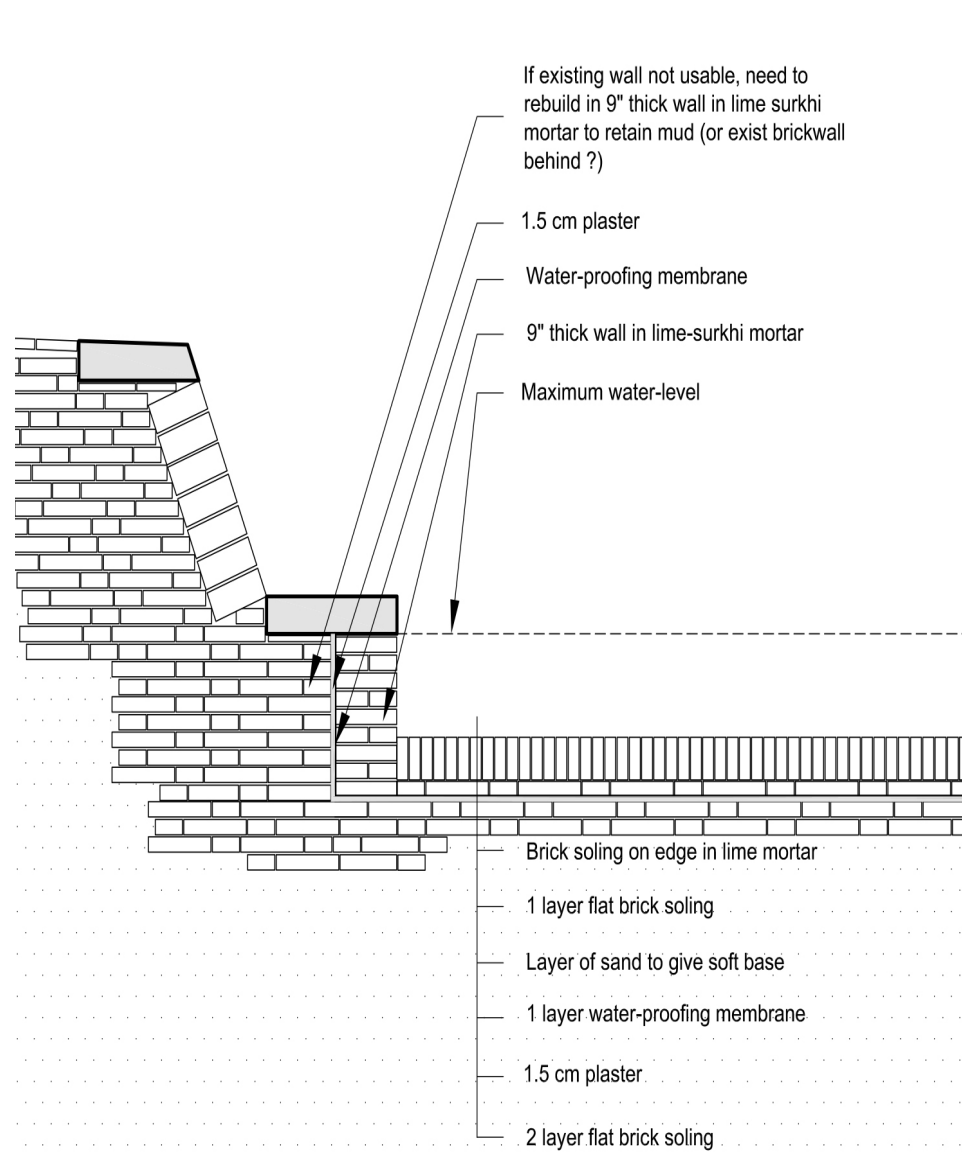
A similar restoration was undertaken in the Bhandarkhal Pond in Patan Palace, which had been dry for decades. Prior to restoration, heavy rainfall would accumulate in the tank but would be soaked by the ground within hours.

Historically, the Bhandarkhal Pond was sealed with black soil on the base and on the walls to protect seepage. This is typical for ponds which were fed by the source through channels. The black soil in Bhandarkhal was damaged in the last few decades. It is recommend to use this traditional technology in the Jalayasan Narayan pond as well, but it is also highly recommend to add an extra layer of waterproofing membrane as back up, in order to retain water in the future.

Flooring: Before the wall reconstruction, the floor of the pond needs to be repaired properly. The existing floor level will be retained. The existing on-edge brick soling should be removed carefully, so that those bricks can be reused in the same area. Another 12.5" should be excavated to allow for brick soling, black soil, and an additional layer of brick soling before final brick soling on edge. See drawing for details.



Proposed East West section thru plinth walls to middle platform.



Proposed typical section thru plinth walls and pond level. First option without thick mud layer, because this pond was not built with such way to prevent water leakage. It was built on place where water table was high. So it is recommendable to keep simple with layer of water proofing membrane to keep water even artificially. This will give good appearance of pond visually and religiously. Second option with thick mud layer.



Bhandarkhal Pond, Patan Palace.

Top left: There was no water retained in this pond before the restoration, since part of the traditional black clay waterproofing system had been unknowingly removed during repairs.

Top right: One layer of thick plastic sheet was introduced as back up to prevent water leakage after proper foundation and base was built to prevent settlement.

Bottom: Black mud was laid (8"-10") above the water proofing membrane.



*Top left: One layer of flat brick soling was placed above the mud.
 Bottom left: On-edge bricks on sand with lime surkhi pointing, were laid out in the historical pattern.
 Top: After completion.*

5.6. BRIDGE

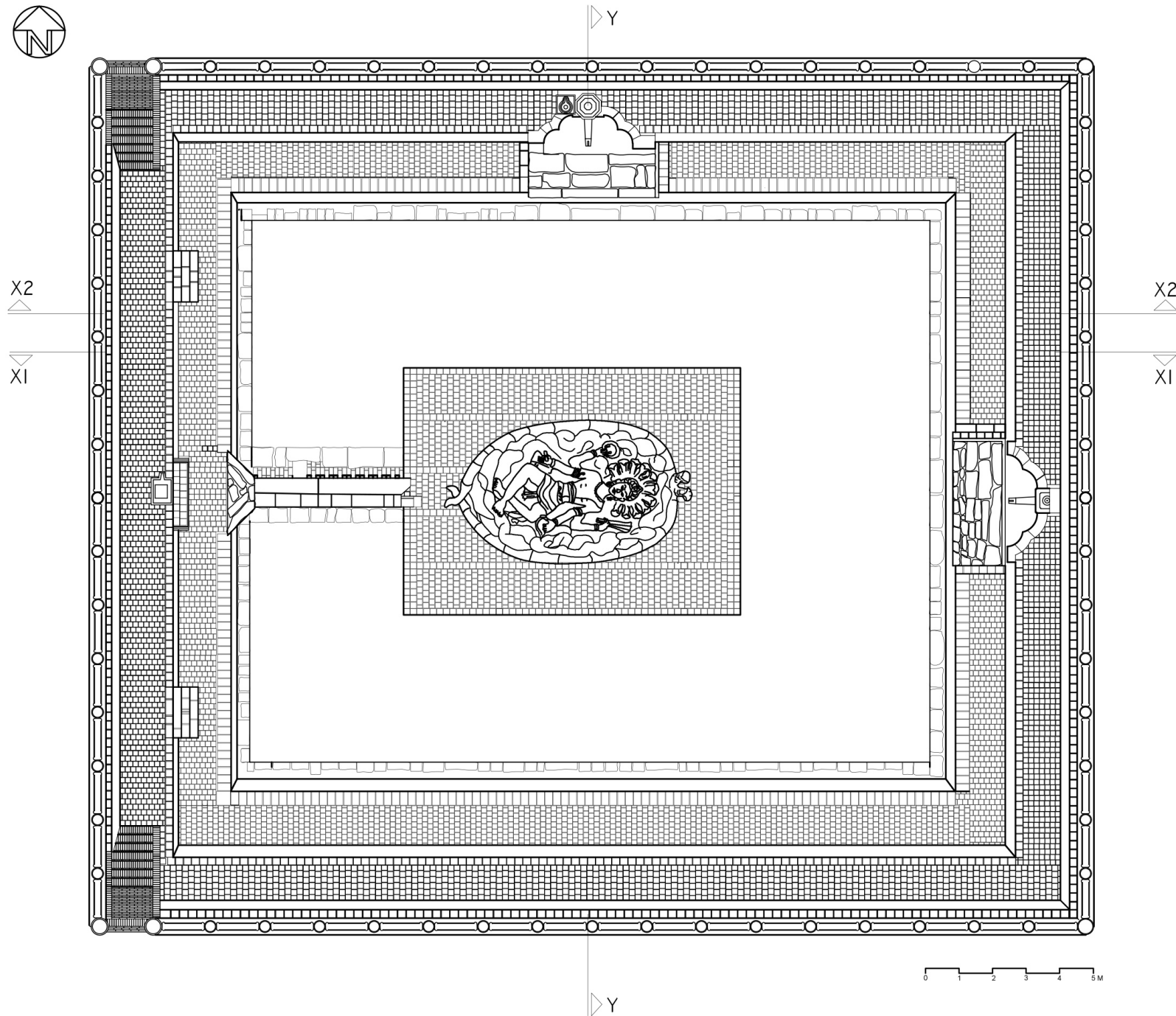
The bridge is about 10" higher than the platform and was built covering the lower part of the snakes on the main shrine. It does not seem that the bridge would have originally covered the snake surface. The bridge should just be built up to the stone edge without overlap. The main bridge level, made of stone, has minor settlement in the middle, which does not need to be leveled.

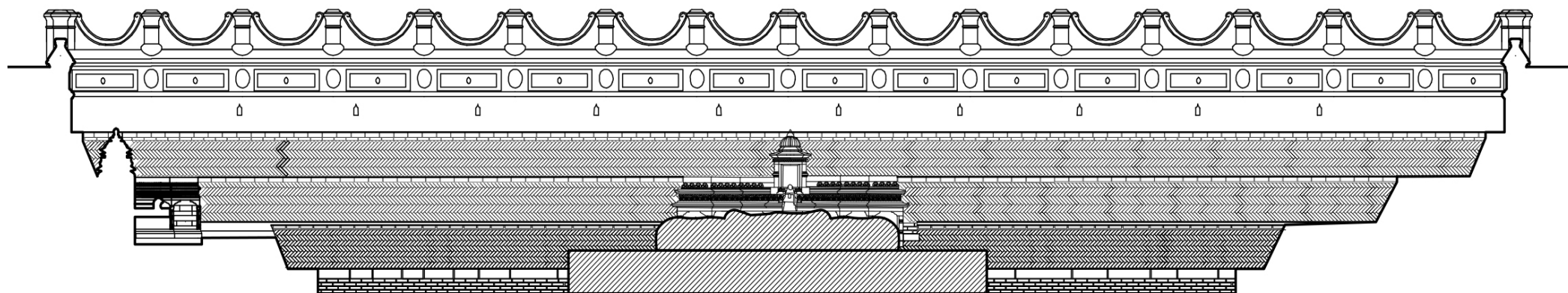
The height between the bridge and platform is not comfortable for the worshippers, so it is recommended to add one step in stone. The lower step of the bridge is leveled with the lower-most plinth, and will need to be rebuilt to install the waterproofing membrane.



6.o. Drawings

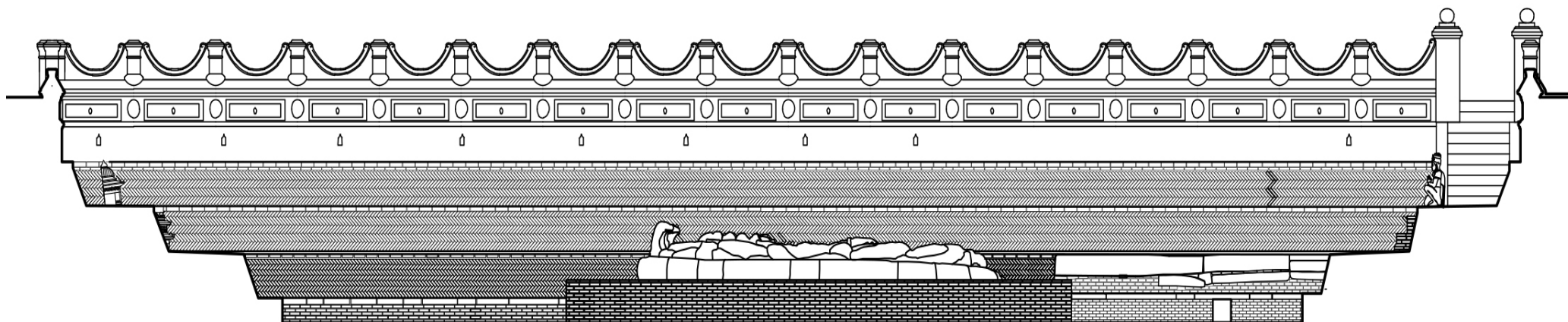
Existing Conditions





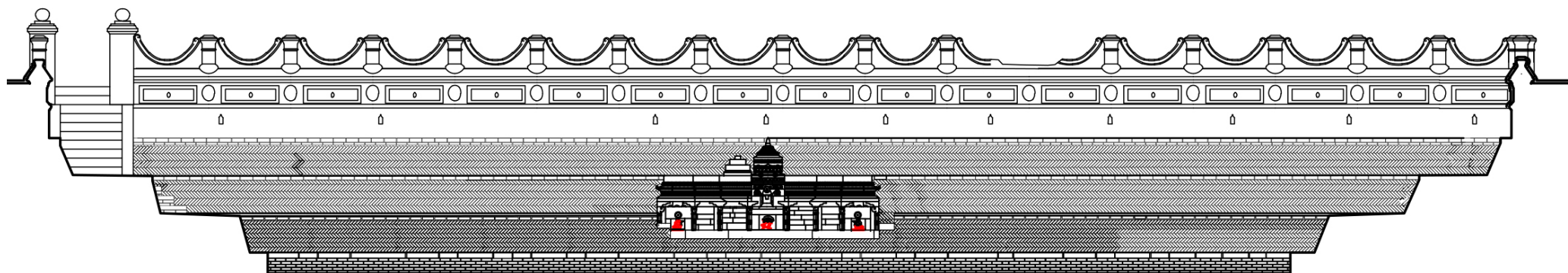
0 1 2 3 4 5 M

SECTION AT YY



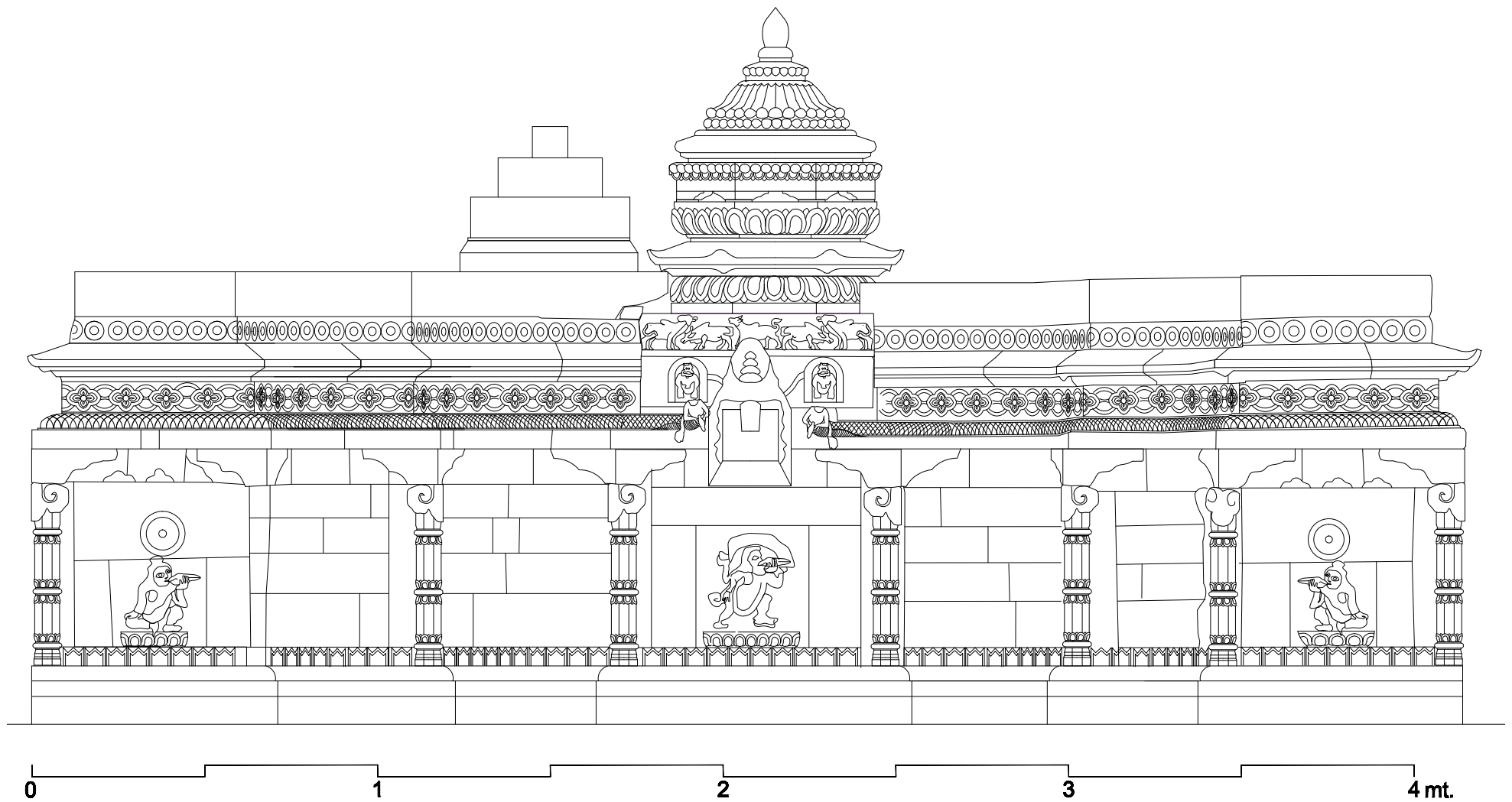
0 1 2 3 4 5 M

SECTION AT XIXI

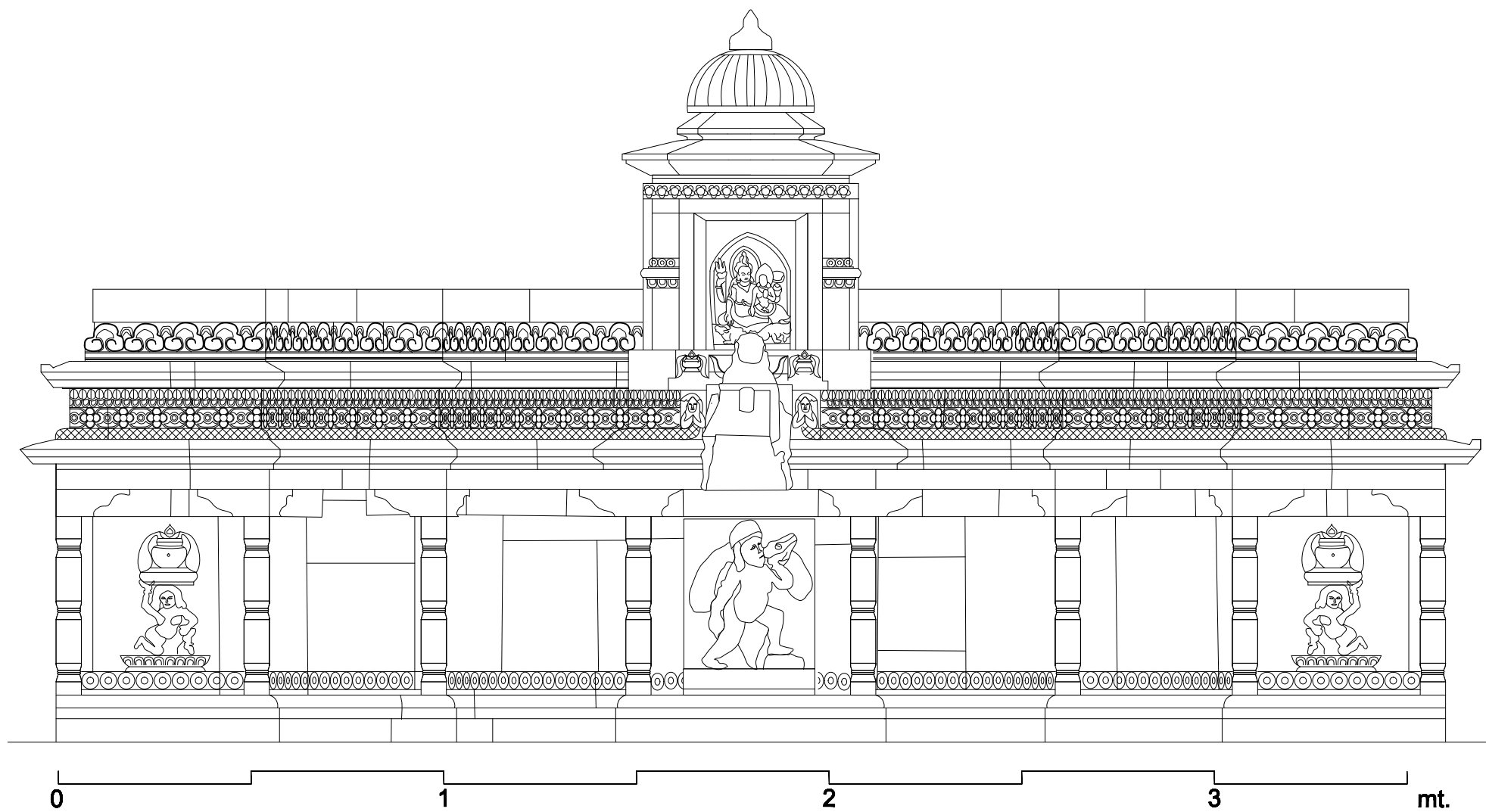


0 1 2 3 4 5 M

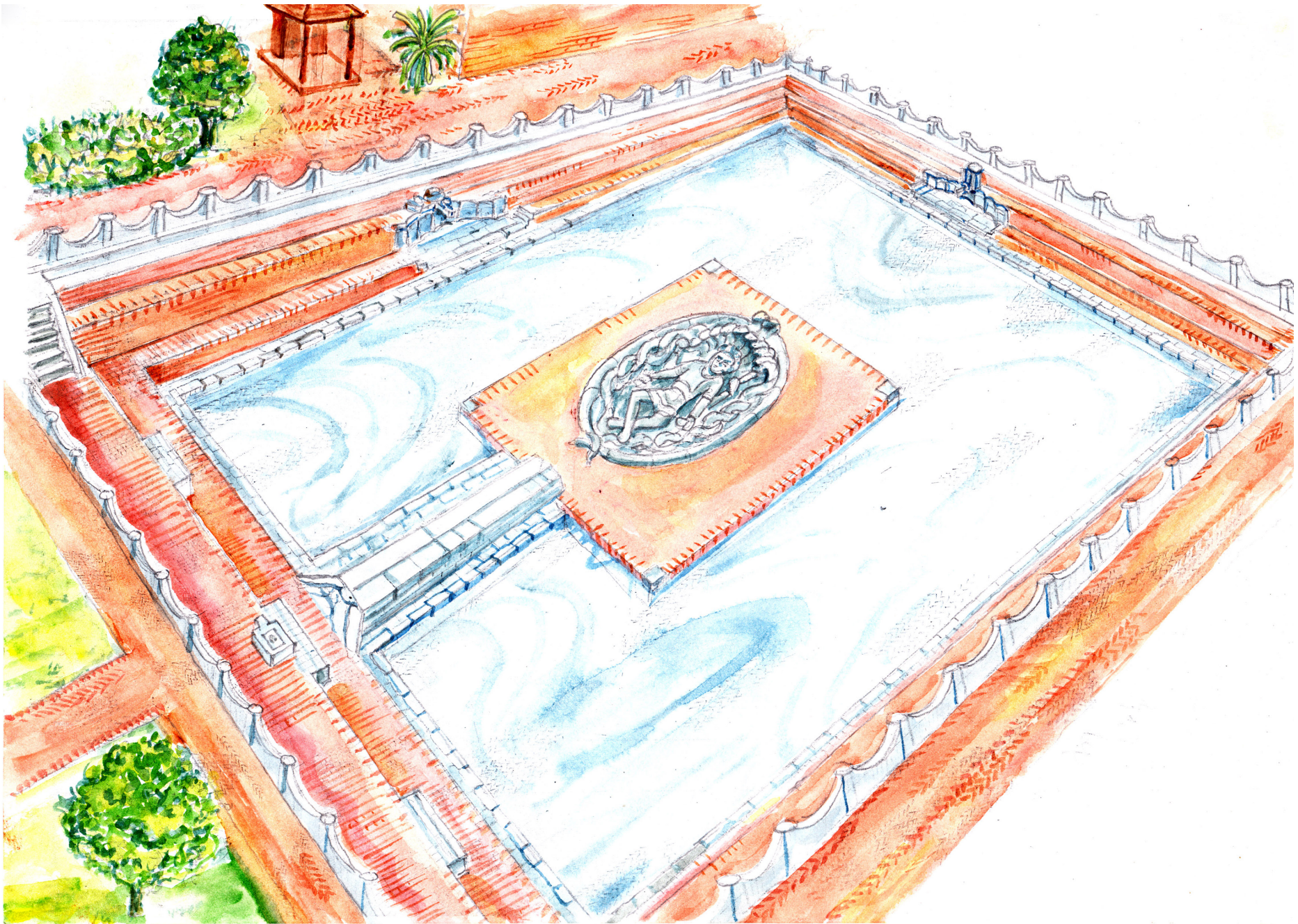
SECTION AT X2X2



East Hiti; existing condition.



East Hiti; existing condition.



7.0 Preliminary Cost Estimate

s.n.	description of works	length	breadth	height	nos	quantity	unit	rate	amount	remarks
Pond, Central Platform & Lower most plinth (1st level)										
1	excavation of base level of the pond	20.23	16.21	0.33	1	108.22				height to be maintained as exiting
	deduct central platform	10.03	7.37	0.33	(1)	(24.39)				
	excavation for plinth wall foundation	74.88	0.60	0.35	1	15.72				
	excavation for platform wall foundation	32.40	0.60	0.35	1	6.80				
						106.35	c.m.	355.35	37,791.89	
2	dismantling lower most plinth wall (store reusable materials) to built new wall with water proofing membrane	74.98	0.47	0.42	1	14.80			-	
	dismantling platform wall on peripheri to built new wall with water proofing membrane	33.80	0.47	0.50	1	7.94			-	
						22.74	c.m.	457.13	10,396.99	
3	disposal of unusable debris				60	60.00	trucks	1,500.00	90,000.00	
4	preparation of base on the pond (rammed earth)	21.11	17.18		1	362.67			-	
	deduct central platform	10.03	7.37		(1)	(73.92)			-	
						288.75	s.m.	118.45	34,202.28	
5	foundation (ma apa in lime surkhi) for lower most plinth wall	74.88	0.60	0.35	1	15.72				
	foundation for platform	32.40	0.60	0.35	1	6.80				
	inner wall of lower most plinth	75.88	0.25	0.62	1	11.76				
						22.53	c.m.	12,798.22	288,328.54	
6	one layer of regular brick soling on edge (or 2 layers of flat brick soling) in lime surkhi mortar					288.75	s.m.	1,135.50	327,875.63	
7	lime surkhi (slake lime stone, at least 4 weeks) plaster on the floor to give smooth surface for water proofing membrane	20.73	16.71		1	346.40			-	
	deduct central platform	9.53	6.87		(1)	(65.47)				
	lime surkhi plaster on the walls	74.88		0.62	1	46.43			-	
	lime surkhi plaster on the platform walls	32.80		0.97	1	31.82			-	
						359.17	s.m.	393.20	141,225.17	
8	one layer of heavy duty water proofing membrane (floor & walls)					359.17	s.m.	673.26	241,814.79	
9	thin layer of sand to give soft base for brick soling to protect water proofing membrane	20.73	16.71		1	346.40	s.m.	70.00	24,247.88	
10	brick masonry (ma apa in lime surkhi) on lime surkhi mortar on plinth wall	73.88	0.25	0.62	1	11.45			-	
	brick masonry on lime surkhi mortar on central platform	33.80	0.25	0.70	1	5.92			-	

					17.37	c.m.	12,798.22	222,259.01	
11	one layer flat brick soling on sand	20.23	16.21	1	327.93			-	
	deduct central platform	10.03	7.37	(1)	(73.92)			-	
					254.01	s.m.	571.07	145,055.89	
12	final finish brick on edge in lime surkhi mortar				254.01	s.m.	1,135.50	288,428.36	
13	lime surkhi pointing on the joints on base (floor)				254.01			-	
	lime surkhi pointing on the joints on plinth wall	72.88	0.42	1	30.61			-	
	lime surkhi pointing on the joints on platform wall	34.80	0.50	1	17.40			-	
					302.02	s.m.	131.94	39,848.47	
								-	
14	new edge stones on plinth wall in lime surkhi mortar	72.88		1	36.44			-	50% reusable (?)
	new edge stones on central platform	34.80		1	17.40			-	
					53.84	r.m.	3,852.06	207,394.91	
15	existing 50% reusable with necessary dressing (labor only)				53.84	r.m.	700.00	37,688.00	
16	tile pavement on lower most plinth floor remaining parts after edge stone in lime surkhi mortar	72.88	0.15	1	10.93	s.m.	1,510.95	16,517.71	
17	tile pavement and repair on the central platform	16.20	0.30	1	4.86	s.m.	1,510.95	7,343.22	
					-			-	
	plinth wall 2nd level				-			-	
18	minor repair on the inclined wall with brick on edge with fish tail pattern on all 4 sides			4	4.00	sides	15,000.00	60,000.00	
19	repair and replacement of damaged edge brick on header bond with sloped edge, match with inclined wall)	15.78		1	15.78	l.m.	1,926.00	30,392.28	about 80% of the edge brick are intact in this level
20	partially repair tile pavement (damaged areas during repair of the edgw bricks) after installation of edge bricks	86.42	0.45	1	38.89	s.m.	1,510.95	58,759.33	
21	repair steps besides garuda and in front of garuda (steps from 3rd to 2nd plinth)			3	3.00	nos	15,000.00	45,000.00	
								-	
	plinth wall 3rd level							-	
22	minor repair on the inclined wall with brick on edge with fish tail pattern on all 4 sides			4	4.00	l/s	17,500.00	70,000.00	
23	repair and compact sunken areas before edge brick installation (specially on west side, north from garuda)			1	1.00	l/s	12,000.00	12,000.00	

24	replacement of alledge bricks with sloped edge brick on header bond as on 2nd plinth wall	100.22			1	100.22	r.m.	1,926.00	193,023.72	all exisitng bricks were not original, replaced with regular edge brick without angle on edge
25	partially repair tile pavement after installation of edge bricks	97.52	0.45		1	43.88	s.m.	1,510.95	66,306.53	
26	repair steps besides on south wset and north west corners (steps from ground level to 3rd plinth)				2	2.00	pcs	20,000.00	40,000.00	
						-				
plinth wall 4th level (only inclined part below parapet wall)										
27	minor repair on the inclined wall with brick on edge with fish tail pattern on all 4 sides				4	4.00	l/s	17,500.00	70,000.00	
28	compact sunken areas before edge brick installation (need to slope outward to flow rain water down)				4	4.00	sides	15,000.00	60,000.00	
29	rebuilding top edge brick with (damaged bricks replaced with unused large bricks from 3rd plinth without slope edge)	106.50			1	106.50	l.m.	300.00	31,950.00	
									-	
Top parapet wall										
30	repair of parapet walls several areas (mainly cracks and falling plaster works)	1.00				1.00	l/s	25,000.00	25,000.00	
31	rebuilding missing section on north parapet, matching historic					1.00	l/s	35,000.00	35,000.00	
32	top decorative element of south step pillar	1.00				1.00	l/s	8,000.00	8,000.00	
33	flooring around the parapet wall					-			-	
34	white wash	109.30	1.00	1.44	2	314.78	s.m.	134.49	42,335.30	
						-			-	
East Hiti										
35	stone flooring repalcing unhistoric brick pavement	2.40			1	2.64	s.m.	2,189.09	5,779.20	
36	drainage to flow water to pond (concealed pipe)				1	1.00	l/s	2,500.00	2,500.00	
37	repair/ partially rebuild front stone paved wall area	3.70	1.47		1	5.44	s.m.	750.00	4,079.25	
38	rebuilding steps on both sides of the stone paved area, leaving space between stone wall and floor				2	2.00	l.m.	3,000.00	6,000.00	
39	replicating missing nagakanya on left side, matching other side				1	1.00	l/s	15,000.00	15,000.00	
40	rebuilding up to hiti level on proper angle (slightly slope to flow water)				1	1.00	l/s	7,000.00	7,000.00	
41	rebuilding of central small shrine behind/ above hiti with backing on back of shrine and pinnacle				1	1.00	l/s	8,500.00	8,500.00	
42	recirculating pump to run water in hitis, including plumbing system				1	1.00	no	7,500.00	7,500.00	
						-			-	

North Hiti									-	
43	repair step on right side of stone platform with large terracotta bricks				1	1.00	nos	7,000.00	7,000.00	
44	rebuilding steps on left side with space between stone platform and hiti wall and shift back same as on right side				1	1.00	nos	9,000.00	9,000.00	
45	side drain same as right side to flow water from hiti to pond				1	1.00	nos	2,500.00	2,500.00	
46	restoration of temple (octagonal) above with 8 new stone pillars				1	1.00	nos	35,000.00	35,000.00	
47	missing stone pillar on left corner (replicate from right corner)				1	1.00	no	12,500.00	12,500.00	
48	missing stone on top most level on right corner and repair				1	1.00	no	5,000.00	5,000.00	
49	recirculating pump to run water in hitis, including plumbing system				1	1.00	no	7,500.00	7,500.00	
						-			-	
Bridge									-	
50	dismantling bridge to introduce water proofing membrane upper and lower level (remove large stones carefully to reuse in same location)				1	1.00	l/s	7,500.00	7,500.00	
51	rebuilding after introduce water proofing membrane lower level in brick with lime surkhi mortar	4.52	2.25	0.50	1	5.09	c.m.	12,798.22	65,078.95	
52	edge stones on lower step of bridge after minor dressing (labor only)	4.52			2	9.04	r.m.	700.00	6,328.00	
53	rebuilding upper level with historic large stones and few new stones to avoid small part of brick work in between	6.14			1	6.14	r.m.	2,500.00	15,350.00	
54	stone pavement on lower step of bridge	4.52	0.40		1	1.81	s.m.	2,189.09	3,957.87	
						-			-	
Misc Works						-			-	
55	cleaning of main shrine "Jalasayan Narayan" with soap water to take out all dirts from oiling				1	1.00	no	15,000.00	15,000.00	
56	cleaning of Garuda with soap water to take out all dirts from oiling				1	1.00	no	6,000.00	6,000.00	
57	final cleaning all brick works				1	1.00	l/s	10,000.00	10,000.00	
58	misc				1	1.00	l/s	15,000.00	15,000.00	
59	site clearance during construction period				1	1.00	l/s	12,500.00	12,500.00	
Total Preliminary Cost									3,299,759.16	
Contingency 10%									329,975.92	
Grand Total									3,629,735.08	

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