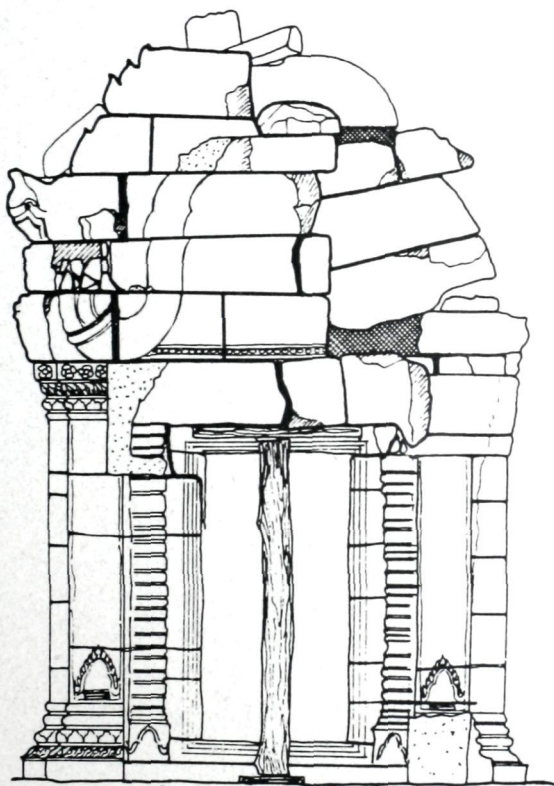


# PREAH KHAN CONSERVATION PROJECT

HISTORIC CITY OF ANGKOR

Siem Reap, Cambodia

REPORT VIII  
FIELD CAMPAIGN V



May 12, 1998

The World Monuments Fund, New York

# PREAH KHAN CONSERVATION PROJECT

## HISTORIC CITY OF ANGKOR

Siem Reap, Cambodia

Report VIII  
Field Campaign V

October 1996 - September 1997



*above:* Young musician at Preah Khan, photo courtesy of Lane Montgomery, 1998.

*cover graphic:* Large freestanding "Elephant" shrine at the Preah Khan Buddhist Complex, field drawing by Ms. Chhun Soma showing existing conditions at the eastern elevation.



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5. Work Plan for October 1996 - September 1997, J. Sanday

## PREFACE

This report documents the numerous accomplishments of Field Campaign V at the temple complex of Preah Khan from October 1996 to September 1997. This also marks the successful completion of the first year with our professional staff of former students at Preah Khan. A year that World Monuments Fund sees as a monumental step forward in completing our 10-year mission through the Preah Khan Conservation Project to train this new generation of conservation professionals.

Following the political disturbances 5-6 July 1997, Cambodia had a major setback in its development program. Many countries withdrew their financial aid, visitors to Cambodia fell to almost zero and Cambodia was once again isolated.

The political disturbances effected Angkor and Preah Khan. Many of the projects were ordered to close down by their governments, some foreigners were evacuated from Siem Reap and tourist arrivals hit zero. Yet the Preah Khan Conservation Project continued without a single day of stoppage. The only effect the project felt was that regular payments were disrupted because the banks were forced to close for several days.

The short term consequences were very little change in the day to day activities in Siem Reap. However, the long term and far reaching effect has been that as a result of cut backs, as a result of a fall in visitors from 120, 000 tourists to zero and the demise of the travel industry, most businesses were forced to close.

WMF's efforts during this period were to mitigate the potential detrimental effects on WMF's support of the on-site program at Preah Khan. We could not abandon the individuals we had trained and nurtured. This report details the ongoing conservation activities supported by WMF's generous donors, a 10-year program, all the more remarkable for its continuity in the field.

The months between July and September were tense and uncertain. However, at the beginning of October the International Coordinating Council held its technical committee meeting in Siem Reap, preceded by a tour of the sites in Angkor. This gathering restored confidence in the participants that Cambodia was beginning to stabilize again politically.

A few intrepid travelers started returning to Angkor in November, and the Japanese Government's Team (JSA) held a workshop at Angkor in mid November which marked the return to work of all those Angkor project teams that had been evacuated from Cambodia. Although the monuments remained unscathed by the political events and no physical harm came to the people of Siem Reap, their morale and economy was certainly affected. But the resilience that exists in most Khmers has enabled them to pull through yet another crisis and efforts of the international community are once again focused on Angkor and its future. It is hoped therefore that Preah Khan supporters will take courage and inspiration from the Khmers and see fit to continue their support for the Preah Khan Project.

*John Sanday  
Project Manager, Preah Khan Conservation Program  
November 1997*

## ACKNOWLEDGMENTS

The World Monuments Fund is grateful to an ever increasing number of individuals who have served and continue to serve as members of the Preah Khan Field Missions and to those who have contributed to this report.

The Preah Khan Conservation Consultant Team for Field Campaign V consisted of the following consultants:

John Sanday, Field Director, Preah Khan Conservation Project  
Predrag Gavrilovic, Structural Engineer  
Paolo Pagnin, Conservator/Restorer  
Ronnie Yimsut, Forester/Environmentalist  
William Chapman, Preservationist/Educator

WMF and the consultant team are pleased to have as members of our professional staff the team of students who have been training at Preah Khan and have now graduated from the Departments of Architecture and Archaeology from the University of Phnom Penh. This team consists of architects Mr. Lek Sareth, Mr. Var Morin, Ms. Cheam Phally, Ms. Chhun Soma, and Mr. Sam Kimheng. The team also included returning archaeologist Mr. Chan Chamroen, and Mr. Nay Sophea. WMF especially wishes to thank the Dean of the Department of Architecture for his help and insight. Contributions to this report have also been provided by WMF headquarters in New York, from Bonnie Burnham, President, John Stubbs, Vice President for Programs, and Felicia Mayro. Jon Calame produced this report.

Special thanks are expressed to our hosts: the Royal Cambodian Government, and in particular to His Majesty King Norodom Sihanouk; H.E. Vann Molyvann, Minister of State; H.E. Son Soubert; H.E. Nouth Narang, Minister of Culture and Fine Arts; and other members of the ministry including Under Secretary Mr. Michel Tranet, National Museum Director Mr. Pich Keo, and Cultural Adviser Mr. Ouk Chea.

WMF would like to express its gratitude to Governor Ton Chay of Siem Reap Province for his support of the Preah Khan Conservation Project; to Mr. Uong Von, Director of the Conservation d'Angkor in Siem Reap, for his constant support and advice. Gratitude is also extended to the staff of the Conservation d'Angkor.

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Special thanks go to WMF's local administration team and work force ably led by Project Assistant Kusom Sarun, with special mention of the house staff at No.4 Wat Bo in Siem Reap. The Preah Khan work force, consisting of 60 masons, metalworkers, foremen and laborers, excelled throughout Field Campaign V and worked hard as a harmonious group. WMF thanks the entire project development team based in Cambodia for their contribution to the success of the project.



WMF's efforts have also been aided by important contributions from individuals acting on their own initiative, both in Cambodia and throughout the world. The ongoing conservation project has attracted a large number of visitors to Preah Khan who have continually offered assistance in the form of advice, funds, food, and medical supplies for the local team. For these thoughtful and generous deeds the Preah Khan Conservation Project team conveys its thanks.

The Preah Khan Conservation Project Team is especially grateful for the continuing support and encouragement of the Board of Trustees of the World Monuments Fund.

#### Sponsors

The World Monuments Fund is grateful to the many donors whose generous support sustains its efforts at Angkor, in particular the campaign to safeguard Preah Khan, one of the world's priceless resources. On the following page we recognize some of the many individuals, visitors to the site, and organizations whose assistance with the ongoing site conservation work has been most gratefully received.

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## SECTION 1

# THE WORLD MONUMENTS FUND IN ANGKOR: 1990-2000

## 1.1 HISTORY OF THE WORLD MONUMENTS FUND PREAH KHAN CONSERVATION PROJECT

## 1.2 PREVIOUS ACCOMPLISHMENTS, CAMPAIGNS I-IV

## 1.1 HISTORY OF THE WORLD MONUMENTS FUND PREAH KHAN PROJECT

### *Sketch History & Description Of Preah Khan*

In its present state, Preah Khan is best described as a partial ruin set deep in the jungle of north central Cambodia. It is one of the few temple complexes at Angkor which is still totally surrounded by jungle. The coexistence of these historically significant man-made remains and its relatively untouched natural setting makes Preah Khan one of the outstanding sites at Angkor.

Preah Khan, covering approximately 56 hectares, is an extensive building complex within the Historic City of Angkor, located a short distance beyond the North Gate of the Angkor Thom precinct. It was built by the Khmer King Jayavarman VII as a monastery and teaching complex. Preah Khan is the most prominent of several temple complexes associated with the Northern Baray (often referred to as the Preah Khan Baray), which stretches approximately four kilometers eastward and links Preah Khan with the contemporaneous sites of Neak Pean and Ta Som. This group, one of Angkor's major urbanistic conceptions, once formed a major part of Angkor's vast hydrological system, which is now largely in disuse.

According to the Preah Khan stele, the site was dedicated in A.D. 1191. Over the next three centuries the temple complex was modified considerably. Four concentric enclosure walls subdivide the monastic complex. The outer wall is encircled by a wide moat, which today encloses a large tract of jungle. This area was formerly the living quarters of the monks and attendants of Preah Khan. The second enclosure wall delineates the principal religious compound, within which temples and shrines dedicated to the Hindu sects of Vishnu (West) and Shiva (North) are densely concentrated. The central shrine is Buddhist, the southern quadrants are dedicated to ancestor worship, and the eastern axis forms a grand approach to the principal Buddhist shrine in the center.

Like most of the monuments of Angkor, Preah Khan is in a state of ruin following a slow decline in royal patronage beginning in the middle of the 15th century. While evidence suggests that some of the temples and shrines remained in use (probably until the end of the 17th century), it was not until the end of the 19th century that Preah Khan, like many other temples at Angkor, was 'rediscovered' by the Ecole Française d'Extrême Orient (EFEO). EFEO's work is well documented and archived both in Cambodia at the National Museum in Phnom Penh and in Paris; records are available in the form of transcriptions and microfiche.



## *World Monuments Fund at Angkor*

The World Monuments Fund (WMF) sent its initial field mission to Cambodia in December 1989 to survey Angkor and evaluate the damage the site had suffered after 20 years of civil strife and isolation. The mission soon discovered that the temples were relatively unaffected by the upheavals that shook Cambodia. Angkor's caretakers, however, were not as fortunate. Among the educated Cambodians to die in the "killing fields" were those with specialized training in architectural conservation. By the time the Khmer Rouge were ousted from power in late 1978, only a handful of the former workers at Angkor had survived. While the country remained isolated for more than a decade after the overthrow of the Khmer Rouge, the site was virtually unattended and the French conservation facility was in shambles.

When WMF visited Angkor in 1989, the Cambodian government urged its team to organize a pilot project to address some of the challenges facing preservationists at Angkor; the site selected by WMF for this undertaking was Preah Khan, a 12th-century Buddhist monastic complex. WMF has since conducted regular field missions to the site, under the supervision of Project Field Director, John Sanday, a conservation architect with expertise in Asian structures who has been a consultant to WMF since the late 1970s.

By November 1992, WMF had mobilized a team of craftsmen and laborers to commence its program of on-site activities at Preah Khan. Mission I in 1989 represented the commencement of a projected 10-year commitment to assist the Royal Cambodian Government and UNESCO by contributing to the International Campaign to Safeguard Angkor. See previous reports Volume I — *Conservation Considerations for the Historic City of Angkor* (1992) and Volume II—*Preah Khan, Project Identification* (1993).

In preceding reports, WMF recommended a course of action at Preah Khan which was subsequently approved by Cambodian authorities and the ICC. The development of basic conservation principles and procedures guides the WMF team and its work force in a long-term program to repair, conserve and present Preah Khan as a partial ruin. Due to the magnitude of the task, major reconstruction is not to be undertaken at Preah Khan, which is presented to the public as an exposed archaeological and architectural ruin. In addition, judicious jungle clearance, debris removal and on-site interpretive aids have made Preah Khan more physically and visually accessible and its rich history more intelligible to visitors. WMF seeks to pass Preah Khan on to future generations in a state similar to that in which it was found, but with the added assurances that, by using modern conservation technology, the site will be rendered structurally sound and the natural environment will be sustained.

Since 1991, WMF has advocated and administered an on-site training program for Cambodian students of architecture and archaeology from the University of Fine Arts, Phnom Penh in recognition of the Preah Khan's value as a conservation training laboratory. During the 1995/96 Field Campaign IV, the graduate students trained under this program were integrated into WMF's professional team. Part of this training is being directed at the craftsmen who are also taught appropriate conservation skills as an extension of the local craft tradition.

## *Philosophy and Approach*

WMF's philosophy at Angkor is based on a dual challenge: to preserve a magnificent heritage site and to insure that its Cambodian custodians possess the expertise required for its care and management. Initial surveys of the site led WMF to construct a long-term program to repair and conserve the site as a partial ruin. Major reconstruction was not judged appropriate due to the lack of historical data, the magnitude of the task, and the questionable philosophical nature of such an approach

WMF also intends for its work at Angkor to help support the restoration of peace and prosperity in Cambodia. It strives not only to preserve Angkor, the country's most cherished symbol of identity and its touchstone to the past, but also to strengthen the sense of stability and security in the local population by providing jobs, new expertise, and contact with the outside world.

WMF is dedicated to a comprehensive conservation strategy at Angkor which embraces the following objectives:

- Establish conservation methodologies which are appropriate for use at Khmer monuments and analyze building materials to determine how to resolve problems related to their use and conservation.
- Stabilize and partially consolidate structures at locations within the Preah Khan complex.
- Recommend ways to protect and properly present the historic monuments at Preah Khan and its environs.
- Emphasize formal on-site conservation training for Cambodian architecture and archaeology students and for local craftsmen.
- Seek to ensure the protection of Angkor's movable cultural property by deterring theft and vandalism, using video imaging and site-specific computerized inventories to document the architectural sculpture at Preah Khan.
- Conduct above-ground archaeological research at Angkor to learn more about the ancient Khmer empire and Angkor's prehistory.



## 1.2 PREVIOUS ACCOMPLISHMENTS

### Field Campaign I (1992-1993)

The first extended Field Campaign at Preah Khan, from October 1992 to April 1993, initiated the project's conservation plan. This campaign consisted of three principal field missions of WMF consultants as well as continuous on site work by laborers.

In March 1993, WMF brought five consultants to the site to conduct a documentation and materials testing program. This led to the development of policies for structural repair, consolidation and planning to be further advanced the following year. *For more detailed information, please see Preah Khan Conservation Project Report IV: Field Campaign I — Project Mobilization, including three separate appendices.*

### Field Campaign II (1993-1994)

Field Campaign II, which ran from November 1993 to May 1994, consisted of three separate missions, which began with site clearance and preparation for the technical team's arrival in January.

During the first mission in January 1994, a nine-member team initiated the following projects: cleaning, repair and maintenance of stonework; structural testing, repairs and consolidation at the South Portico of East Gopura III, the Hall of Dancers, and the Lanterns (Bornes) along the West Processional Way; survey of the natural environment; and graphic and photographic documentation for architectural, archeological, engineering and interpretation purposes.

During the second mission, in March 1994, the team completed work begun earlier in the campaign and initiated new activities, including structural repairs and archeological soundings. Also, work began on the production of an annual report of WMF's accomplishments at Angkor.

The third mission was conducted in April 1994. Preah Khan Project Field Director John Sanday and WMF team members participated in the filming of the U.S.-based Discovery Channel's *The Struggle for Angkor*, which demonstrates present-day efforts to conserve the monuments of Angkor; the documentary aired in October 1994.

Based on its experience at Preah Khan and by arrangement with the Royal Cambodian Government, WMF began general maintenance work at nearby Prasat Neak Pean, located in the center of the Preah Khan baray, and proposed possible conservation and protection interventions at other sites within the Historic City of Angkor. This same year, a group of Preah Khan students prepared their final architectural diploma projects on the Neak Pean complex.



### **Field Campaign III (1994-1995)**

Preah Khan Field Campaign III commenced after the rainy season in October 1994. Efforts during this period concentrated more than in previous years on interventions for structural consolidation, in particular to prevent several imminent collapses and to make the site safer for visitors.

Project Manager John Sanday visited Siem Reap with specialist Sharosh Pradhan to commence preliminary analyses of possible applications for computer-aided design (Autocad) at Preah Khan. Sanday returned to the site in December to introduce volunteer Andrew Dennis to the project and prepare for the arrival of a group of 24 visiting sponsors from the World Monuments Fund in New York and the first mission in January 1995.

The first mission, January 2-22, overlapped with a WMF sponsors' visit. After preparing work plans with each of the consultants, Sanday joined WMF Vice President for Programs John Stubbs, WMF Chairman Marilyn Perry, and WMF Board of Trustees Secretary Robert Geniesse at a conference entitled *The Future of Asia's Past* sponsored by The Asia Society in Chiang Mai, Thailand.

As part of its ongoing participation in to the campaign to safeguard Angkor, WMF, in conjunction with the Royal Angkor Foundation (RAF), introduced radar images of the entire Historic City of Angkor as provided by the National Aeronautics and Space Administration's Jet Propulsion Laboratory. Taken by the space shuttle Endeavour during its April and October 1994 flights, these images are valuable new resources for the documentation and analysis of Angkor. With the support of the J.M. Kaplan Fund, Inc., WMF and RAF organized a scientific roundtable in February 1995 in Princeton, New Jersey to discuss space-borne radar imaging and its applications at Angkor. A report on the conference entitled *Radar Imaging Survey of the Angkor Eco-Site* was printed in March 1995.

During the second field mission, the team of consultants and the Preah Khan work force concentrated on the systematic consolidation of structures along the principle axial route originating at the East Gopura IV and the central gateway in particular. Since the de-mining and clearance of the original east access road along the boundary between Preah Khan and the North (Preah Khan) Baray, it is now possible to enter the site from the East or principal entrance. Priority was given to the consolidation and partial reconstruction of the North West Portico at East Gopura IV, which was at the point of collapse. In the Hall of Dancers, located on the main east/west axial route within the temple complex proper, the consultant team identified the south east sector of the hall as being in need of urgent consolidation — a choice which was justified as the extant quarter vaults were also threatening collapse.

### **Field Campaign IV (1995-1996)**

Previous campaigns surveyed and prioritized many physical conservation projects at Preah Khan; during campaign IV many of those projects matured or reached completion. Continuing interventions occurred at East Gopura IV (central gate entrance and tower, south tower, northeast tower and portico), the Hall of Dancers (southeast sector wall, southern causeway, northeast sector), Enclosure Wall IV (northeast sector, southeast sector), with the Garuda engaged statuary (NE31, NE35 "Brewer", NE36), the Central Buddhist Complex (southwest

courtyard, central tower, northeast shrine), West Gopura III ('Dvarapala' statue South), and the Northeast 'Dharmasala' Pavilion.

Research and training activities also expanded in the last year in anticipation of the eventual inheritance of the project by an entirely Cambodian professional staff. Training was facilitated by the presence of two foreign experts: Paolo Pagnin, an Italian stone conservator, instructed Cambodian staff in appropriate techniques for stone consolidation, put to use immediately on the broken southern Dvarapala statue at the west Gopura III; Dr. Predrag Gavrilovic of the Institute of Earthquake and Engineering Seismology in Macedonia offered his expertise on emergency structural repairs and reinforcement for load bearing stone masonry. Following training sessions with these visiting experts, the full time staff was able to replicate the new techniques successfully and improved results were clearly evident.

Three on-site interns—the second group of architectural students from Phnom Penh University to be trained in conservation at Preah Khan—graduated successfully on January 27, 1996; their thesis work involved numerous projects relating to the short and long term conservation of Neak Pean Temple and that site's important hydrological features. Phally, Soma, and Heng joined the Preah Khan Conservation Project as paid full time assistant architects in March. Architect Var Morin, who graduated in December 1995, also joined the regular staff in January.

The efforts of visiting experts Pagnin and Gavrilovic brought to light numerous techniques for gluing, pinning, and doweling broken stone elements which had never been used by the Preah Khan team before; these advances were made through the selection of experimental projects designed to test the ease and efficacy of their application under field conditions. The resulting documentation and capacity enhancement have formed a lasting contribution to the site.

Assistant architect Caroline Schweyer from France spent five months at Preah Khan, and during that time completed the modification of commercial Access II software for storage of the Preah Khan archive of architectural drawings and photographs which has been underway since 1992; her efforts have generated a systematic storage and retrieval system which will greatly facilitate research and enhance efficiency of the overall documentation program. This digital database will allow drawings to be tracked according to number, date, location, size, and type. All drawings have been reproduced at A3 size for consistency and ease of handling. Ms. Schweyer also developed a photographic database for the Preah Khan prints archive.

## SECTION 2

### CAMPAIGN V: 1996 - 1997

#### 2.1 Summary of Campaign V Accomplishments

#### 2.2 Physical Conservation Projects

##### Preah Khan Locator Maps

- ① Buddhist Complex - SW Courtyard
- ② Hall of Dancers
- ③ North Gopura IV
- ④ West Gopura III
- ⑤ Garuda Program
- ⑥ Enclosure Wall IV
- ⑦ Archaeological Investigations at the Eastern Jetty

#### 2.3 Research, Survey, & Training

1. Removal of Hazardous Trees
2. Stone Conservation Training
3. On-Site Training Activities
4. Assistance to Faculty of Architecture



## 2.1 FIELD CAMPAIGN V: SUMMARY OF ACCOMPLISHMENTS

### Overview

In Field Campaign V a great variety of work was accomplished, several more innovative conservation techniques were perfected and the WMF work force became more adept in many different types of conservation and repair interventions.

The project benefited greatly from the presence of four of its consultants who were able to check the progress of work on-site. Their reports were favorable and encouraging. With their guidance and direction the project was able to undertake a series of interesting new interventions with particular reference to stone repairs, environmental developments and the establish of an excellent visitor center, a facility that is greatly lacking in Angkor.

WMF's approach to conserving and presenting Preah Khan as a partial ruin are being recognized by the Royal Cambodian Government as well as the other international teams working at Angkor as being not only appropriate for the site but also an excellent model for other sites in Angkor where major structural interventions are either necessary or appropriate.

A general maintenance program was continued for another successful season at Preah Khan and the following activities were routinely undertaken:

- Regular checking of the structures throughout the temple complex against structural movement or collapse and providing temporary support as necessary.
- Checking and replacing as necessary the temporary emergency supports placed to prevent structural failure.
- Careful control of vegetation around the site. No further new disengagement was planned during the year but the clearance of the exposed continued.
- Treatment of wall tops and structures against vegetation using a systemic herbicide was undertaken (*Updown*, available in Thailand)
- A program of planning and implementing stormwater drainage systems to prevent unnecessary standing water within the temple complex.
- Resetting of stone paving along the causeways to prevent channeling of rainwater and removal of all tree roots and vegetation growing between the paving .

*All procedures have been described in previous WMF field reports.*



## Physical Conservation

The following conservation interventions were undertaken as part of WMF's Field Campaign V Program between October 1966 and July 1997:

section / site	intervention zone	actions
① Central Buddhist Complex	southwest courtyard	<i>Tree clearance and damage assessment; repair and consolidation of roofs and vaults; dislodged stone replaced; damaged decorative stones sorted, identified and refixed.</i>
② Hall of Dancers	Northwest sector; East Doorway; South promenade; South doorway	<i>Consolidation of NW sector structure and fabric; repair and consolidation of the main East doorway leading into the Hall of Dancers; promenade clear of vegetation and earth and dislodged stones replaced and consolidated at western end; South doorway consolidated and part of the east enclosure wall reconstructed on a new concrete base</i>
③ North Gopura IV	Central gateway North	<i>consolidation of the defective north west bearing wall and the remaining corbelled vaults; damaged stones pinned and glued and the corbelled vaults properly aligned and consolidated</i>
④ West Gopura III	West portico	<i>roof vaults dismantled to beam level; concrete fill removed and a detailed assessment was made of the stone beams supporting the corbelled roof; defective vault stones removed and stored on the scaffolding; lintels have been lifted and placed on the scaffolding</i>
⑤ Garuda statuary	NE35	<i>survey, drawing, dismantling, repair, consolidation</i>
⑥ Enclosure Wall IV	Northeast sector	<i>The blocks have wherever possible been placed in their original positions; inner faces placed as new dressed outer faces; gaps between the blocks filled with a concrete laterite reinforced with steel bars.</i>
⑦ Eastern Jetty	Units 1 and 2	<i>Archaeological excavations completed and the excavation pits have been back-filled in readiness for the monsoon</i>

*Specific conservation actions will be detailed in subsequent sections of this report.*

## Staff Training

The Senior professional staff member, Lek Sareth, completed his training at the Frank Lloyd Wright School in the USA. Sareth spent six months at the Taliesin West Studio in Arizona and six months at Taliesin Spring Green in Illinois. By all accounts from the staff and architects at Taliesin Sareth was a keen and hardworking student and benefited greatly from the experience of working in such surroundings. As part of his design course Sareth presented for his "Box" study the designs for a Visitor Center at Angkor. Skills that Sareth returned with include full mastery of Computer Aided Design skills, knowledge of construction and project management.

The second staff member to benefit from training abroad was Var Morin. Morin was sent to Venice on an ICCROM Scholarship for their stone conservation course. Morin became one of the principal coordinators of the student group and many of the students were guided by Morin through the course. He proves himself a good leader and an achiever. He was able to study in greater detail the theory of stone conservation and repair based on his diverse practical experiences working with WMF's consultants at Preah Khan.

As usual Preah Khan's program of on site training continued with the presence of the WMF consultants. This process has become extremely successful and beneficial. Many of the other teams are turning to Preah Khan for advice and demonstration. The Preah Khan workforce were split up into different groups depending on their different competencies and have over the year become specialists in specific interventions. The skills have been developed in collaboration with the WMF consultants who develop specific intervention processes. Each return visit of the consultants provided a new opportunity to expand the skills and knowledge of the work force as new problems and procedures are gradually introduced.

This year, following years of informal training of professional staff on site, WMF endeavors to provide greater opportunities through its present program in Angkor and also through its contacts internationally to develop a series of programs for more formal training in Cambodia. To this end, WMF sent William Chapman of University of Hawa'i at Manoa to assess and recommend possible directions that WMF's training efforts in Cambodia might take. This is described in greater detail in later in this report. The idea of expanding WMF's educational initiative has resulted in the development of a proposal to establish an International Center for Khmer Studies in Siem Reap.

## New Directions in Research

### *Archaeological Research*

The research activities in Preah Khan included archaeological research undertaken at the Preah Khan East Jetty at the edge of the Jayatataka Baray. The excavation Program was supervised by Archaeologist, Chan Chamroen, who was a student at Hawaii University. Chamroen returned to work at Preah Khan Project as its principal archaeologist.

Further studies have been carried out on the cleaning of the internal stone walls of the East Gopura 1 (shrine) where the stone work has been etched with images of the Bhudda and floral decoration. This is the only section of stonework that WMF consultants consider necessary to clean. The concern is that the presence of heavy biological growth during the wet months, tends to dry and shrink as a skin causing the surface of the stone to also suffer damage. The process of cleaning would remove this condition. However, abrasion during cleaning and problems of preventing regrowth are still not properly resolved. WMF were fortunate in being able to consult Dr. Thomas Warscheid a microbiologist who took samples and will be advising us on his recommendations for biological control measures.

### *Planning for the International Center for Khmer Studies*

Over the course of eight years of field conservation work at Angkor, it has become apparent to WMF that training and research programs in heritage conservation at the Historic City of Angkor and elsewhere in Cambodia need further development. WMF is dedicated to addressing these needs as a contribution to Cambodia's political and economic recovery. A planning and fundraising effort is currently underway to establish a permanent international study facility in Siem Reap dedicated to training with an emphasis on architectural conservation and advanced scholarly research.

The purpose of this undertaking is to expand the opportunities for education and training available to Cambodians and to foster exchange between Cambodians and their foreign counterparts. The tentatively named *International Center for Khmer Studies* in Cambodia will have two main components:

1. A certificate program in cultural resource management designed for Cambodian students, jointly developed by WMF, its Cambodian partners, and other American and international institutions with expertise in the field of cultural resource management; and
2. A residence, resource center, and study facility to support the program in cultural resource management as well as an international academic fellowship program.

The facility envisioned will also provide a place for professionals and scholars in the fields of art and architecture, conservation, and the humanities to live, work and exchange ideas with colleagues from Cambodia and abroad. The Center will invite senior level professionals whose work focuses on Khmer and Southeast Asia studies and on architectural conservation to become fellows in residence at Siem Reap, both to pursue their independent projects and share their knowledge. Some will teach courses in the certificate program in cultural resource management dedicated to training Cambodian students in the care of their national heritage.



An expanded curriculum in cultural resource management to be offered at *The International Center for Khmer Studies* will permit a greater number of Cambodian university students to learn to manage, conserve, and maintain the country's significant cultural resources—ranging from ancient Khmer ruins to the vernacular architecture of the Colonial period—according to the highest professional standards.

The creation of *The International Center for Khmer Studies* at Angkor will help support the restoration of peace and prosperity in Cambodia by training young people to assume leadership positions within the society. It will also strengthen the sense of stability and security in the local population by providing jobs, new expertise, and increased exchange with non-Cambodian professionals.

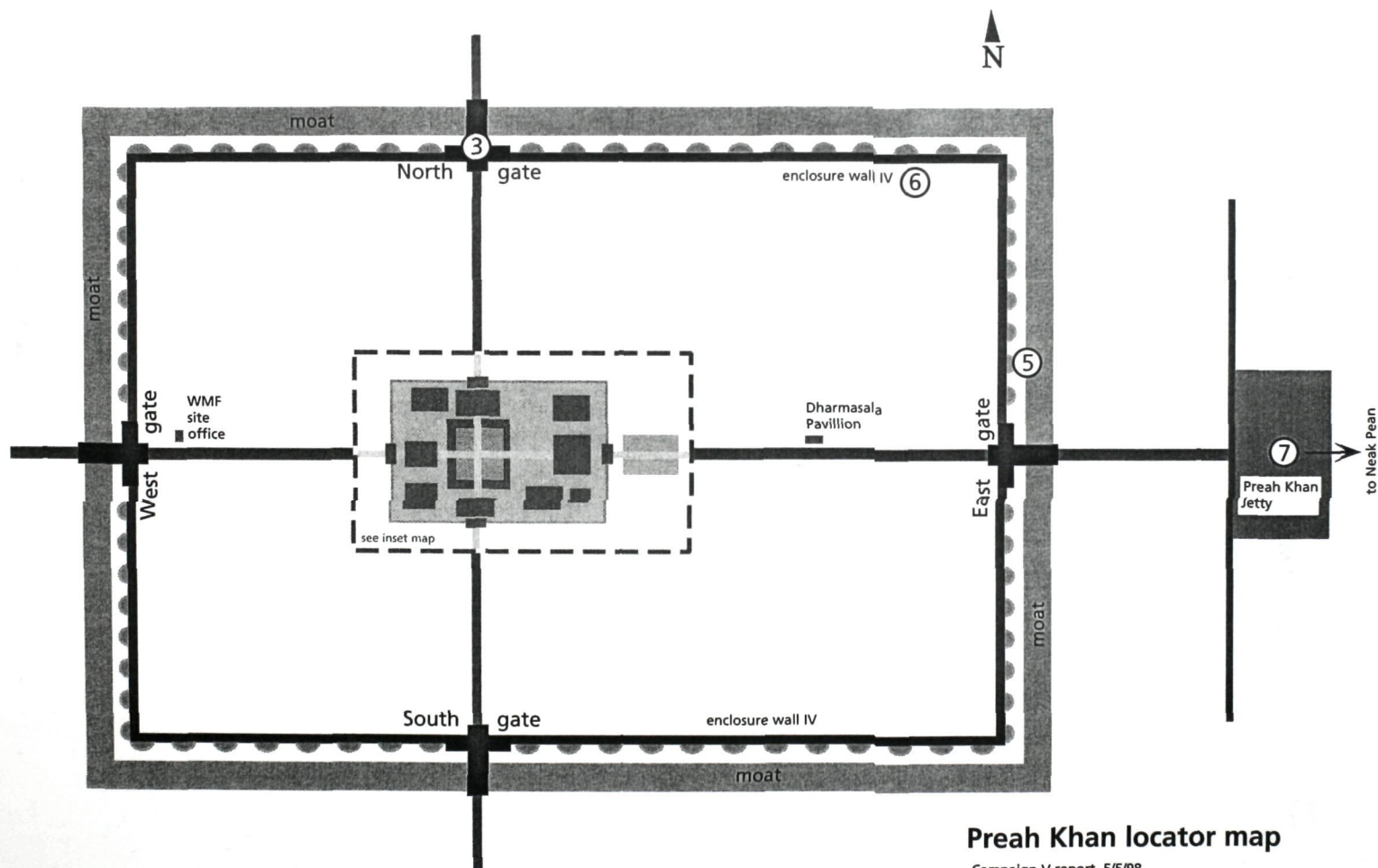


## 2.2 CAMPAIGN V--PHYSICAL CONSERVATION

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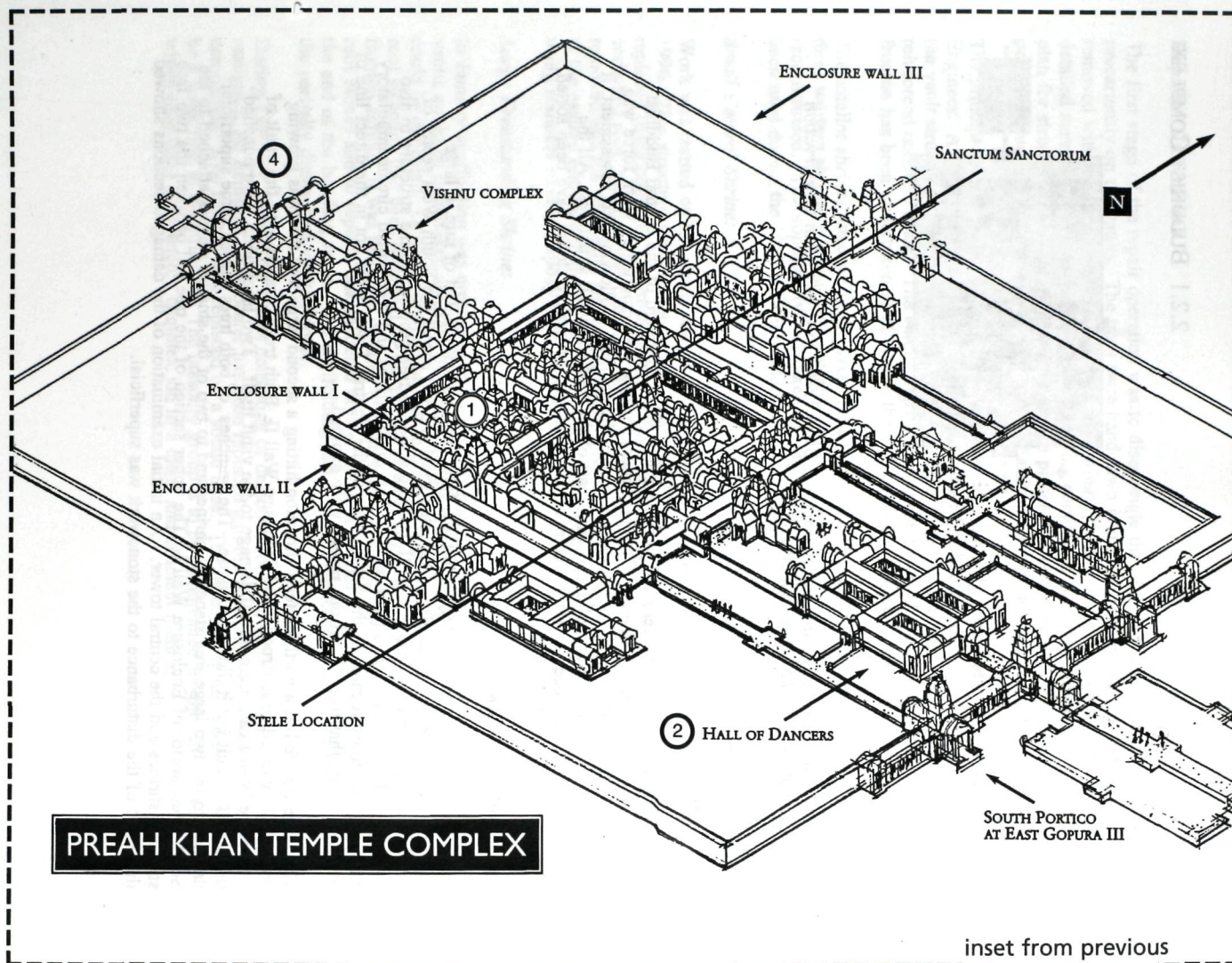
LOCATOR MAPS

CONSERVATION PROJECT SUMMARIES

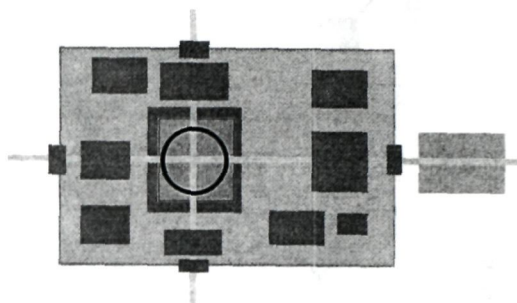


**Preah Khan locator map**

Campaign V report, 5/5/98



## 2.2.1 BUDDHIST COMPLEX



*For previous actions and additional information, please refer to Preah Khan Conservation Project Report VII, Field Campaign IV section 2.2.5.*

### Southwest Courtyard

#### **Summary**

On 8th June 1996 two large trees fell into the South West courtyard of the central Buddhist complex causing damage to several of the individual shrines. An emergency work force was immediately assigned to clear the trees and to assess the damage. Following this assessment, it was decided to repair and consolidate a large part of the roof and vault structures. All the dislodged stones have been carefully replaced, and damaged decorative stones have been sorted, identified and refixed.

#### **As Found Condition**

On the 8th June at approximately 19:00 hrs, following a small amount of rain, a large "Fromagere" (*tetrameles nudiflora*) uprooted itself and fell across the South West sector of Enclosure Wall I and Enclosure Wall II, causing a second tree growing on the structure to also collapse and cause damage to the structure. The small shrines and the vaulted circumambulatory passages which are located to the South West of the Central Tower were not in the direct line of the collapse so that truly disastrous results were avoided.

The large tree fell in a north-easterly direction hitting a second large tree that was growing around the vaulted roof structure of Enclosure Wall II. Both trees crashed onto the vault of Enclosure Wall I causing minimal damage to the vault itself. Two large holes were punched through the vault but it did not collapse. The branches of both trees caused some superficial damage to the two large free standing shrines and to two of the smaller shrines attached to the South West sector of Enclosure Wall I. The upper section of the tree fell between the two free standing shrines and the central tower. An initial examination of the damaged sections showed that most of the disturbance to the stonework was superficial.



## Repairs Undertaken

The first stage of the repair operation was to disentangle the 7'-0" diameter trunks balanced precariously on the vaults. The trees were hand sawn into small sections so that they could be removed without damaging the structures. Following a careful assessment of structural integrity, detailed surveys were undertaken to record existing conditions, identify dislodged stones, and to plan for structural interventions. All the broken pieces of stone were collected and, where possible, were pieced together and glued immediately to prevent loss of small fragments.

The principal shrine suffered the most damage and was carefully inspected by the Consultant Engineer. A section of stone acting as a beam, fractured in two pieces, was identified as part of the vault structure in the shrine. As it was not visible from any vantage, it was replaced with a reinforced concrete beam. The careful repair and consolidation of the sculpted West facing fronton has been undertaken to minimize the loss of loose decorative fragments.

The smaller shrines attached to the West gallery were also repaired. The central structure of the three western shrines was the most severely damaged; about 40% of it was dismantled and reconstructed. The opportunity was taken to remove much of the concrete and mortar that had been used during the 1950's EFEO restoration campaigns.

### *Small Central Shrine:*

Work was started on the repair and structural consolidation of the central small shrine in October 1996. This structure was previously repaired by EFEO in the 1950's and sections of stone were replaced using concrete. Thirteen blocks of stone were dislodged and have been reset. The corbelled roof vaulting was carefully dismantled, all concrete replacement structures have been removed and the sub-plinth stones have been raised to remove the present inclination of 30 cm. at the eastern entrance to the shrine. The lintels have been consolidated by drilling and refixing using stainless steel and epoxy resin glue.

### *Large Freestanding Shrine:*

In January scaffolding was erected on the large freestanding shrine so that repairs to the roof vaults could be undertaken and the "elephant" fronton which had been knocked down by the tree could be relocated. Once the scaffolding was in place, it was found that the whole corbelled dome roof structure had been disturbed by the falling tree and that it was not possible to reassemble the fronton safely. It was therefore decided to undertake the careful realignment of the displaced roof stones and to replace one shattered bondar fusing a precast reinforced concrete implant to the end of the bonding stone. The scaffolding had to be strengthened to carry the extra load of the partially dismantled vaulted dome.

During February, forty three stones consisting of defective roof vaults have been dismantled and realigned, the damaged stone bearer has been replaced and the structure reconstructed to completion. The fronton was replaced on a sound base. The defective stone bearer was found to be a weak link in the structure. The masonry group is to be commended for the skilled way in which they have completed a complex job in a clean and efficient manner.



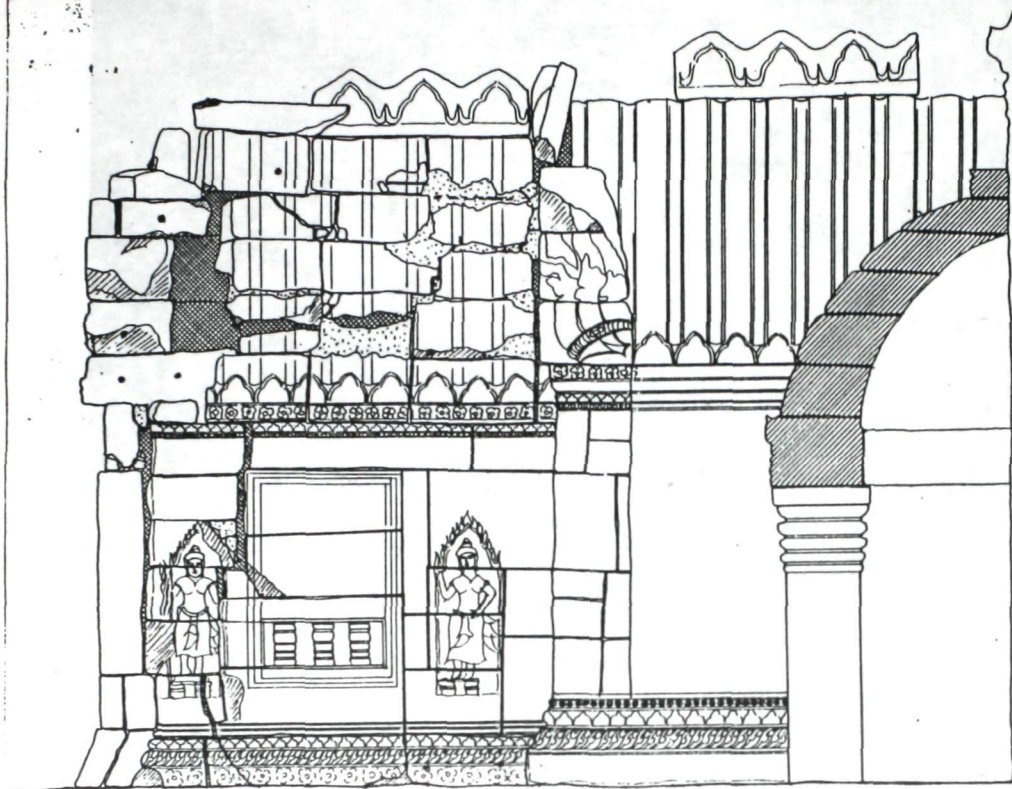
replacement stone carved to match but  
distinct in color, marked "WMF 1997"



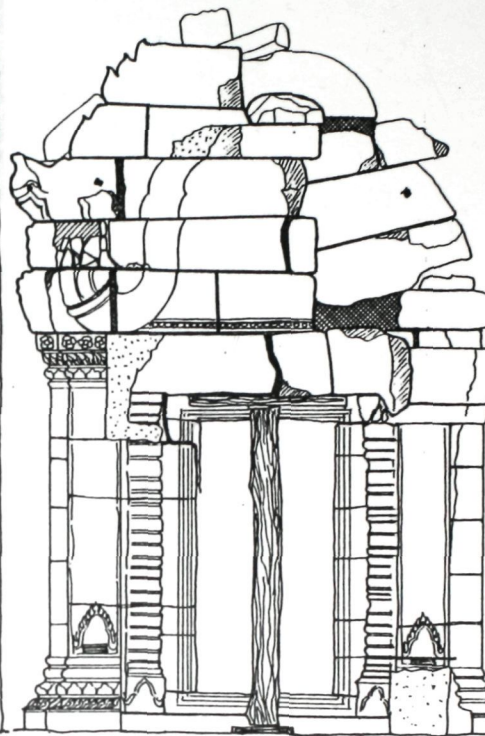
### Buddhist Complex

carved stone repair at small shrine

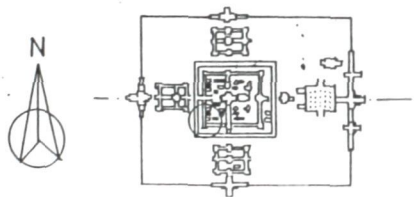




NORTH ELEVATION



EAST ELEVATION



SCALE : 1/20

SHRINE SURVEY AS FOUND CONDITIONS

BY: MS. CHHUN SOMA

OCTOBER 1996

PREAN KHAN CONSERVATION PROJECT





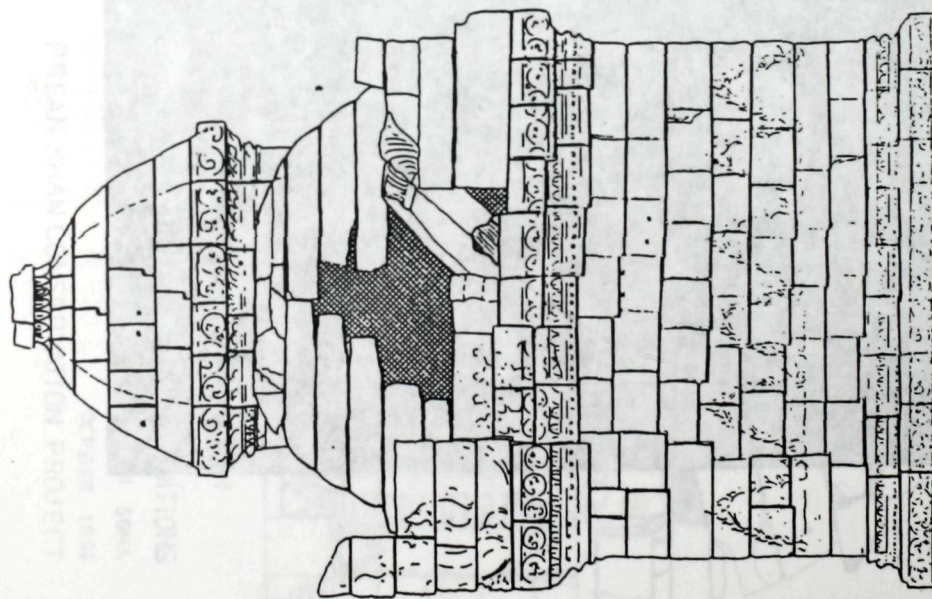
### Buddhist Complex

*left:* repaired elephant fronton,  
damaged by tree fall,  
general view

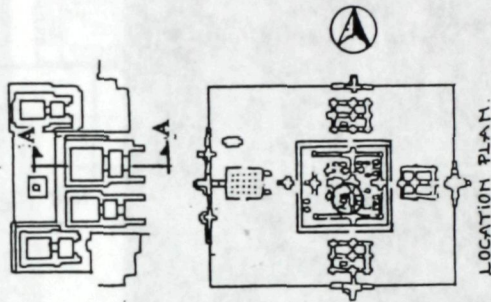
*below:* detail.



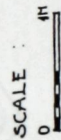




SHRINE TEMPLE WEST ELEVATION  
(SHOWING FALLEN FRONTON)



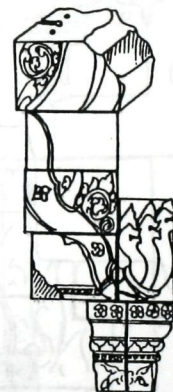
LOCATION PLAN



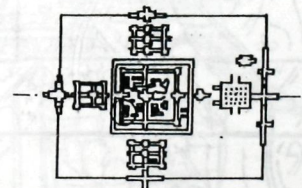
SHRINE TEMPLE SECTION AA  
PRĒAH KHAN CONSERVATION PROJECT  
WORLD MONUMENTS FUND  
JULY 1996  
BY MCHEAM PALL



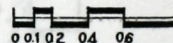
SOUTH ELEVATION



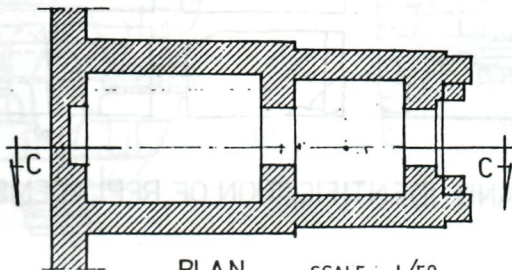
FALLING  
STONE



LOCATION PLAN



SCALE 1/20



PLAN

SCALE 1/50

SHRINE SURVEY AS FOUND CONDITIONS

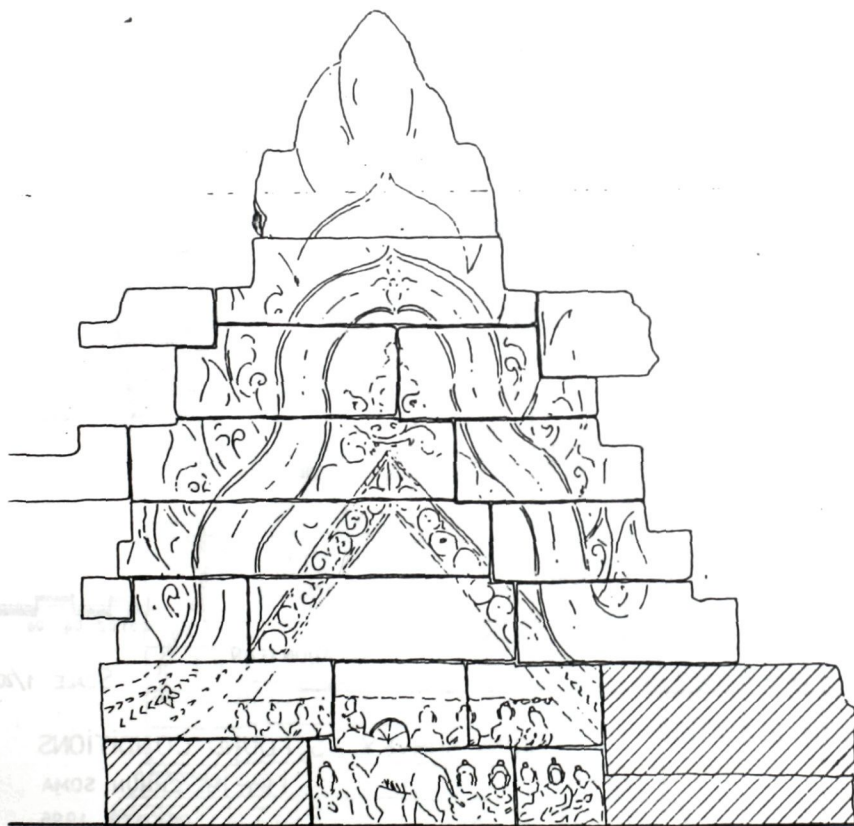
BY: MS. CHHUN SOMA

OCTOBER 1996

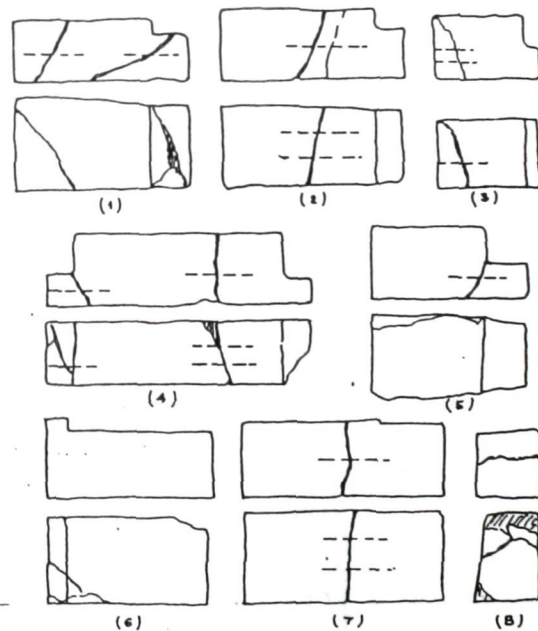
PREAN KHAN CONSERVATION PROJECT

WORLD MONUMENTS FUND





Scale: 0 0.5 1

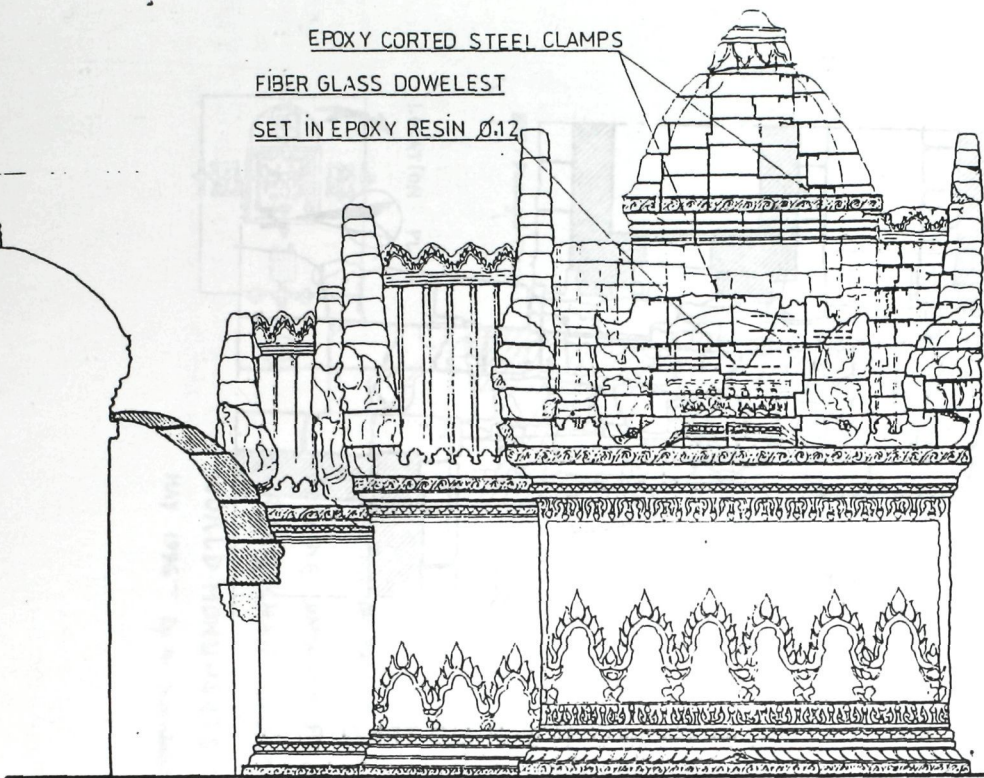


ISSUES RELATING TO REPLACEMENT AND IDENTIFICATION OF REPLACEMENT STONE

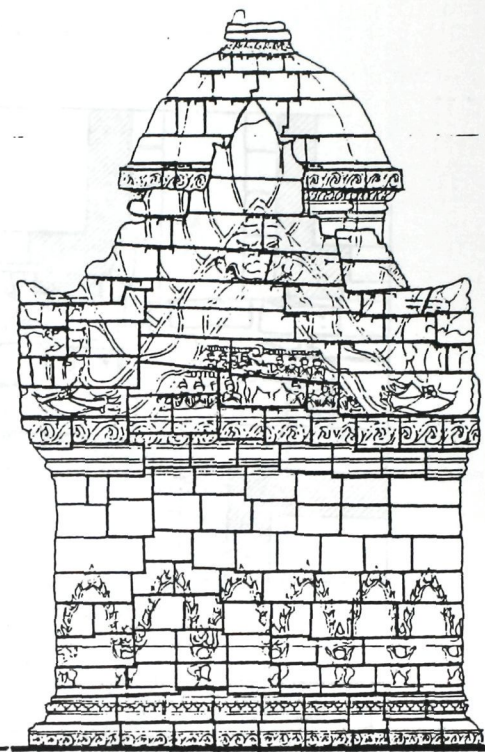
JUNE 1996

By Cheam Phally

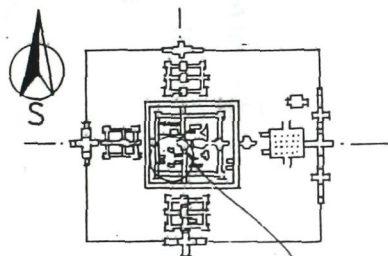
EPOXY CORTED STEEL CLAMPS  
 FIBER GLASS DOWELEST  
 SET IN EPOXY RESIN Ø.12



NORTH ELEVATION



WEST ELEVATION



LOCATION PLAN

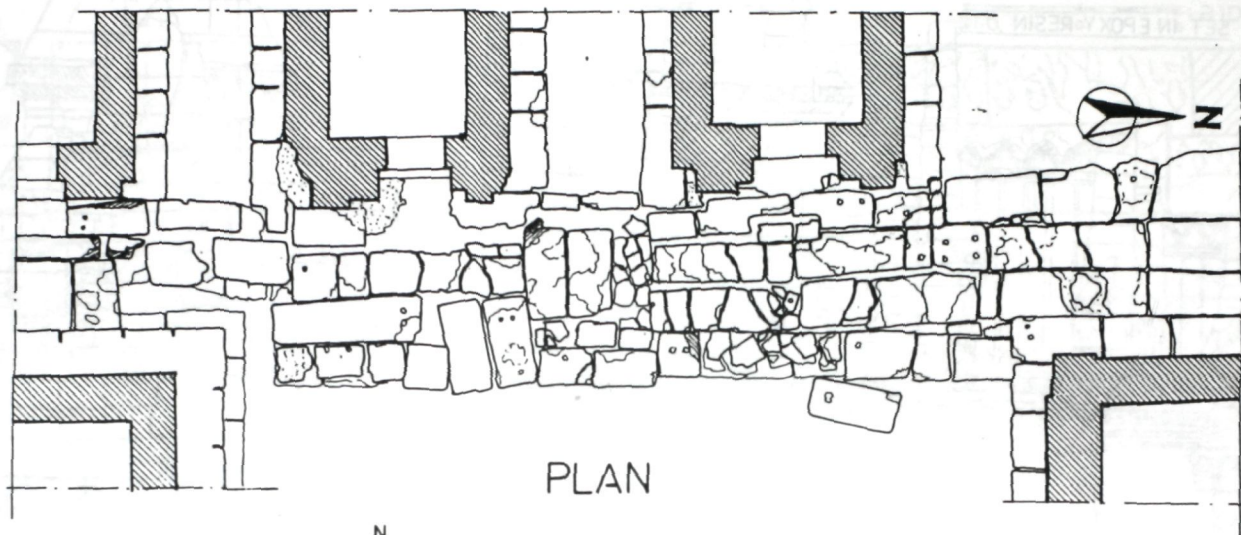
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 SCALE 1/50

## CONSOLIDATION OF SHRINE TEMPLE

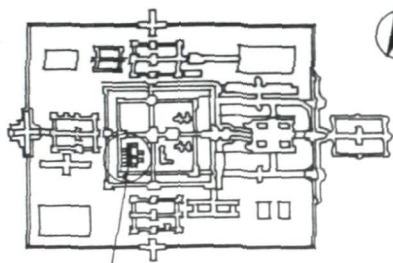
BY : CHHUN SOMA

MARCH : 1997

PREAH KHAN CONSERVATION PROJECT  
 WORLD MONUMENTS FUND



PLAN



LOCATION PLAN



SCALE: 1/50

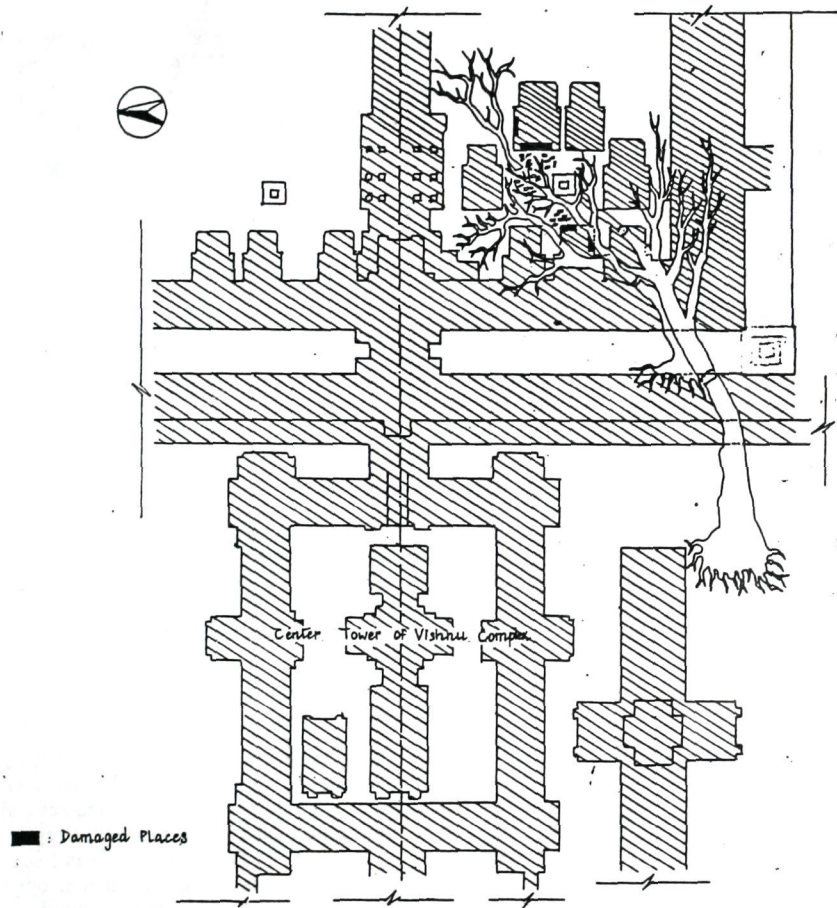
CAUSE WAY OF SHRINE TEMPLE  
CONDITIONS AS FOUND

MARCH 1997

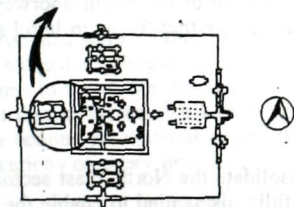
BY CHHUN SOMA

PREAH KHAN CONSERVATION PROJECT  
WORLD MONUMENTS FUND



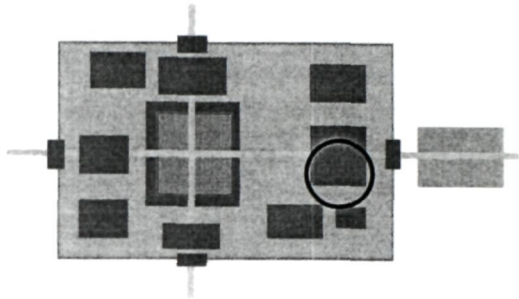


LOCATION PLAN



LOCATION OF FALLEN DOWN TREES  
 SHOWING DAMAGED PLACES  
 PREAM KHAN CONSERVATION PROJECT  
 WORLD MONUMENTS FUND  
 MAY 1996 — By Mr. Sam Kimheng

## 2.2.2 HALL OF DANCERS



*For previous actions and additional information, please refer to Preah Khan Conservation Project Report VII, Field Campaign IV section 2.2.2*

### Consolidation Of NW Sector

#### **Summary**

The North West Sector of the Hall of Dancers occupies the whole of the North West quarter of the Hall of Dancers and is enclosed by a standing wall. The Hall of Dancers is considered one of the most significant structural complexes of Preah Khan. Therefore WMF's efforts are being concentrated on consolidating both its structure and fabric. The recent disengagement of this sector has revealed many structural inconsistencies which require immediate attention to prevent further deterioration.

#### **As Found Condition**

The whole sector has recently been disengaged from the accumulated debris and fallen stone. All stones were located on survey drawings and the location of all the identifiable stones has been established. Several stones of the remaining structure are threatening to fall and several fractured lintels supported by EFEO reinforced concrete lintels are unstable and in need of repair. The main column leans 7 cm towards the exterior and the long North South beam was fractured and had been consolidated by the EFEO intervention. A lintel over one of the smaller openings has also fractured at one end and the stonework over it is very unstable. These fractured beams have been temporarily supported. It was decided to consolidate the structure and carry out necessary repairs to save this sector from further ruin. A careful examination of the North doorway showed that the door's East Jamb had shattered and there was danger that the main lintel set on pilasters might collapse.

#### **Repairs Undertaken**

Work started at the beginning of January to repair and consolidate the North West sector of the Hall of Dancers. A total of 112 stone blocks have been carefully dismantled to enable the

foundation blocks to be leveled as undue point loading caused distortion of several centimeters to the foundation. Twenty Four paving slabs were also reset and leveled using a dry concrete fill where a lift of more than 2 cm was required; in other places the stones have been leveled using lead wedges. Two fractured beams have been repaired and reset using stainless steel dowels and epoxy glue. A cornerstone brace has also been repaired by doweling and gluing and a stone tenon has been inserted to replace one damaged. The repair to this sector was completed within two months and is an example of skillful repair techniques.

## The East Doorway

### **Summary**

The East doorway is the principal access point from the East into the Hall of Dancers. The doorway was identified in Field Campaign IV as unsafe; it was propped against collapse while the southern section of the enclosing wall was repaired. Because it is a doorway used continuously by visitors to Preah Khan, it was decided to prioritize its repair during current Field Campaign V. The problems of consolidation were complicated by the fact that the door frame leans in two directions.

### **As Found Condition**

An earlier intervention to correct a section of the South East enclosing wall accentuated the condition of the doorway: the wall leaned to the north and the east; the northern door jamb was fractured and split; both jambs settled unevenly; the lintel settled unevenly and was also fractured; the door jambs pulled away from the enclosing walls and demonstrated uneven settlement; the ashlar stonework of the enclosing wall was out of alignment, unstable and threatening collapse; many of the outer stones were as much as 5 cm out of alignment.

### **Repairs Undertaken**

A heavy scaffolding was erected in January for work to begin on the repair and consolidation of the main East doorway leading into the Hall of Dancers. The southern section of the wall was previously dismantled and in the same way a large portion of the northern sector adjacent to the door frames was taken down. The jambs and lintels were carefully held in position ready for repair by pinning and gluing. Repairs and consolidation were completed on the badly damaged and splitting northern door jamb. By trial and error a correction factor for the lower courses of ashlar stonework was determined and then translated through the rest of the structure. Fractured stones were carefully repaired and the complicated realignment of the ashlar wall was completed. Levels were re-established by floating a dry concrete/stone bed under the stones or inserting lead wedges. The southern sector which was previously reconstructed has been tied into the doorway using stainless steel dowels.

Several problems were encountered during the correcting, leveling and setting this doorway, which provoked extensive group discussions among the local staff. With the establishment of fixed datum points to which the stones should be aligned, it was possible to reduce the various settlement discrepancies. This intervention is perhaps the most complicated of all consolidation and repair actions yet undertaken and the team has learned to work together as a unit and assess the implications of every decision.



## South Promenade & South Door

### **Summary**

During this Field Campaign it was decided to open up the raised promenade to the south of the Hall of Dancers as it would expand the visitor experience and also provide another access route around the Hall of Dancers where work was in progress. Once cleared of vegetation it was found that many of the stones forming the raised promenade had been dislocated and a section of the paving had been damaged by a falling tree. This route has become popular with visitors and it has therefore been decided to repair and maintain it properly. The raised open promenade runs from East to West linking the East Gopura IV with East Gopura III along the South side of the Hall of Dancers. It also provides access through a South doorway to the Hall of Dancers.

### **As Found Condition**

Once exposed, the raised promenade was generally found to be in reasonable condition. However, many of the edging stones had been disturbed and a section at the eastern end had been damaged by a falling tree. The base of the fallen tree blocked the path to the south doorway. The foundation was examined and it was found that there was no laterite beneath the stone paving, only earth and sand filling. This fill has washed away, leading to paving settling. The structure was found to be leaning 20 cm. out of vertical, the lintels were fractured and had been supported with reinforced concrete lintels cast *in situ* by the EFEO in the 1950's.

It was decided to carry out the repair and consolidation of the South doorway and the adjacent enclosing wall. In total it was necessary to dismantle 110 stone blocks from the damaged wall which was leaning 20 cm out of vertical to the south. At the same time, the reinforced concrete lintel placed by the EFEO was removed and the fractured lintel was carefully taken down for repair. Following the dismantling of this structure, it was discovered that there had been uneven settlement of the foundation amounting to 3.5 cm.

### **Repairs Undertaken**

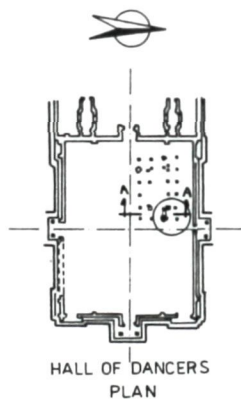
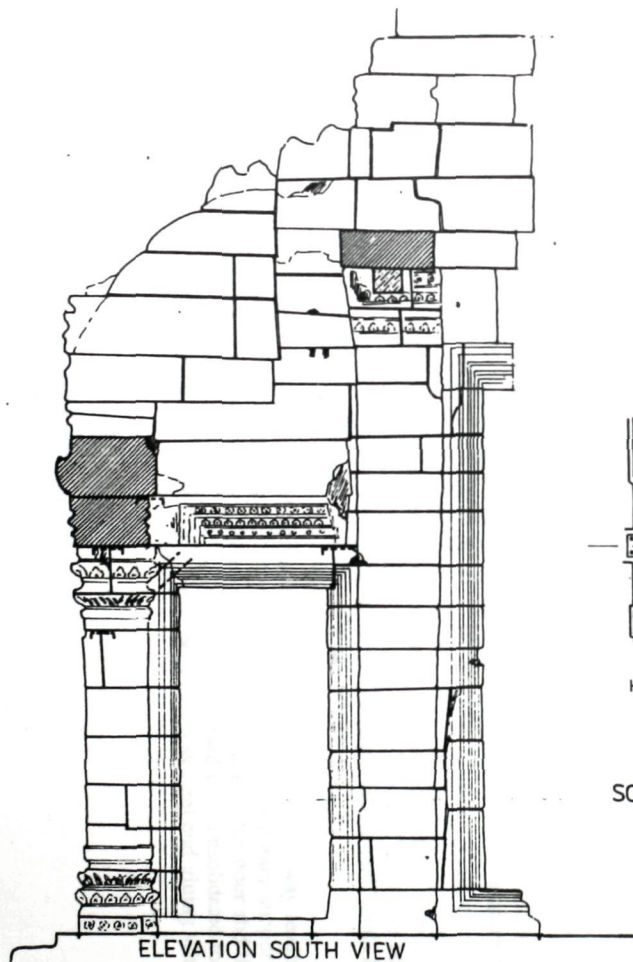
Retaining the dead root structure of the fallen tree, a path between the remaining sections of the tree root has been made after careful above ground excavation, clearance of debris, and identification of fallen stones in front of the South doorway. Survey drawings providing plans, sections and elevations have been prepared for the whole area. The promenade has been cleared of vegetation and earth and most of the dislodged stones have been carefully replaced and consolidated at the western end. There is still some work to complete at the eastern end to repair the platform damaged by the fallen tree.

The South doorway to the Hall of Dancers has been consolidated and part of the east enclosing wall has been carefully reconstructed on a new concrete base and some of the stone blocks have been wedge back to the vertical using lead wedges. Three fractured blocks and lintels have been repaired by doweling with stainless steel and gluing with epoxy resin.

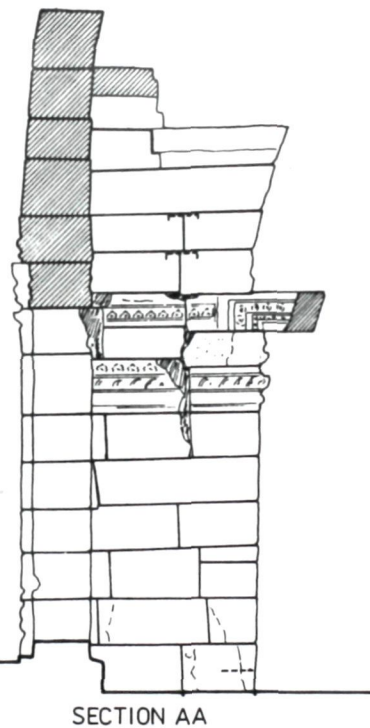
Work was also begun in October on the repair and consolidation of the doorway leading from the Hall of Dancers to the South causeway. Following the insertion of temporary support, the doorway was cleared of fallen stones and debris and the east portion of the door and the lintels were dismantled so that the sub-plinth level stones could be raised and consolidated to remove the present tilt. The lintel has been repaired by pinning with stainless steel and gluing with epoxy

resin glue, and has been reinstated in its original position. The former concrete structure has been removed and 110 stones have been reset in their original positions. The decorative pilaster on the western side, discovered during the clearance of the site, has been repaired and reset. The eastern pilaster could not be reset or stabilized.

The new access along the South promenade and into the Hall of Dancers has proved very popular among visitors to Preah Khan. Also the proximity to the jungle immediately to the south of the promenade creates an image of how overgrown Preah Khan was five years ago.



SCALE : 0 0.50 1M

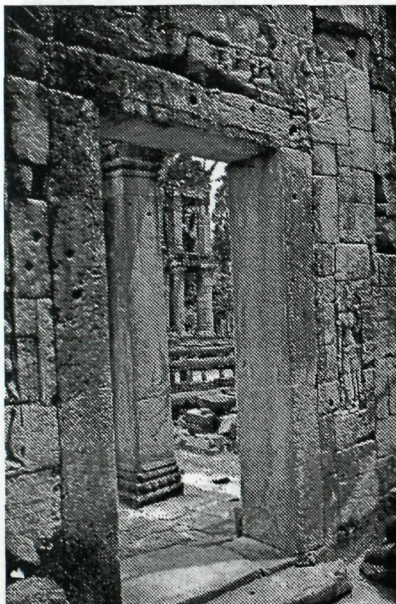


# HALL OF DANCERS-NORTH WEST SECTOR AFTER CONSOLIDATION

PREAH KHAN CONSERVATION PROJECT  
WORLD MONUMENTS FUND

February 1997 . By M. Cheam Phalliv

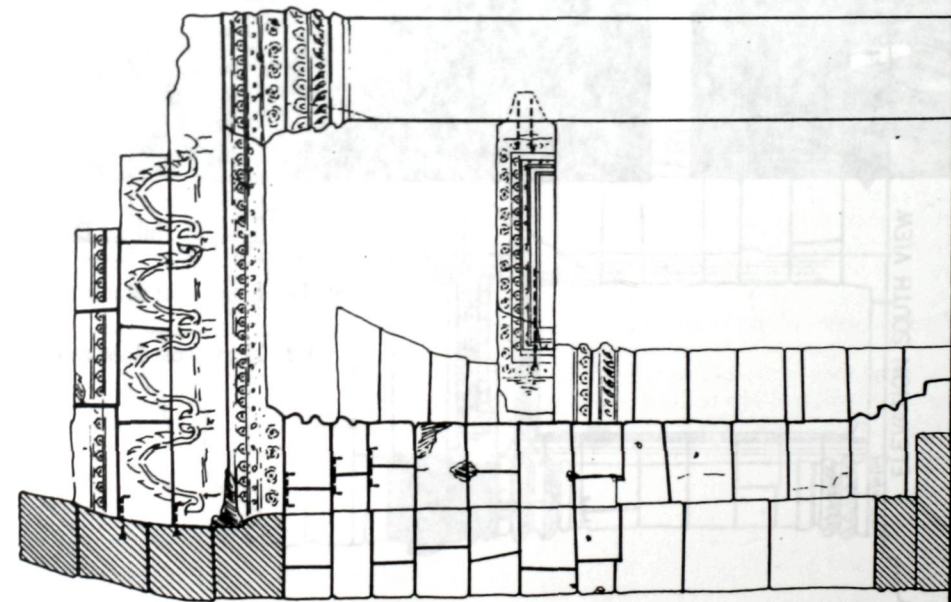




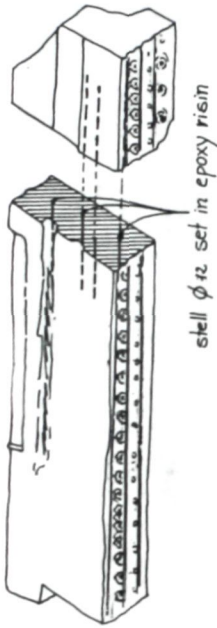
### Hall of Dancers

*above:* Northwest sector repairs

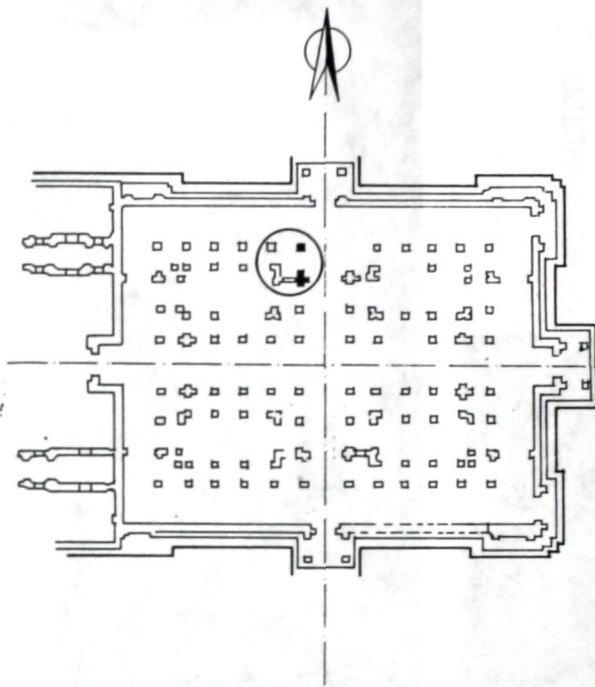
*left:* Northwest door repaired



Scale : 1:20



shell  $\phi 12$  set in epoxy resin



HALL OF DANCERS PLAN

**WEST ELEVATION AFTER CONSOLIDATE**  
 PREAH KHAN CONSERVATION PROJECT  
 WORLD MONUMENTS FUND  
 February 1997  
 By Ms Cheam Phally





### Hall of Dancers

*above:* East door repaired,  
detail & general

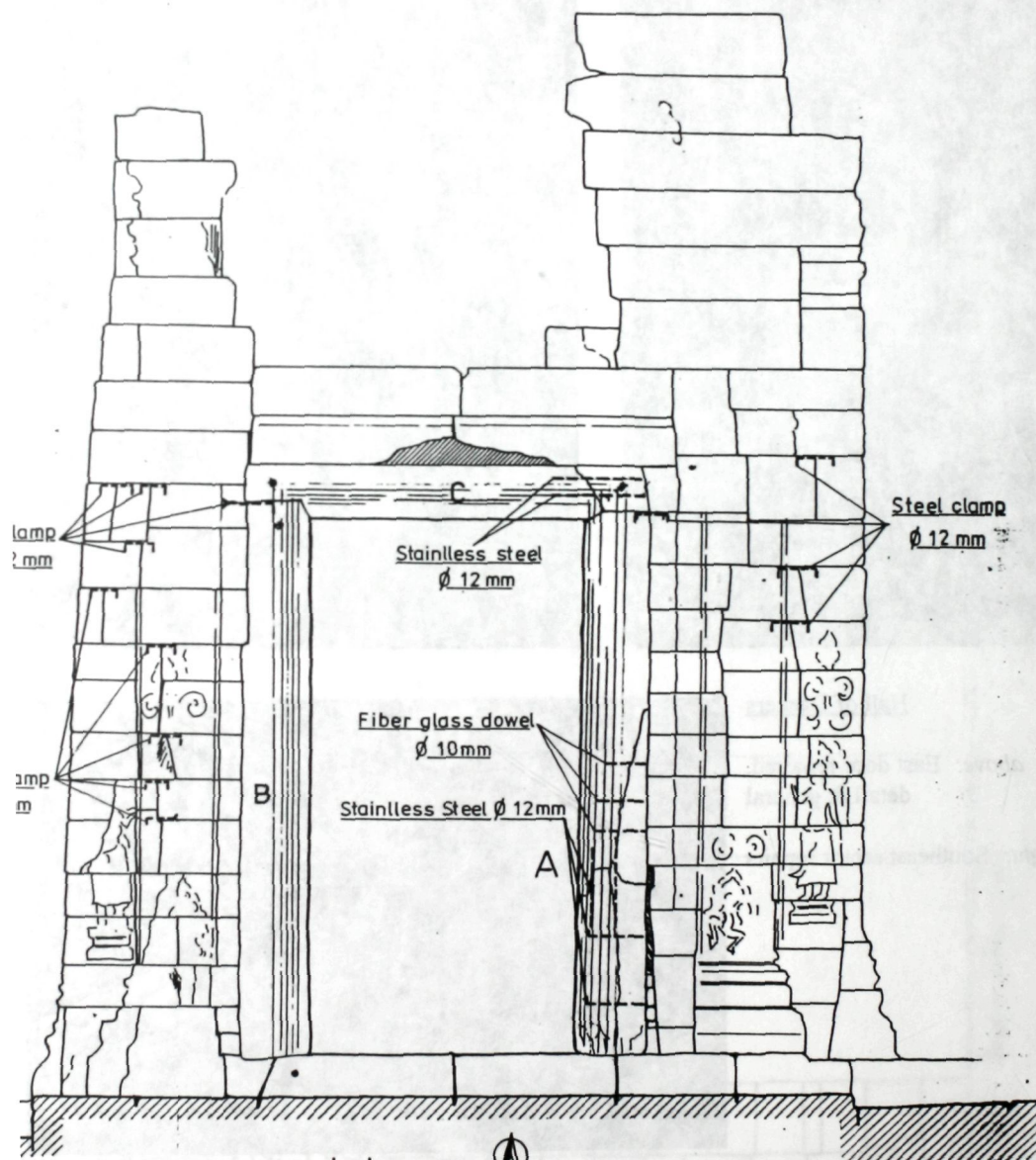
*right:* Southeast sector repairs



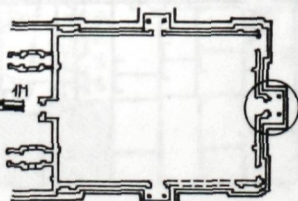
HALL OF DANCERS  
ELEVATION EAST DOORWAY  
AFTER CONSOLIDATION  
PRAHA KHAH CONSERVATION PROJECT  
June 1997  
BY DR. CHANTHAPHA

Scale 1/20  
HALL OF DANCERS PLAN





0.1 0.5 1.0  
Scale 1:20



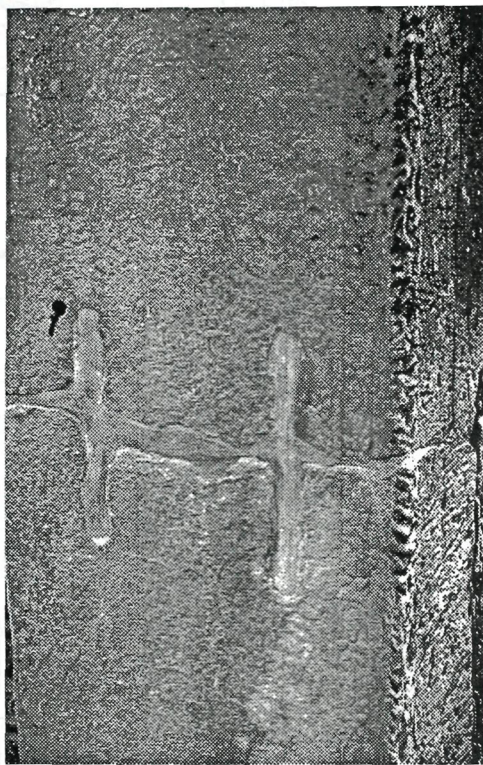
HALL OF DANCERS PLAN



HALL OF DANCERS  
ELEVATION EAST DOORWAY  
AFTER CONSOLIDATION  
PREAH KHAN CONSERVATION PROJECT  
June 1997

By H. CHEAM PHALLY  
15/11/97



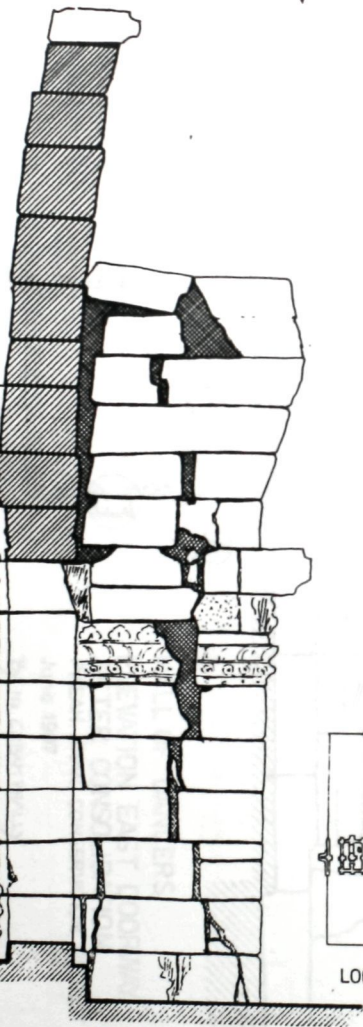


### Hall of Dancers

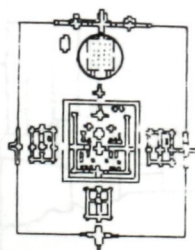
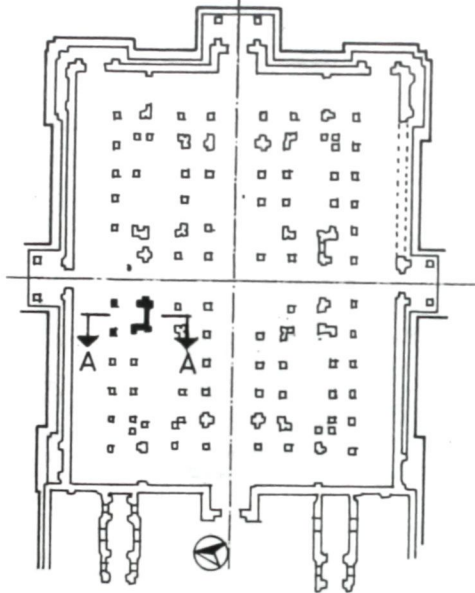
*left:* East door, northwest wall reconstructed

*right:* detail of North door repair





SECTION A A



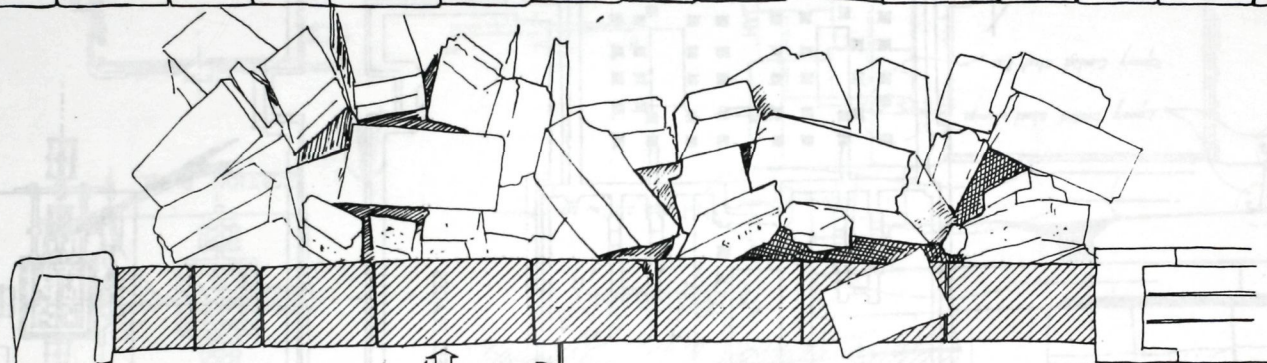
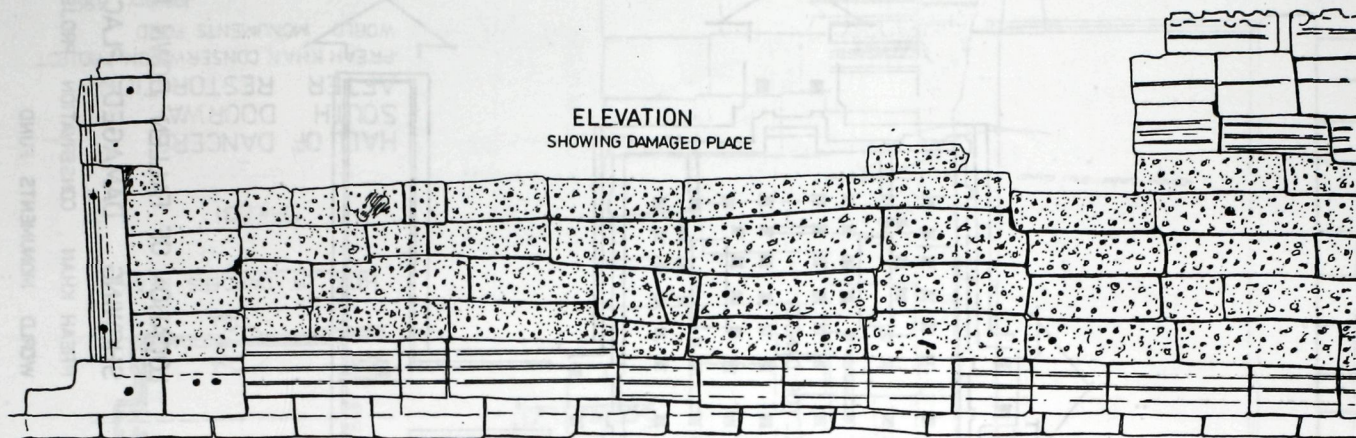
LOCATION PLAN

HALL OF DANCERS-NORTH WEST  
SECTOR  
ELEVATION NORTH VIEW  
PREAH KHAN CONSERVATION PROJECT  
WORLD MONUMENTS FUND  
December 1996  
By Miss Cheam Phally

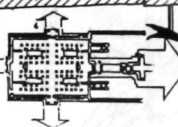
Scale 0 0.5 1







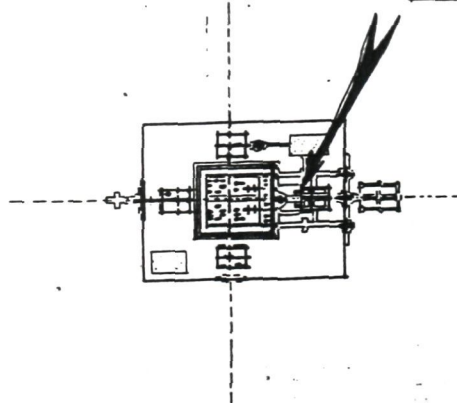
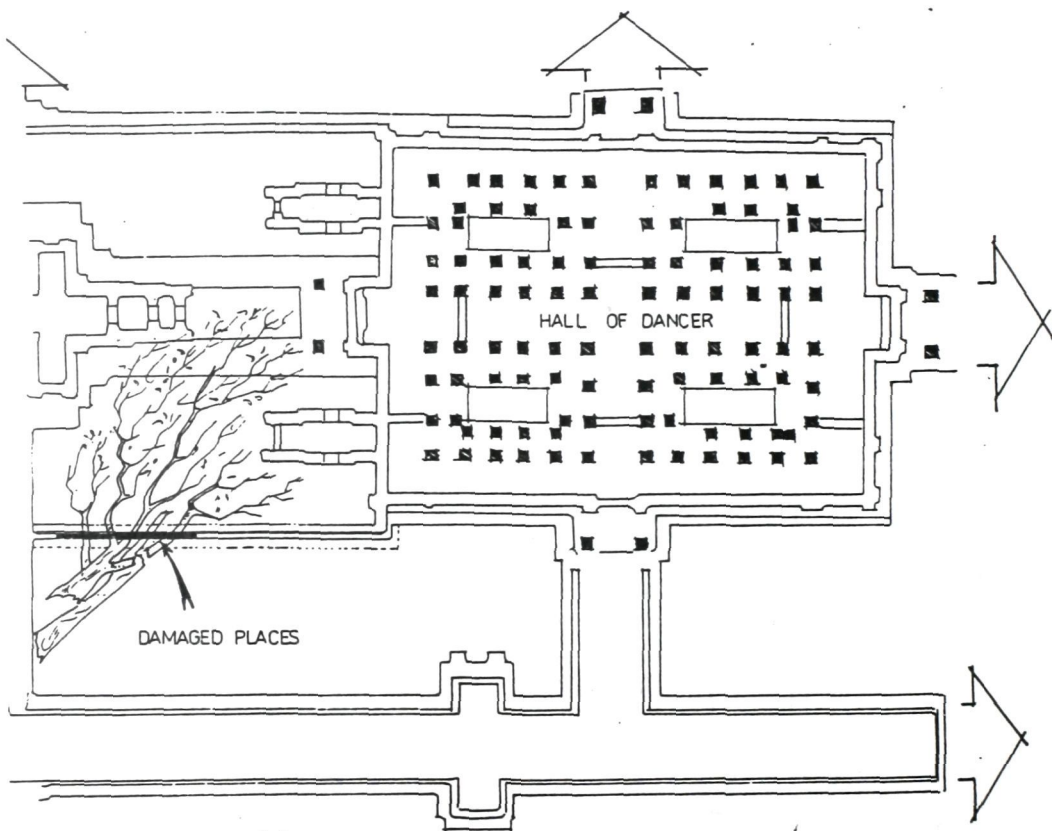
Scale: 0 0.5 1M



LOCATION PLAN

PLAN AND ELEVATION OF FALLEN DOWN BY  
TREE

PREAH KHAN CONSERVATION PROJECT  
WORLD MONUMENTS FUND



LOCATION OF FALLEN DOWN TREES  
 SHOWING DAMAGED PLACES  
 PREAH KHAN CONSERVATION PROJECT  
 WORLD MONUMENTS FUND

September, 1997 by Mr. HANG

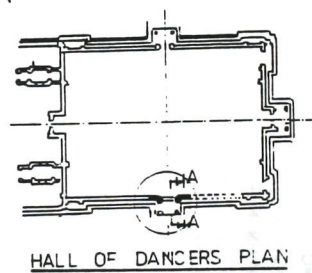
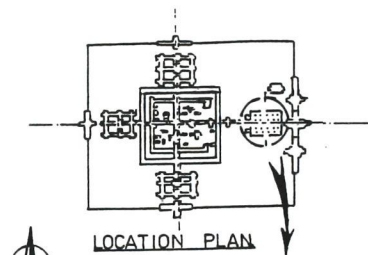
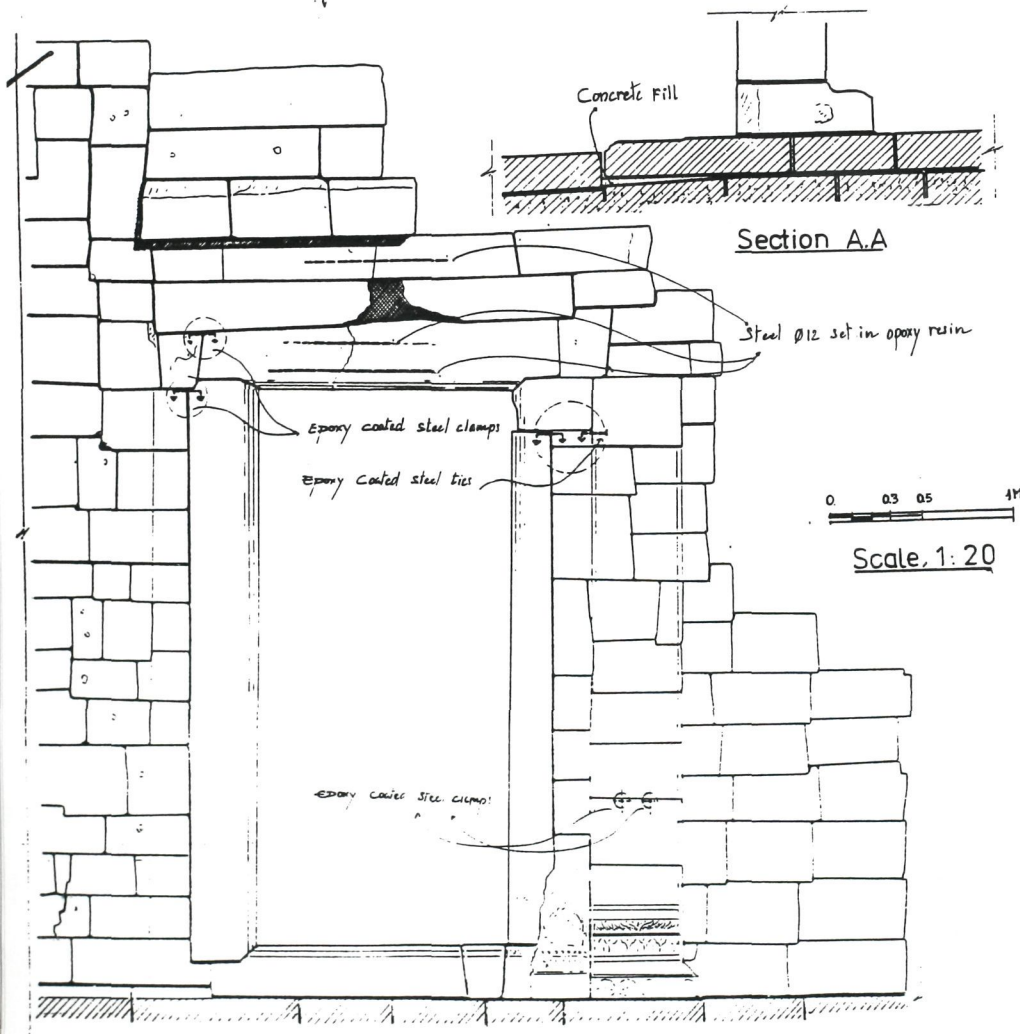
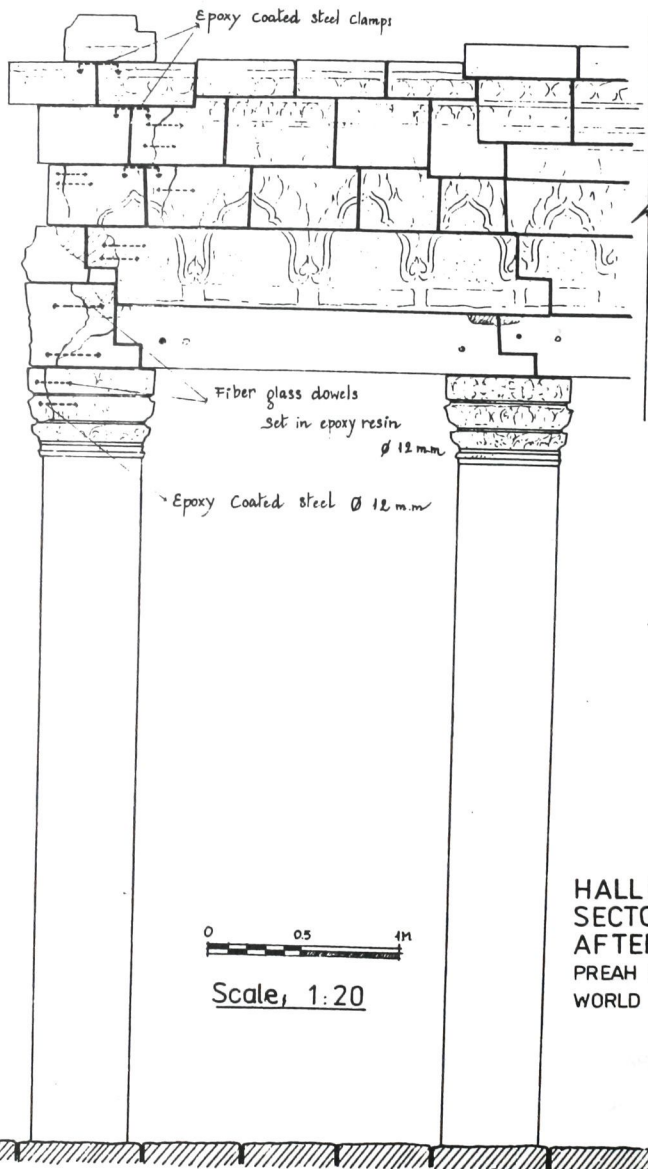


Fig.(33)

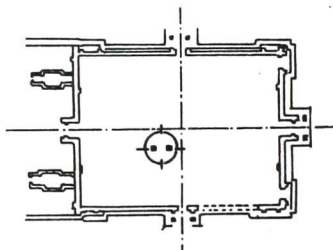
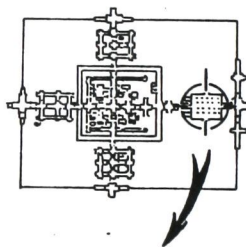
HALL OF DANCERS  
SOUTH DOORWAY  
AFTER RESTORATION  
PREAH KHAN CONSERVATION PROJECT  
WORLD MONUMENTS FUND

By Mr. SAM KIMHEE January 1997





LOCATION PLAN



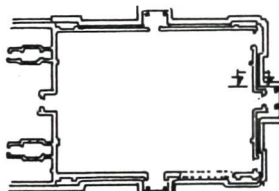
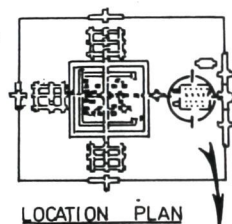
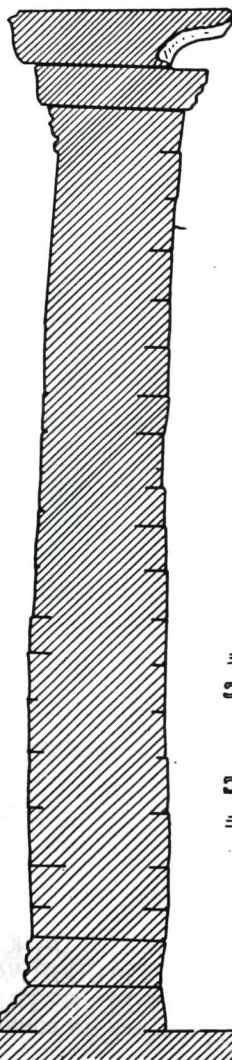
HALL OF DANCERS PLAN

HALL OF DANCERS SOUTH WEST  
SECTOR ELEVATION NORTH VIEW  
AFTER RESTORATION

PREAH KHAN CONSERVATION PROJECT  
WORLD MONUMENTS FUND

December 1996

By: Mr. SAM KIM HENG



HALL OF DANCERS PLAN

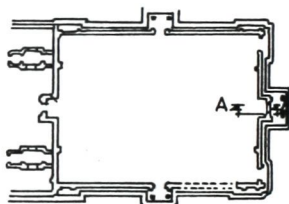
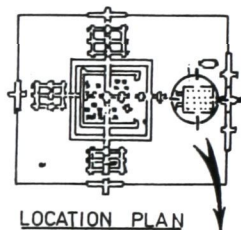
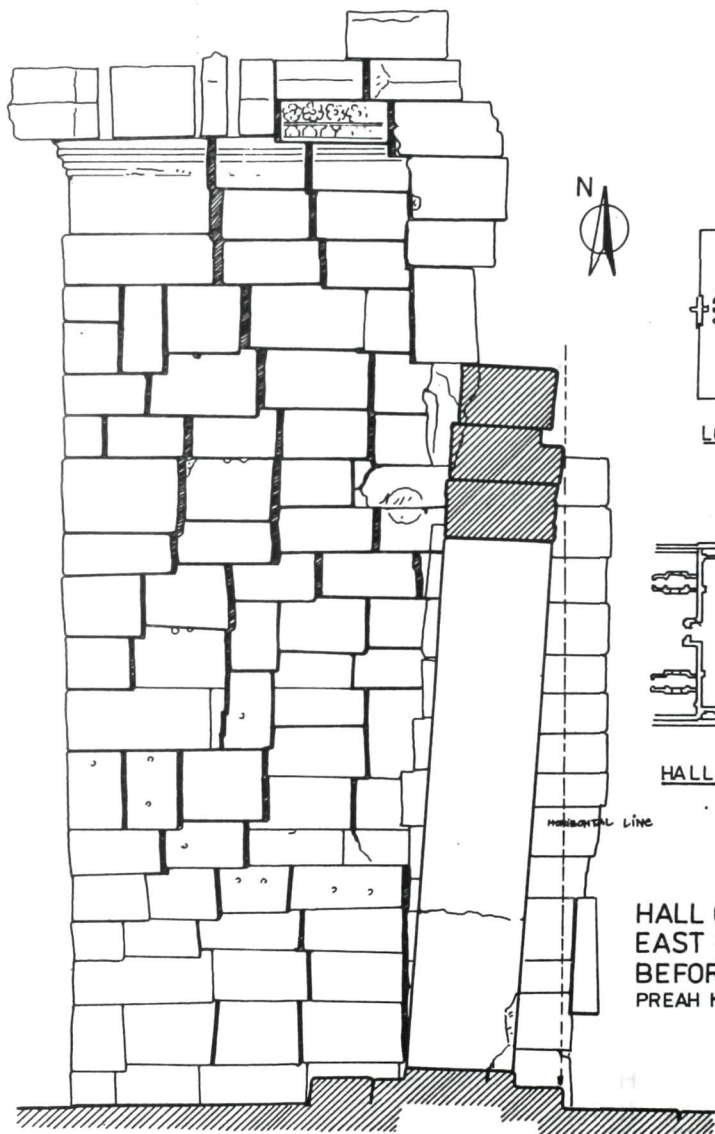
0.1 0.5 1.0

Scale. 1:20

HALL OF DANCERS  
NORTH EAST SECTOR  
WALL SECTION  
PREAH KHAN CONSERVATION PROJECT

January 1997

By. Mr. SAM KIMHENG



HALL OF DANCERS  
EAST DOORWAY SECTION **AA**  
BEFORE RESTORATION  
PREAH KHAN CONSERVATION PROJECT

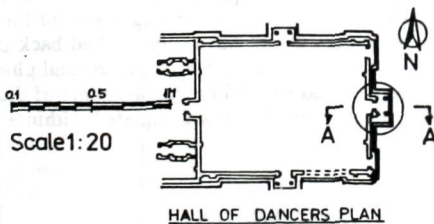
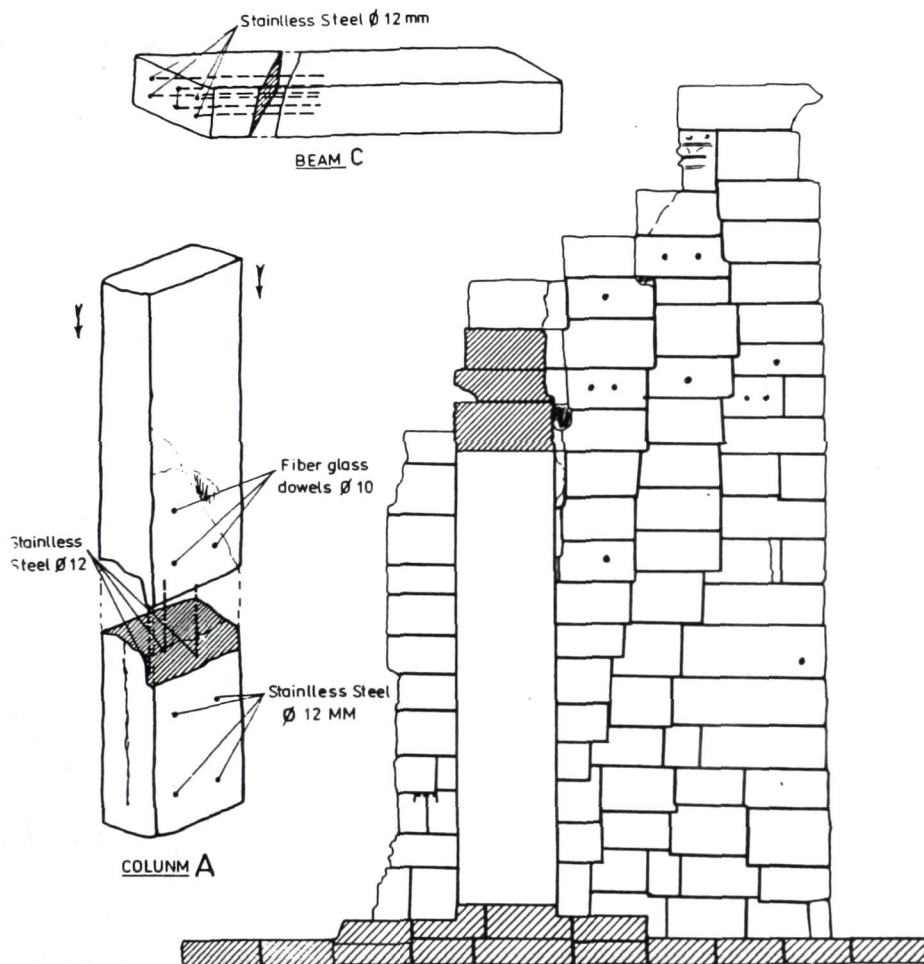
January 1997

By: Mr. SAY KITHENG

0 0.5 1M

Scale: 1/20





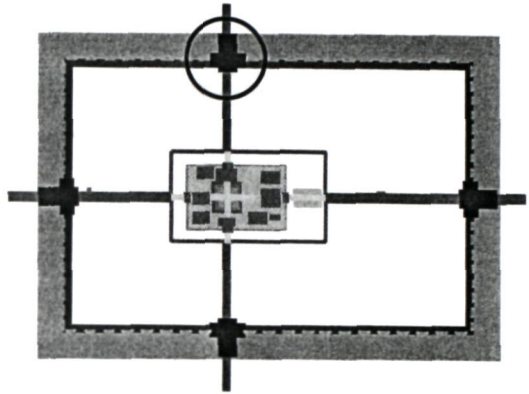
EAST DOORWAY SECTION AA  
HALL OF DANCERS  
AFTER CONSOLIDATION  
PREAH KHAN CONSERVATION PROJECT

June 1997

By Ms Cheam Phally

(Fig 2)

### 2.2.3 NORTH GOPURA IV CENTRAL GATEWAY NORTH



#### Summary

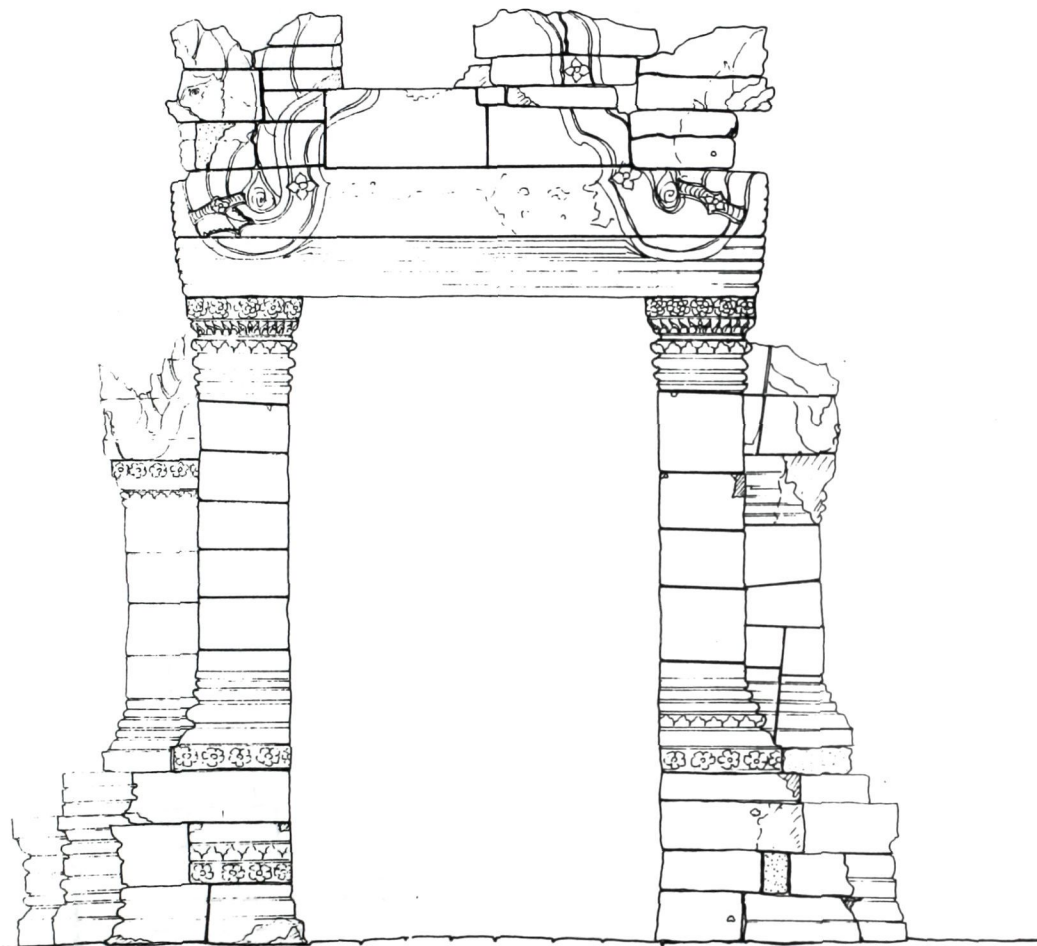
The central gateway to North Gopura IV is the main access route from the North and is often used for the shorter tours. The defective section of the gateway is on the northern side. The instability of the heavy north facing fronton caused the outer section of the wall end/pilaster to fracture due to uneven pressure and shifting. Although collapse appeared unlikely, it was considered important to re-establish the structural integrity of this lintel and column construction since it is on one of the axial routes leading into the temple complex.

#### As Found Condition

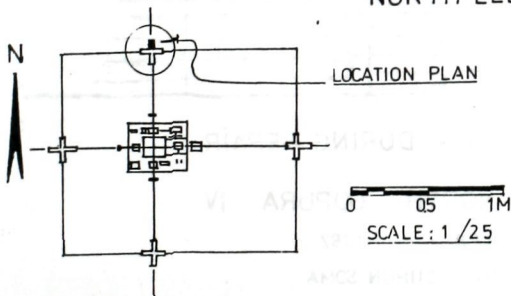
Like many of the Gopuras which have heavy frontons, the supporting columns or wall end had buckled due to the shift of the structure and to the eccentric loading on the outer stone blocks. As the blocks are laid dry, there is no tolerance for movement; the result of this loading has been pinching of the outer edges of the stone and subsequent spalling of the outer surface. These failures lead to increasingly eccentric loading and might have eventually caused the collapse of the fronton; this is a pattern of deterioration repeated at several of Preah Khan's frontons in the past.

#### Repairs Undertaken

Following the consultant engineer's assessment and the preparation of record drawings and interventions, the consolidation of the defective north west bearing wall and the remaining corbelled vaults was undertaken. The misplaced stones have been pushed back into their correct position using hydraulic car jacks; the damaged stones have been pinned and glued and the corbelled vaults properly aligned and consolidated which has enabled some of the reinforced concrete elements to be removed. The whole operation was completed within a week.

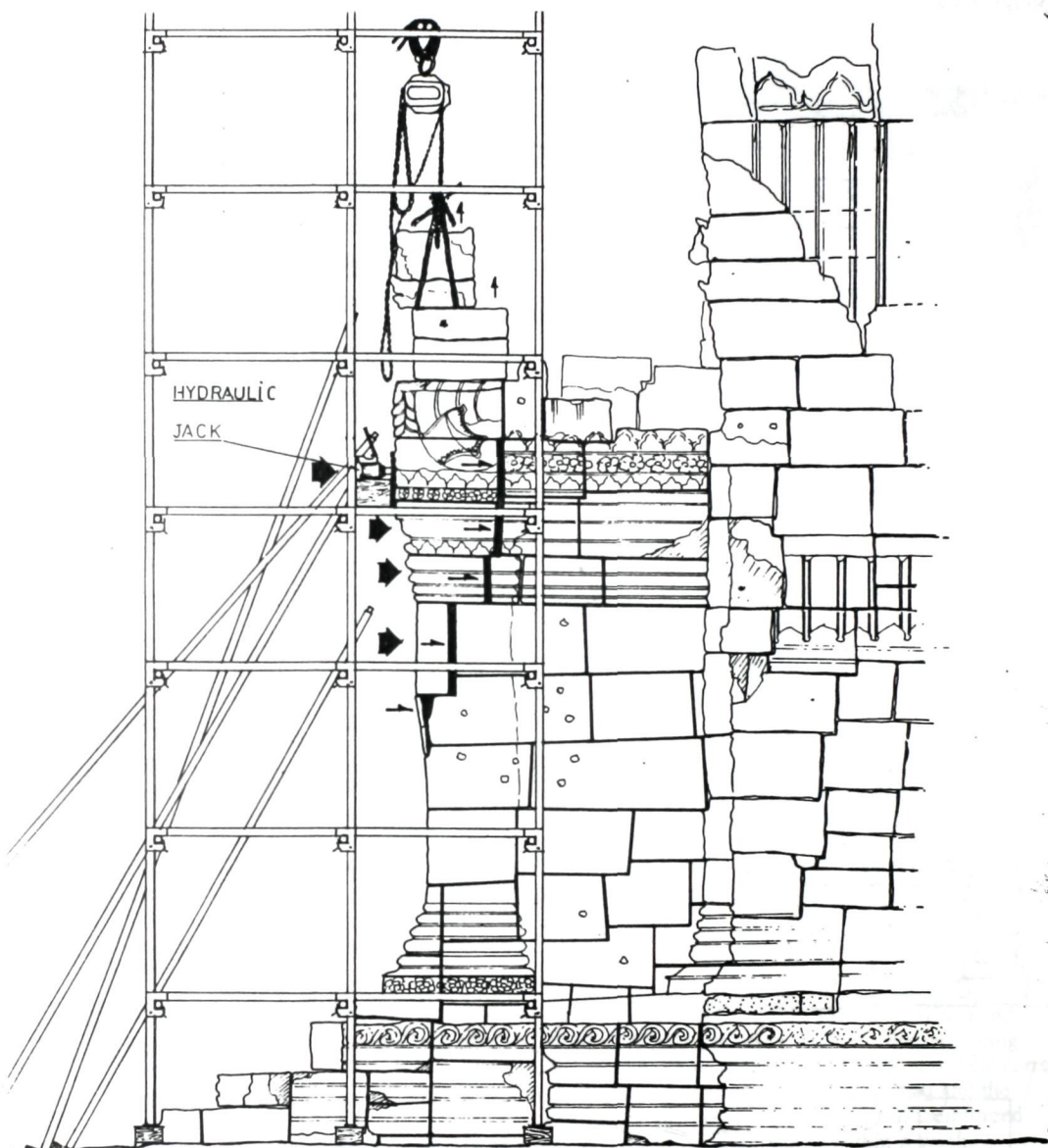


NORTH ELEVATION BEFORE REPAIR



NORTH GOPURA IV  
 APRIL 1997  
 BY CHHUN SOMA  
 PREAH KHAN CONSERVATION  
 PROJECT  
 WORLD MONUMENTS FUND





WEST ELEVATION DURING REPAIR

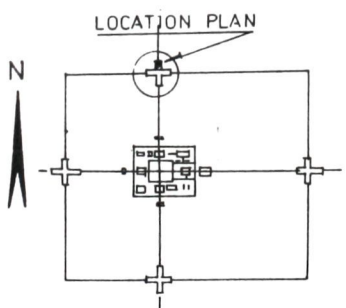
NORTH GOPURA IV

APRIL 1997

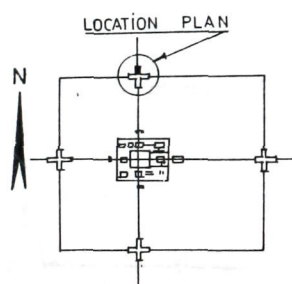
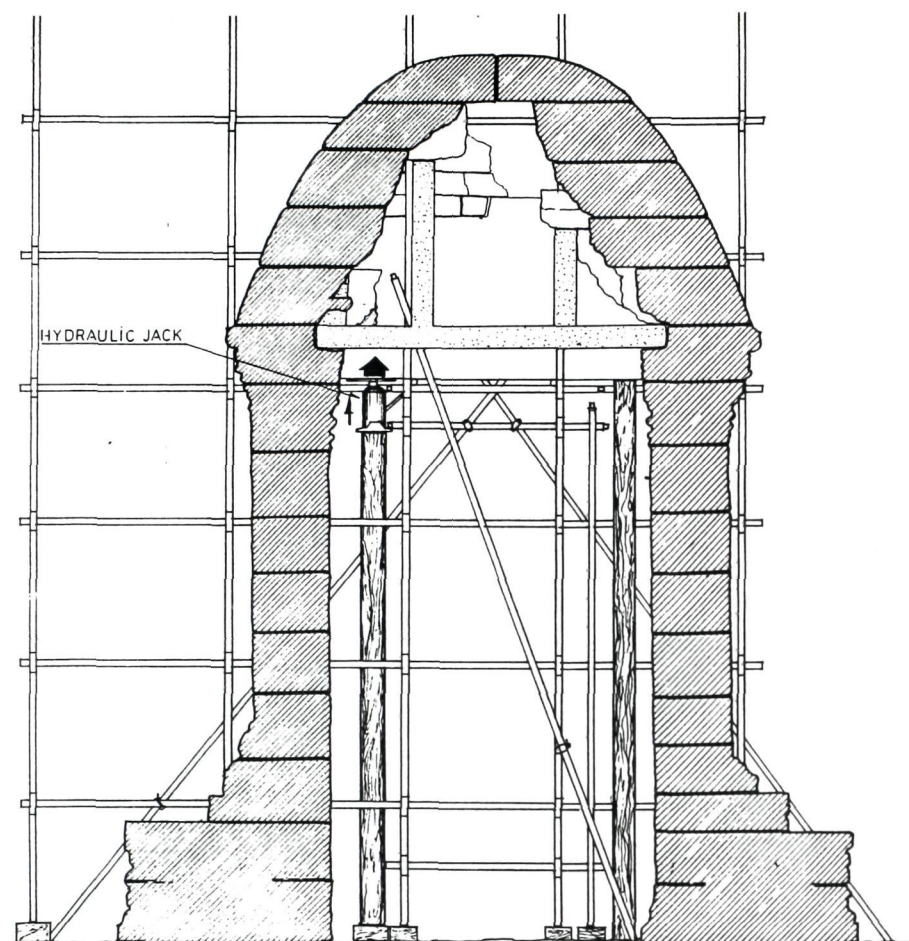
BY: CHHUN SOMA

PREAH KHAN CONSERVATION  
PROJECT

WORLD MONUMENTS FUND



0 0.5 1M  
SCALE : 1/25



NORTH SECTION DURING REPAIR

NORTH GOPURA IV

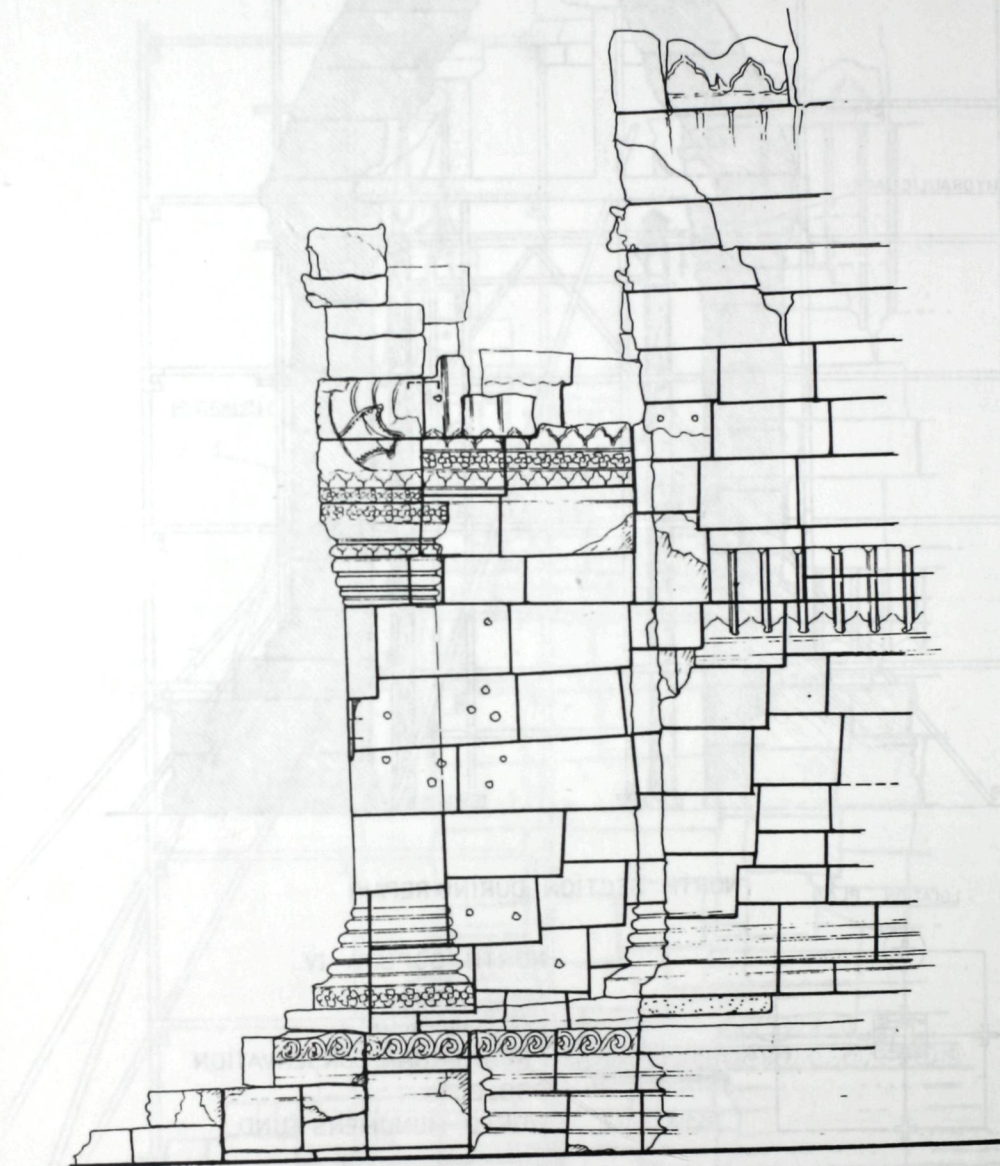
APRIL 1997

BY : CHHUN SOMA

PREAH KHAN CONSERVATION  
PROJECT

WORLD MONUMENS FUND

0 0.5 1M  
SCALE : 1 / 25



WEST ELEVATION AFTER REPAIR

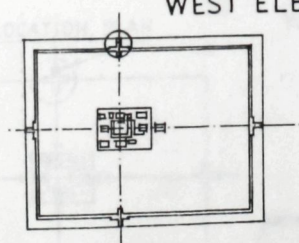
NORTH GOPURA IV

APRIL 1997

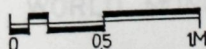
BY MRS CHHUN SOMA

PREAH KHAN CONSERVATION PROJECT

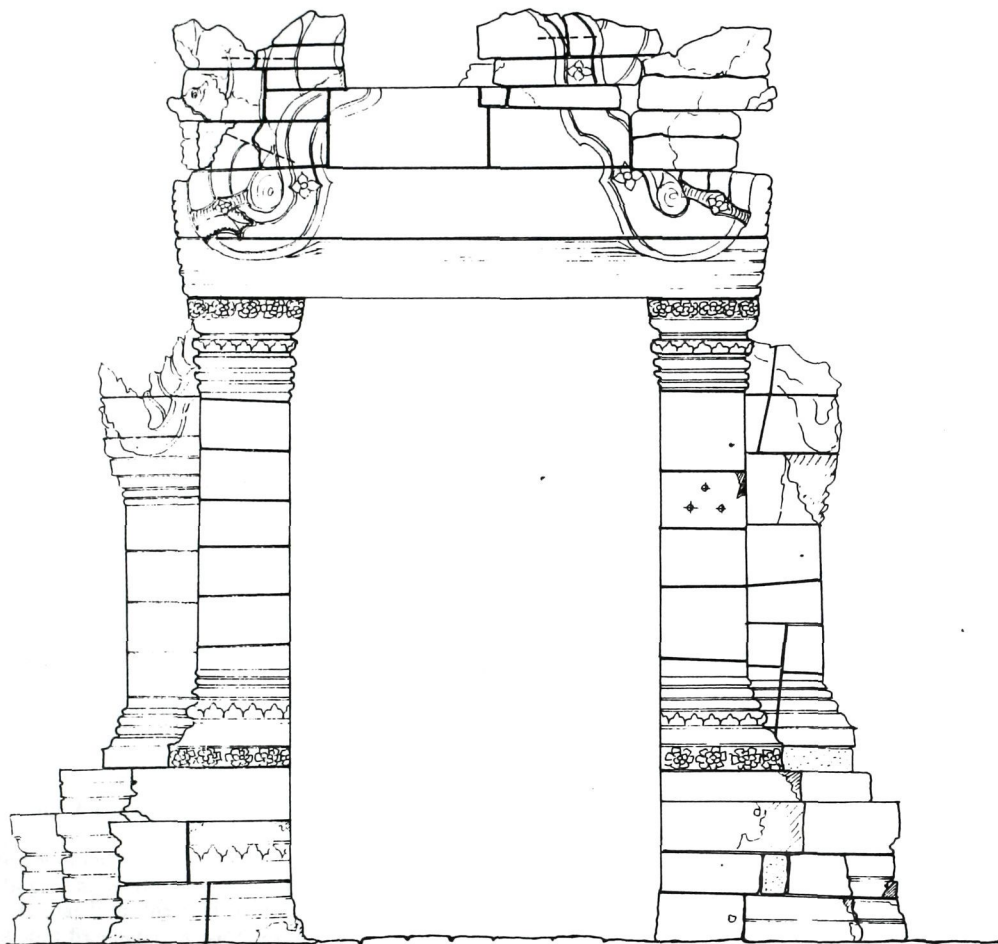
WORLD MONUMENTS FUND



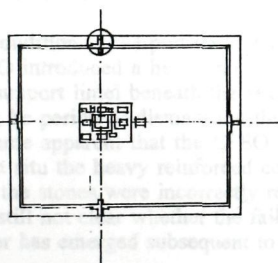
LOCATION PLAN







NORTH ELEVATION AFTER REPAIR



LOCATION PLAN

NORTH GOPURA IV

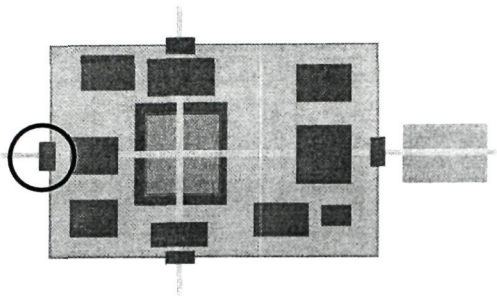
APRIL 1997

BY: MRS: CHHUN SOMA

PREAH KHAN CONSERVATION PROJECT  
WORLD MONUMENTS FUND



## 2.2.4 WEST GOPURA III



*For previous actions and additional information, please refer to Preah Khan Conservation Project Report VII, Field Campaign IV section 2.2.6.*

### West Portico

#### **Summary**

The Portico is on the main axis running west/east providing access to the principal East Gopura IV and to the temple complex from the West. The northern lintel is losing its bearing as a column capital supporting it has fractured and is structurally unsound. The principal lintel on the West elevation is supported by a large and unsightly reinforced concrete beam showing movement fractures at the point of connection. As a result, the portico vaulted roof was in danger of collapse and required immediate intervention.

#### **As Found Condition**

The condition of the Portico was critical as the concrete insertions made by the EFEO were failing. The North West lintel spanning between two columns in turn supports the corbelled vaults that form the roof of the portico. The capital of the central column supporting this lintel had split free due to shear stresses, leaving the lintel without sound bearings. The movement in the already fractured northern capital seemed to be accelerating; clear indications of structural movement were reflected in the settlement pattern of the vaults and in the way the fractured segment has shifted. A temporary metal strap had been placed to give support to the defective capital and temporary vertical shores had been placed beneath the failing lintel.

A study of the condition of the portico indicated that EFEO had found it in a seriously failing condition. EFEO introduced a heavy reinforced concrete structure to support the portico by placing a large support lintel beneath the severely fractured west stone lintel supporting the fronton. During the period of dismantling the roof vaults and the removal of the reinforced concrete, it became apparent that the EFEO had also dismantled the roof, taken off the stone lintel and cast in situ the heavy reinforced concrete lintels. During replacement of the roof vaults, many of the stones were incorrectly replaced, a fact that can now be borne out by survey drawings. It is still not clear whether the failure in the North East capital is the result of the earlier stresses or has emerged subsequent to the EFEO intervention.

## Repairs Undertaken

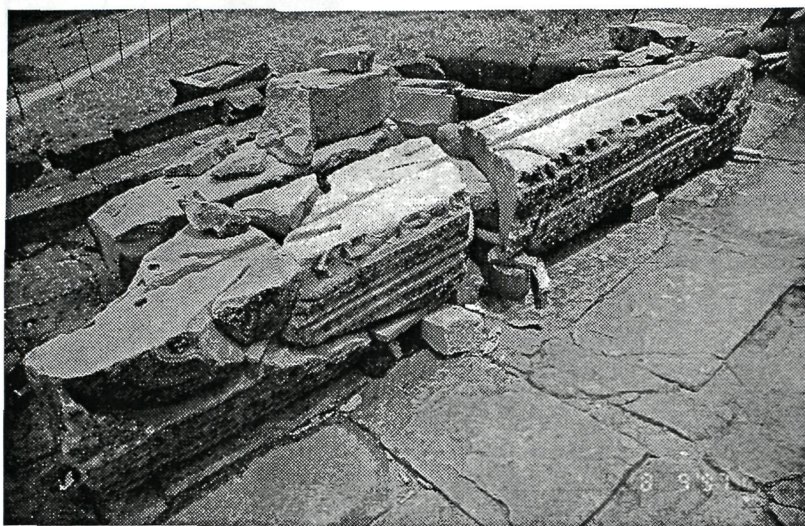
Work has started on this intervention and the repairs are ongoing. Under the Consultant Engineer's supervision, the West portico roof vaults were carefully dismantled to beam level; concrete fill was removed and a detailed assessment was made of the stone beams supporting the corbelled roof.

Interventions were designed to strengthen and stabilize the principal stone lintel supporting the fronton, which had suffered shear fractures in three places and was supported by an enormous reinforced concrete lintel. This lintel appeared to be failing structurally and was an ugly and conspicuous addition to this fronton ensemble. Each detail was carefully drawn as found along with details of interventions have been prepared prior to the new work. The Preah Khan team plans to remove all traces of concrete in the structure and cut out concrete patches in the columns which are showing signs of separation and structural failure. There are plans to replace them with sandstone as before.

At the time of writing, detailed survey drawings have been completed. A work plan has been worked out with the consultants, the site architects, and the work force. Dismantling of the vaults, lintels, and all later concrete interventions has been completed. The repairs undertaken by the EFEO have been checked for structural integrity. A strong working steel scaffolding was erected around the defective area with suitable lifting gear, space and strength to carry the roof vaults and the defective lintels; repairs can be undertaken on the scaffolding rather than having to lower the stones to ground level. The defective vault stones have been removed and stored on the scaffolding. The lintels have also been lifted and placed on the scaffolding.

As an exercise for survey, recording and the preparation of archival material, the Preah Khan Team will carefully record with drawings, photographs and notes the various stages of repair undertaken. The work is also being carefully monitored by the consultant engineer and is being supervised full time by an assistant architect. As the proposed work plan was delayed until the end of March the ensuing delays have meant that the work can only be completed at the beginning of the next dry season.





### West Gopura III

*above:* West lintel broken in 5 pieces

*below:* part of fronton beam

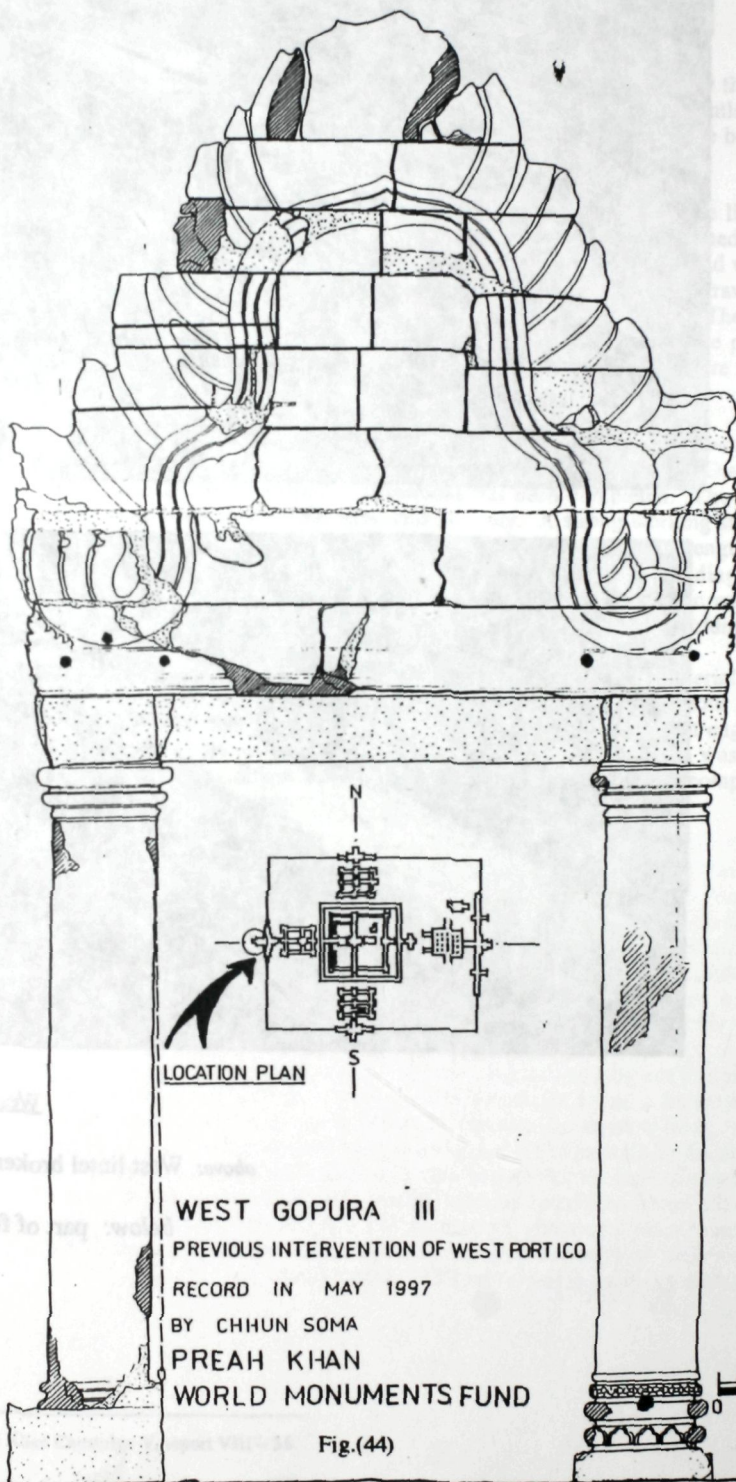
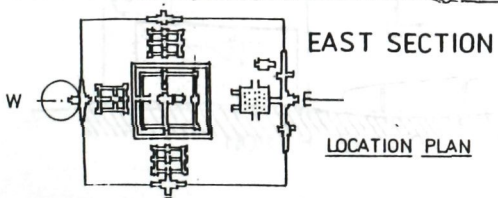
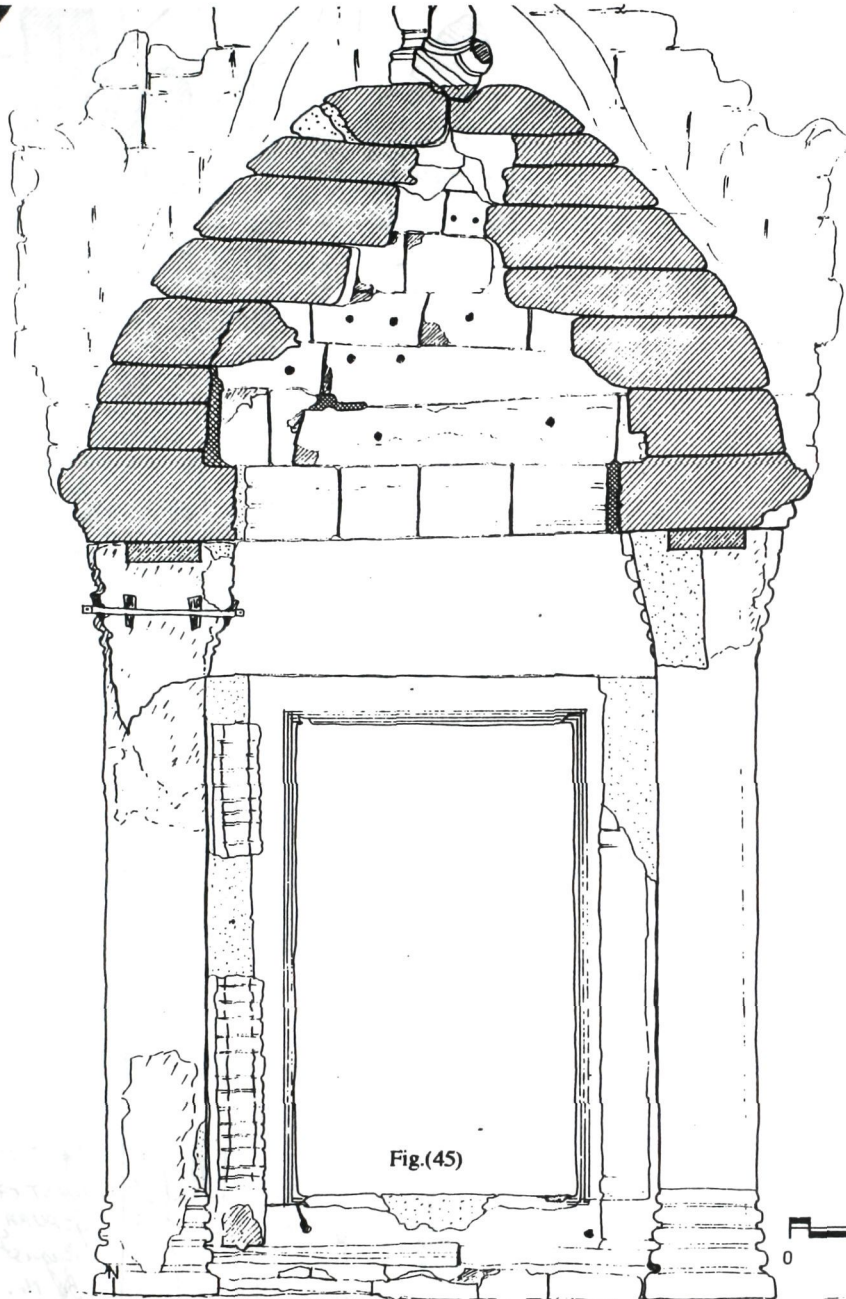


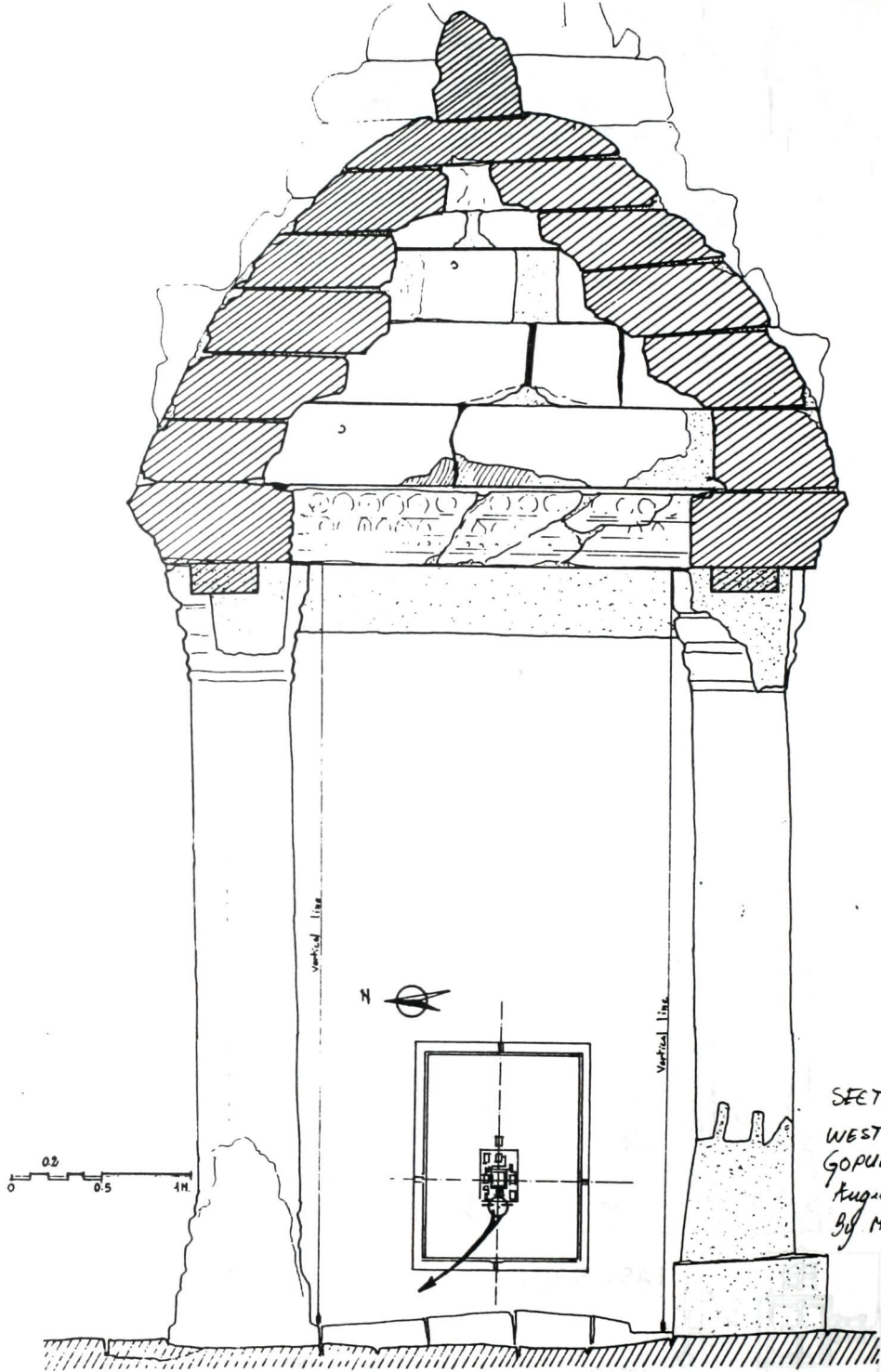
Fig.(44)





WEST GOPURA III  
 BY: CHHUN SOMA  
 MAY 1997  
 WORLD MONUMENTS FUND





SECTION LOOK TO  
WEST OF WEST  
GOPURAM.  
August 1996.  
By Mr. Som Kimthaw C

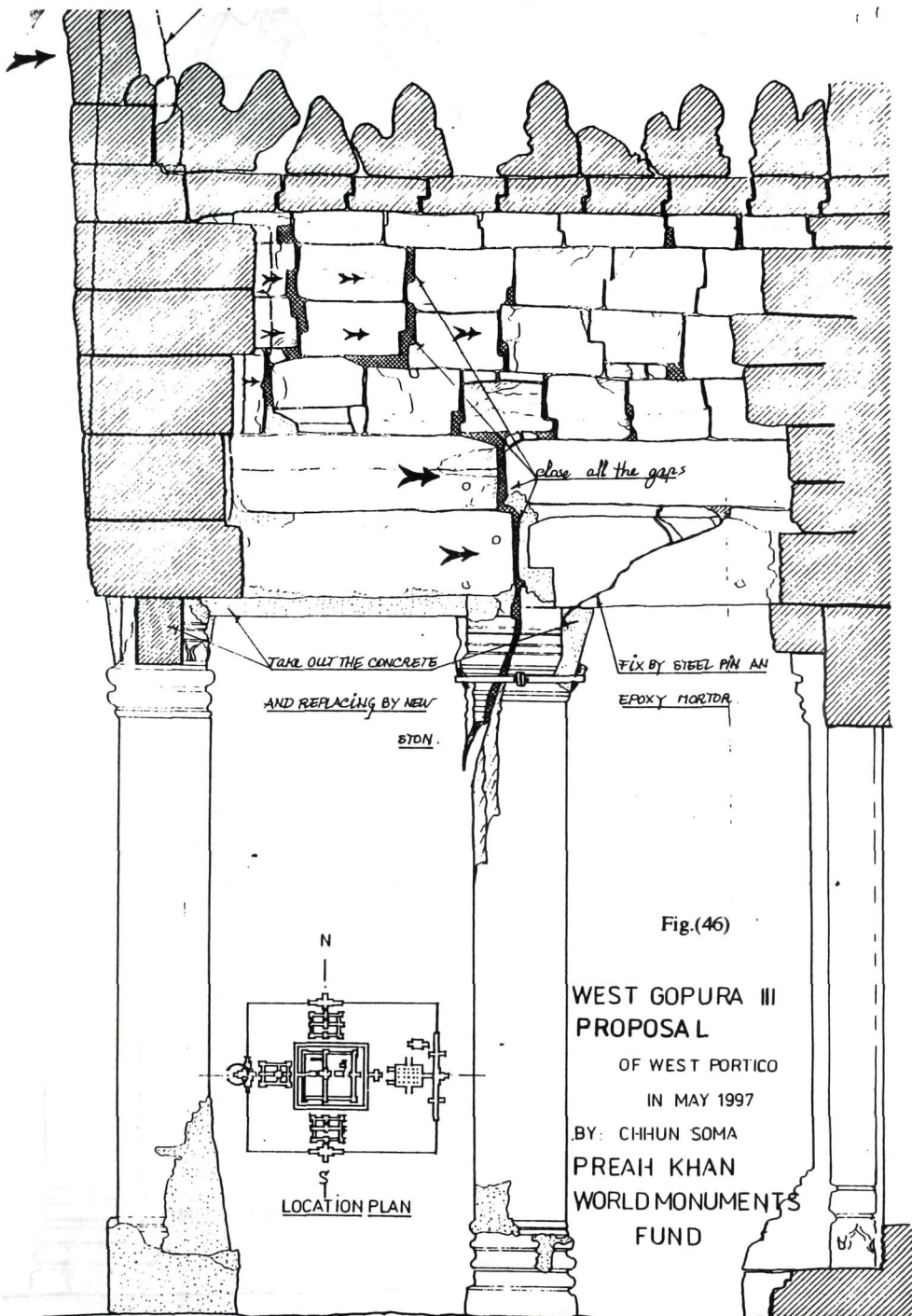


Fig.(46)

# WEST GOPURA III PROPOSAL

OF WEST PORTICO

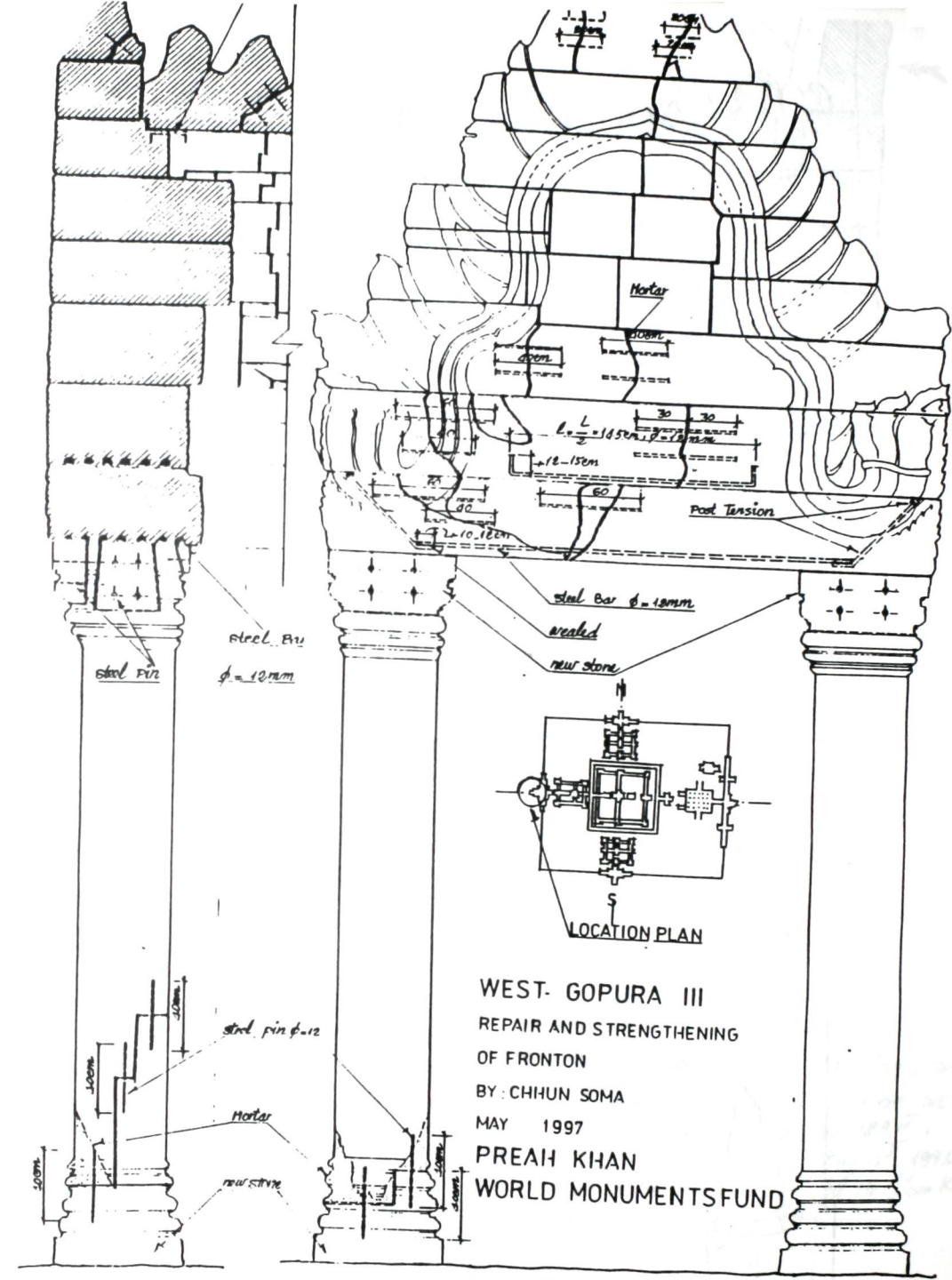
IN MAY 1997

BY: CHIHUN SOMA

PRAEH KHAN  
WORLD MONUMENTS  
FUND

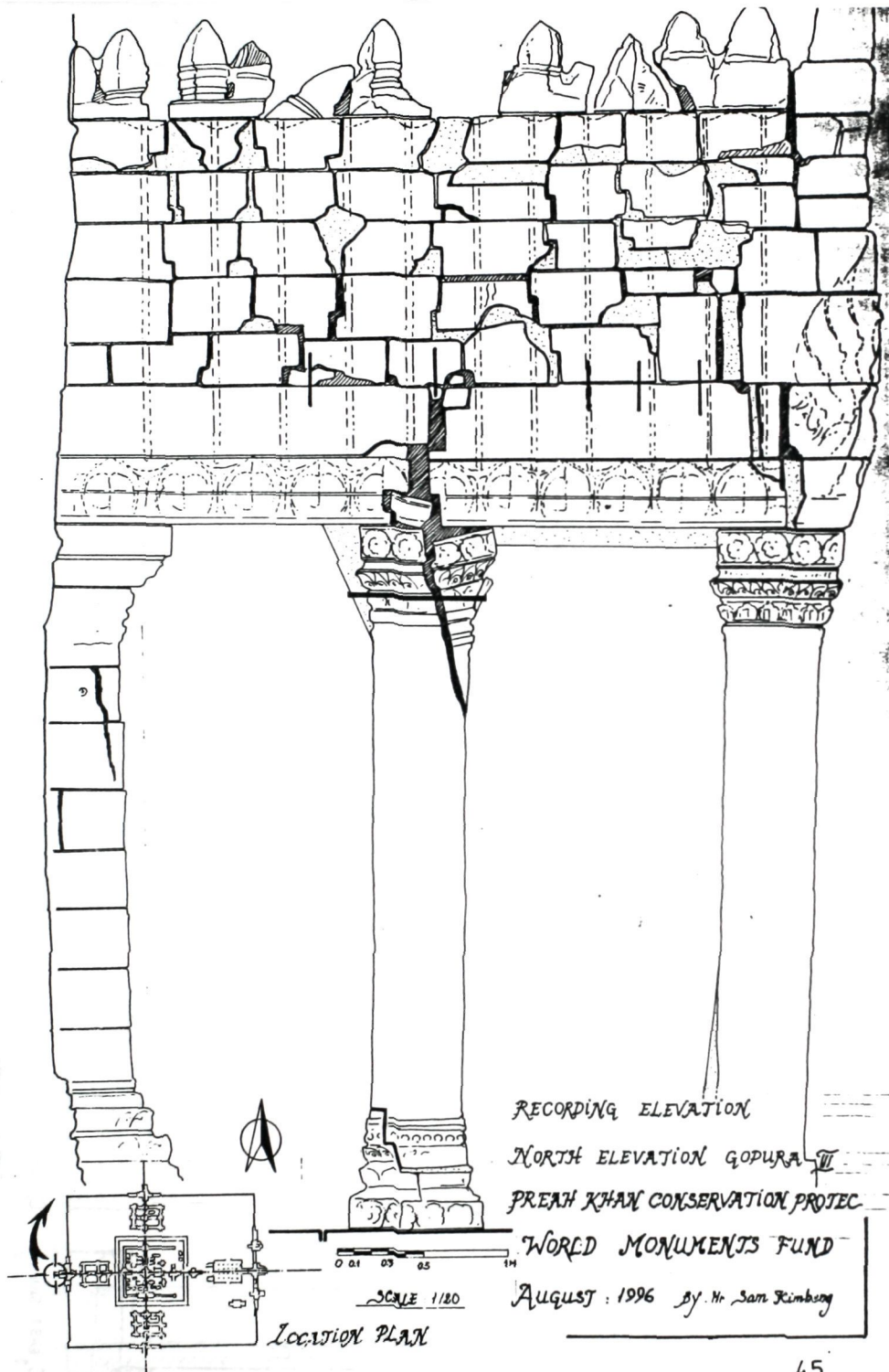
NORTH SECTION

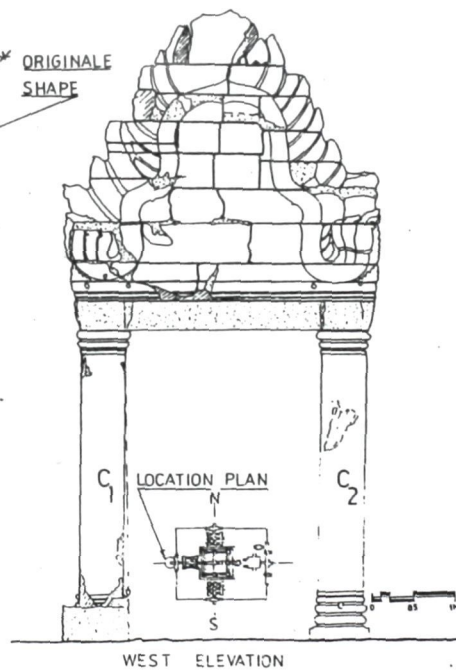
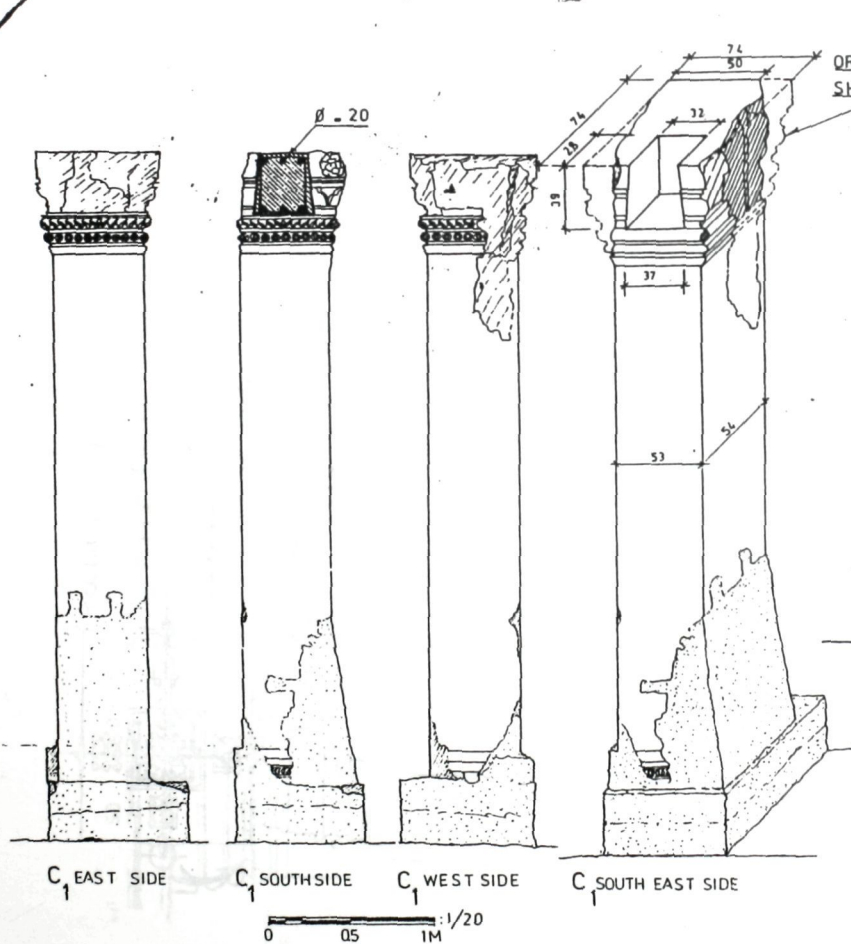




NORTH SECTION OF COLUMN







### WEST GOPURA III

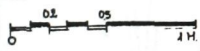
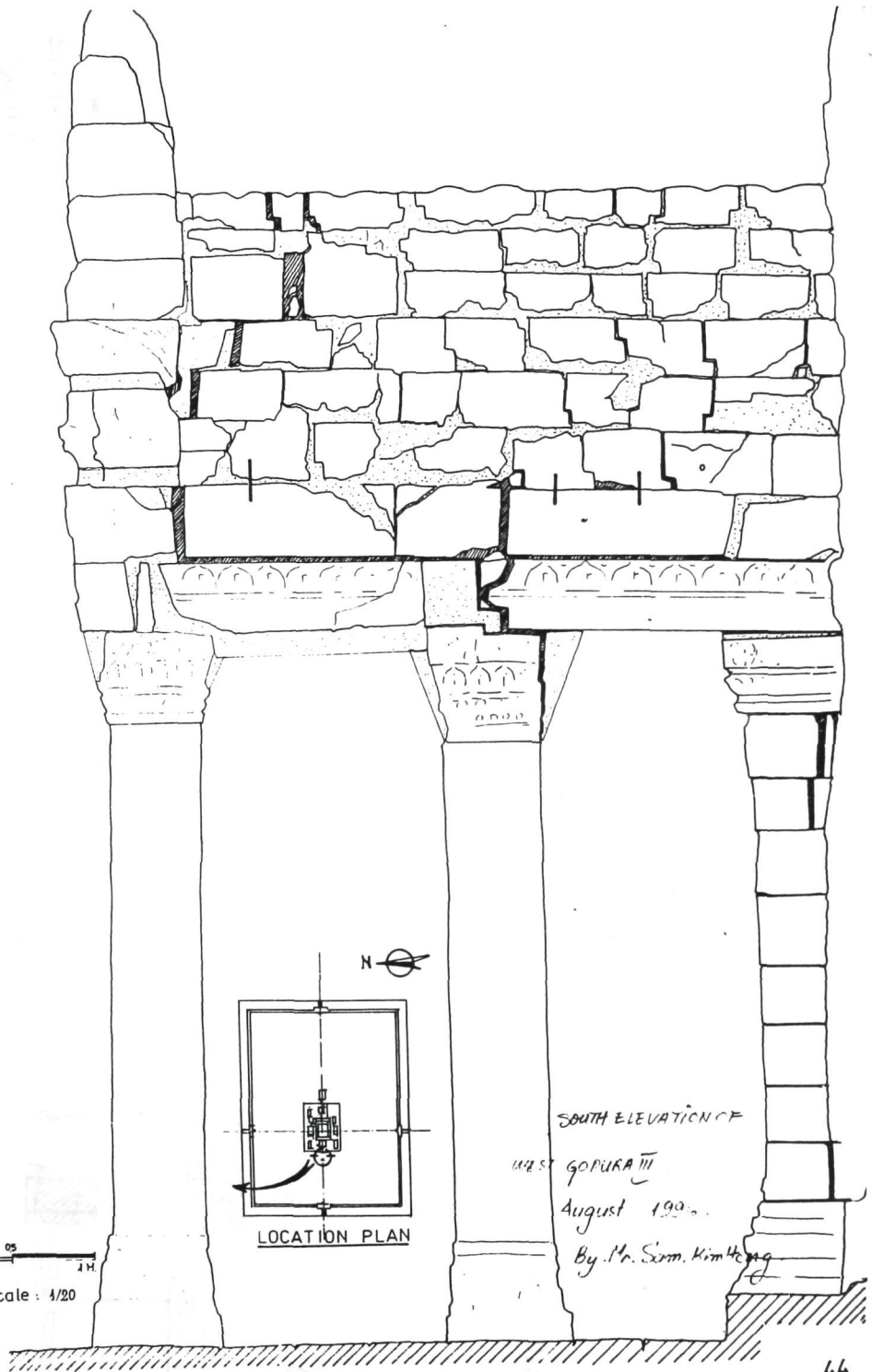
AFTER TAKE OUT THE CONCRETE

COLUMN  $C_1$

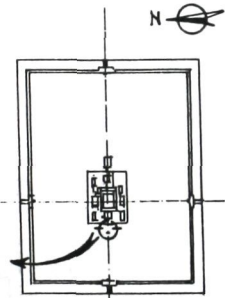
BY CHHUN SOMA

MAY 1997

PRAEH KHAN CONSERVATION PROJECT  
WORLD MONUMENTS FUND



Scale : 1/20

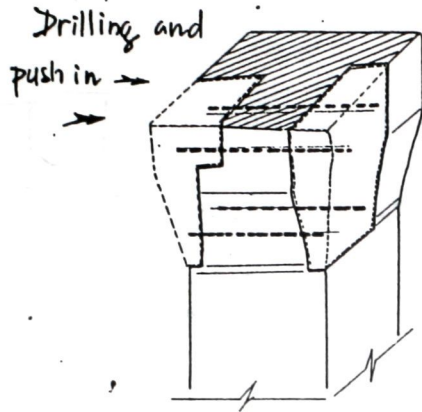


LOCATION PLAN

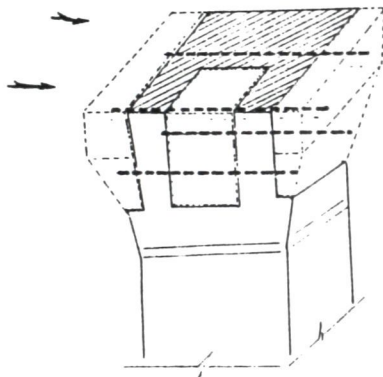
SOUTH ELEVATION OF  
WEST GOPURA III  
August 1922.  
By Mr. Som Kim Hong



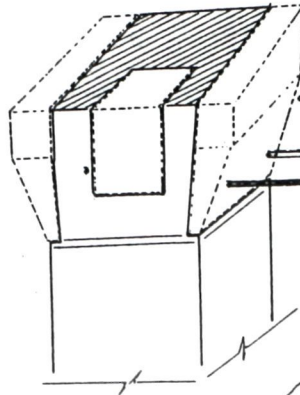
Column head (joint II)



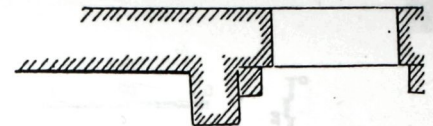
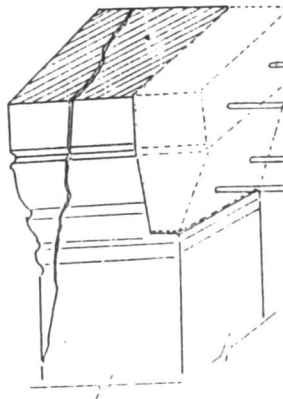
Column head (joint IV)



Column head (joint III)



Column head (joint I)



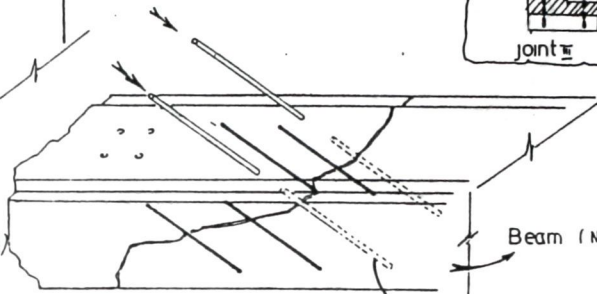
joint I



joint I



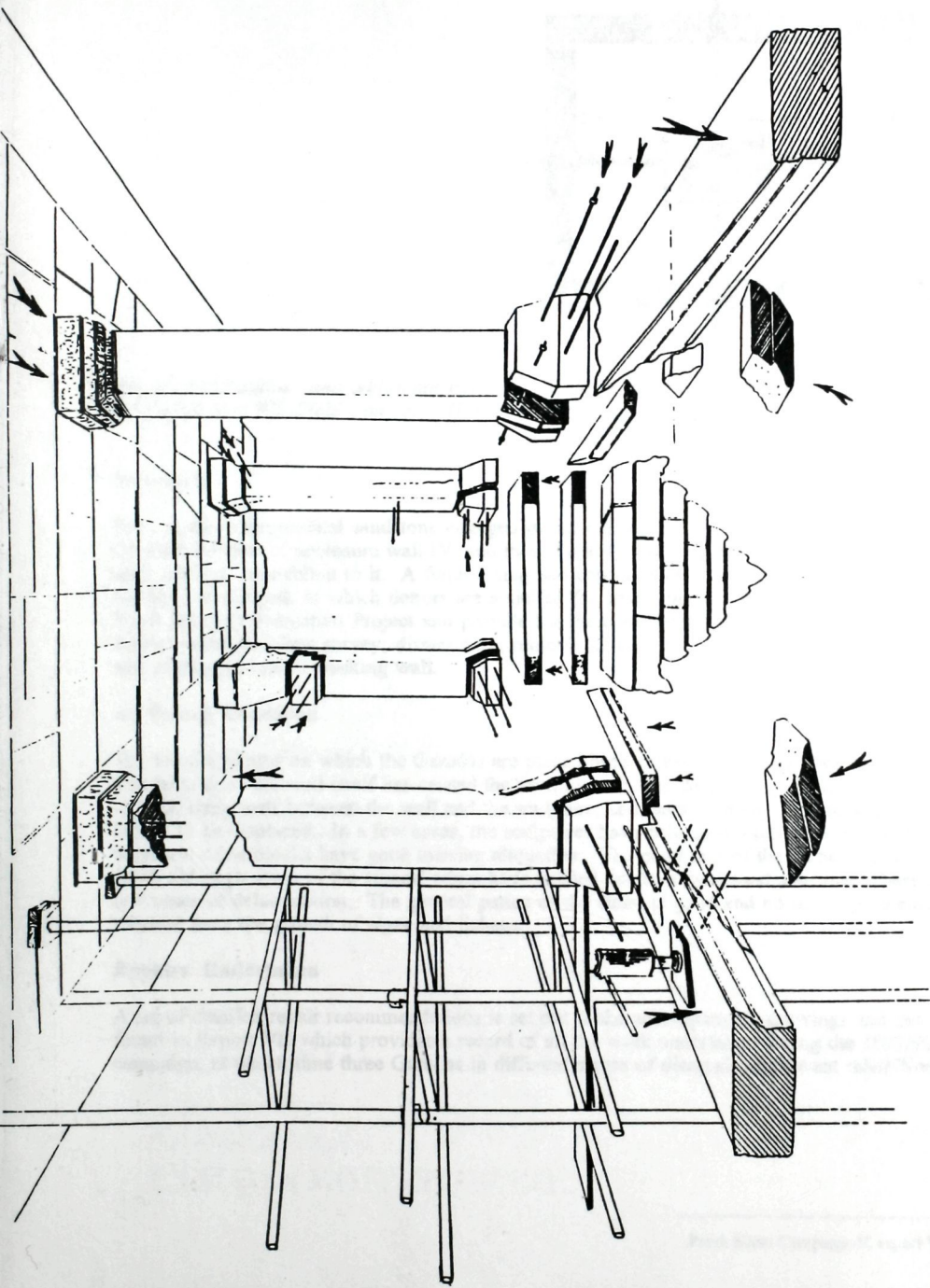
joint II

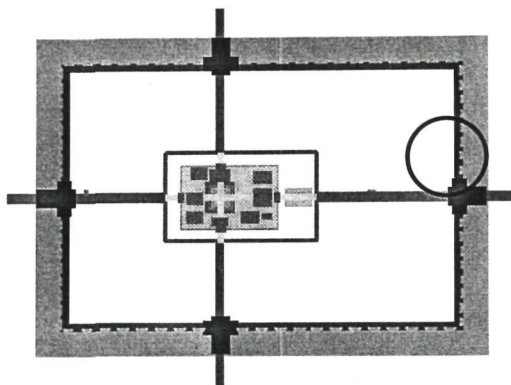


Beam ( $N = \frac{45}{7} N$ )

Stainless steel with

Insulation of the  
beam & the  
July 1997  
for Mr. Samir





*For previous actions and additional information, please refer to Preah Khan Conservation Project Report VII, Field Campaign IV section 2.2.4.*

### Summary

Seventy-two monumental sandstone engaged *garuda* statues are spaced every 35 meters along the outward face of enclosure wall IV, and they stand the full height of the wall (3.25 meters) with minimal connection to it. A fund-raising and conservation strategy called "Adopt a Garuda" has been developed, in which donors are solicited for contributions of \$20,000 to support the Preah Khan Conservation Project and provide for the consolidation and repair of a single statue. Proper repair involves survey, dismantling, removal of termite mounds, realignment, resetting and pinning to laterite backing wall.

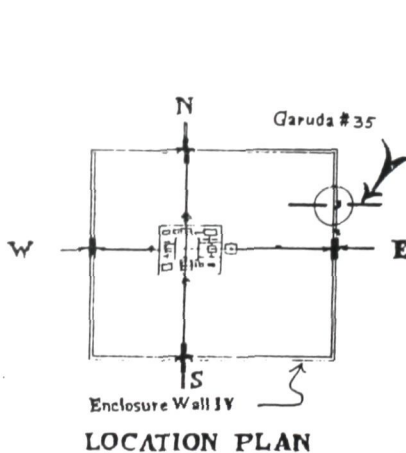
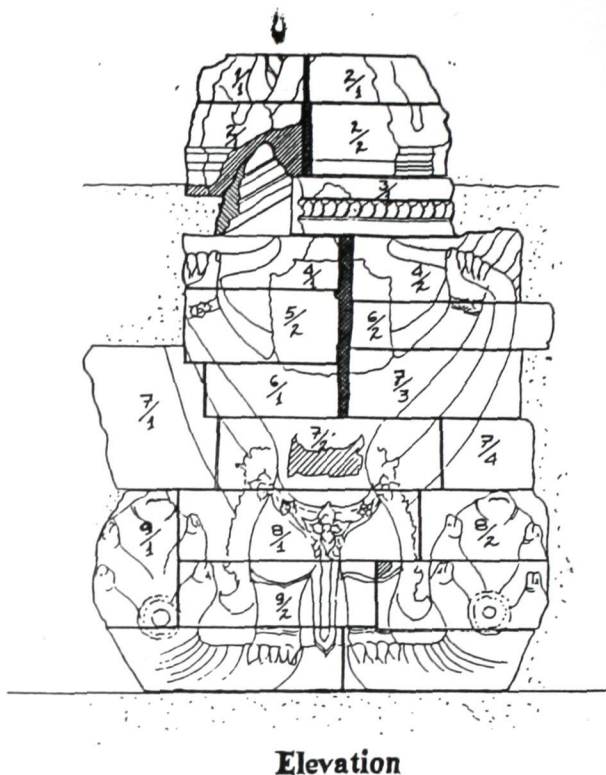
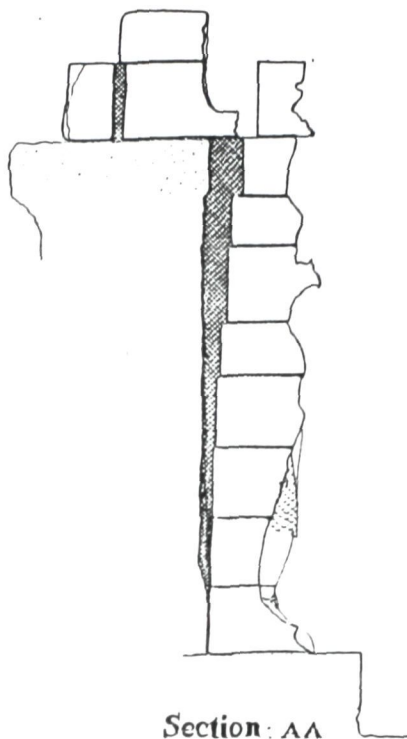
### As Found Condition

The laterite plinths on which the Garudas are placed have settled due to their heavy dead load. The leaning of the wall itself has caused the sculptures to tilt. Subterranean termites have chosen to build their nests between the wall and the sculpture, and have, in many instances, caused the blocks to be displaced. In a few cases, the sculptures have collapsed totally but, fortunately only very few stone blocks have gone missing altogether. The condition of the stone is generally good, although some of the stones' edges have spalled due to a weakened substrate. There are a few cases of delamination. The general patina of the stone is good and no major problems resulted from the growth of algae and lichens.

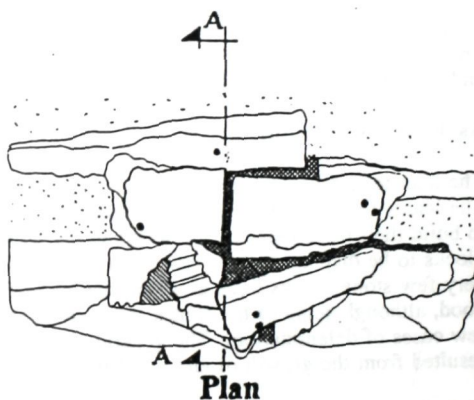
### Repairs Undertaken

A set of detailed repair recommendations is set out in the accompanying drawings and can be found in Report VII which provides a record of all the work undertaken during the 1995/96 field campaign, at which time three Garudas in different stages of disrepair underwent rehabilitation.





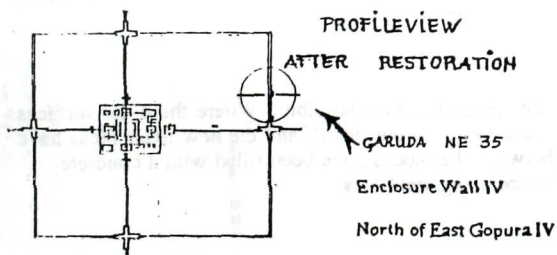
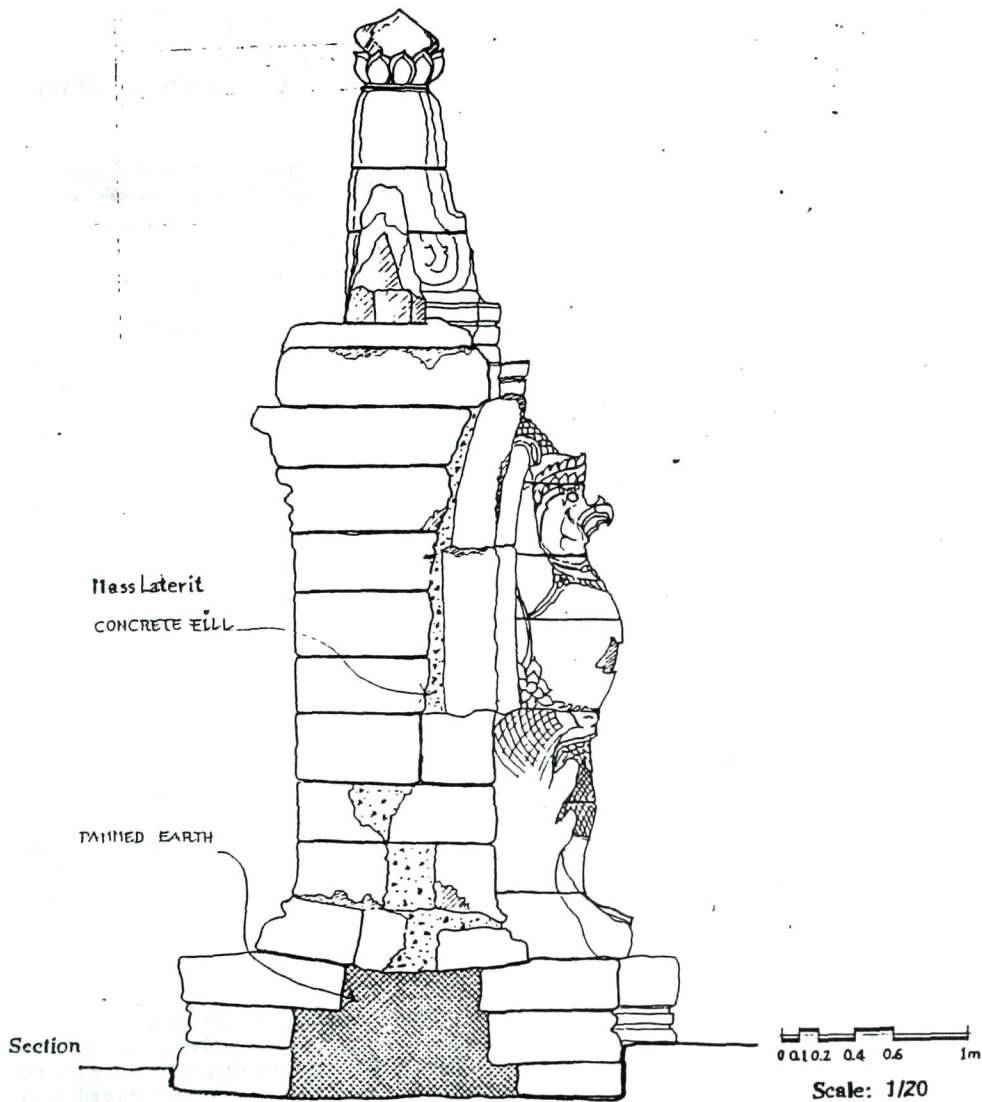
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# **SURVEY AND NUMBERING FOR GARUDA #35**

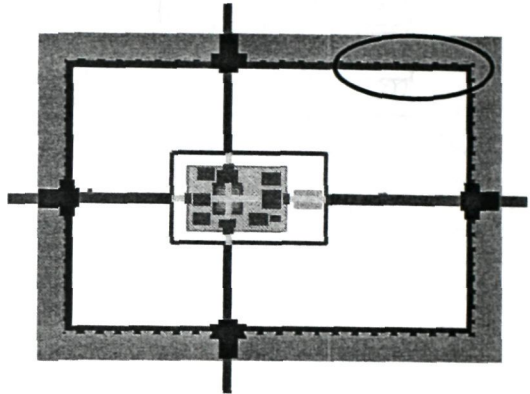
JUNE 1996  
BY: CHRUN SOMA

**PREAH KHAN  
CONSERVATION PROJECT**



REPAIR & STRENGTHENING  
GARUDA # 35 & WALL  
JUNE 1996  
BY : Chhun Soma  
PREAH KHAN CONSERVATION  
PROJECT  
WORLD MONUMENTS FUND

## 2.2.6 ENCLOSURE WALL IV



*For previous actions and additional information, please refer to Preah Khan Conservation Project Report VII, Field Campaign IV section 2.2.3.*

### Northeast Sector

#### **Summary**

The work on the reconstruction of the Enclosure Wall has been carried over from the previous Field Campaign. Enclosure Wall IV and the moat form a rectilinear boundary enclosing the Preah Khan temple complex. The total wall length is approximately 2,760 meters and the precinct contained within it measures 950 by 750 meters. The laterite used in the construction of Preah Khan's outermost protective enclosure is thought to have been excavated from the moat. Were the wall to be completely restored, normal access to the temple could be controlled through the four principle entrance gopuras.

#### **Condition As Found**

About 15 meters to the North of East Gopura IV, a 20 meter wall section standing approximately 4 metres high had collapsed outward at an unknown time, probably within the past one hundred years. The cause of this degradation seemed to be substrate slippage and the hostile encroachment of tree roots. It is part of a small percentage of wall that has been damaged and it was therefore considered important to develop construction technology suitable for rebuilding the wall using as much of the original material as possible.

#### **Repairs Undertaken**

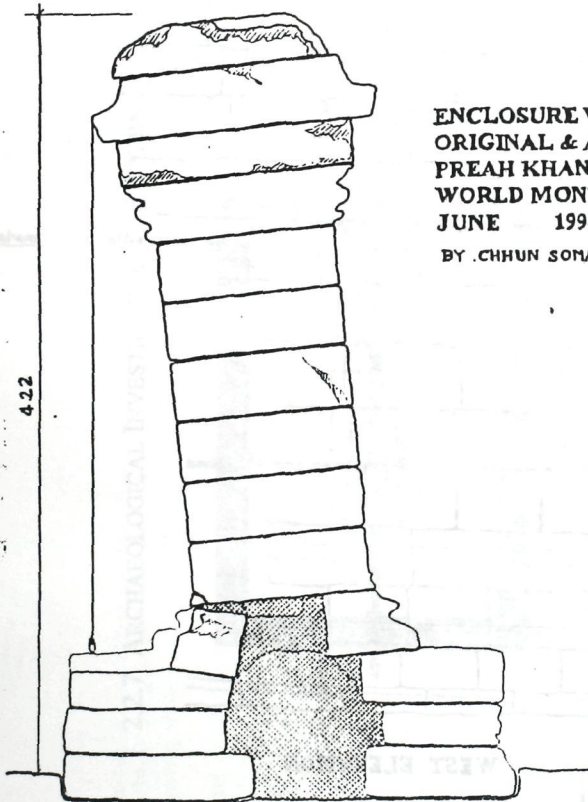
The blocks have been left in their original positions wherever possible. Where the outer surfaces of the blocks have deteriorated badly, the block has been cut in half and the new inner faces have been set as dressed outer faces. The gaps between the blocks have been filled with a concrete laterite mix and the blocks have been reinforced using steel bars.



ENCLOSURE WALL IV, NORTH EAST SECTION  
ORIGINAL & AS FOUND CONDITIONS  
PREAH KHAN CONSERVATION PROJECT  
WORLD MONUMENTS FUND

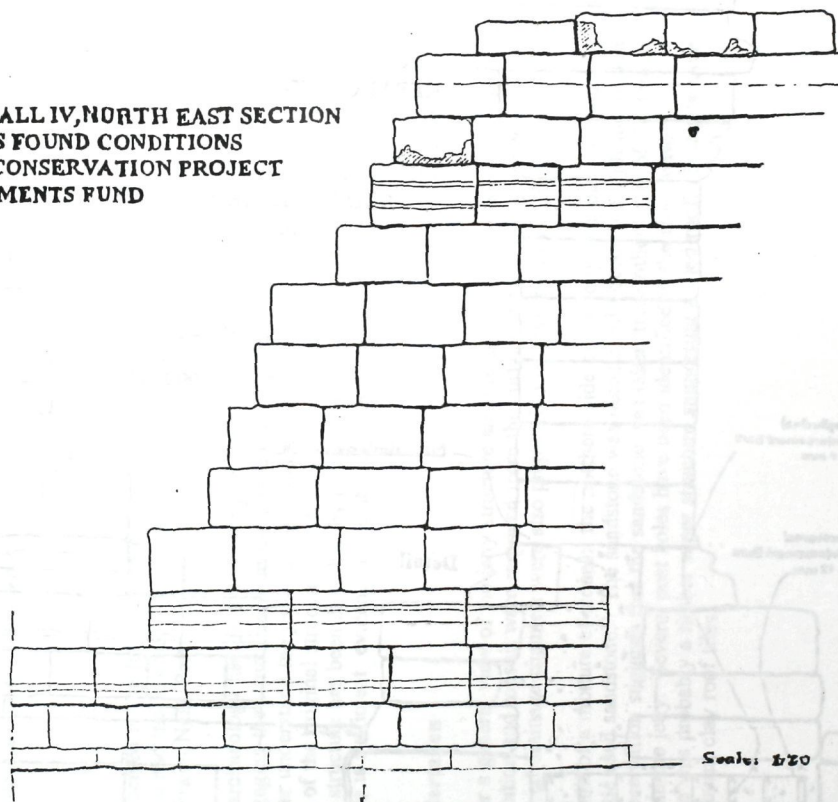
JUNE 1996

BY CHHUN SOMA

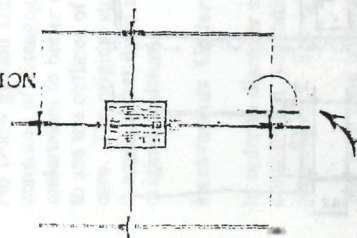


Section

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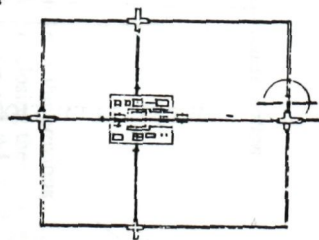
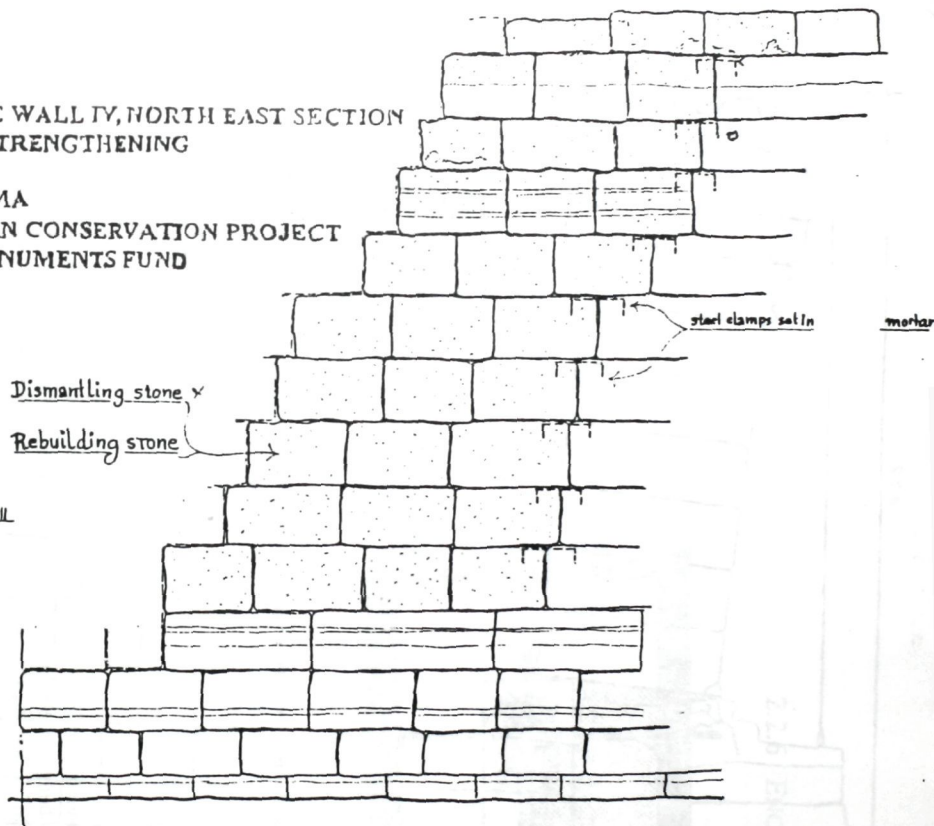
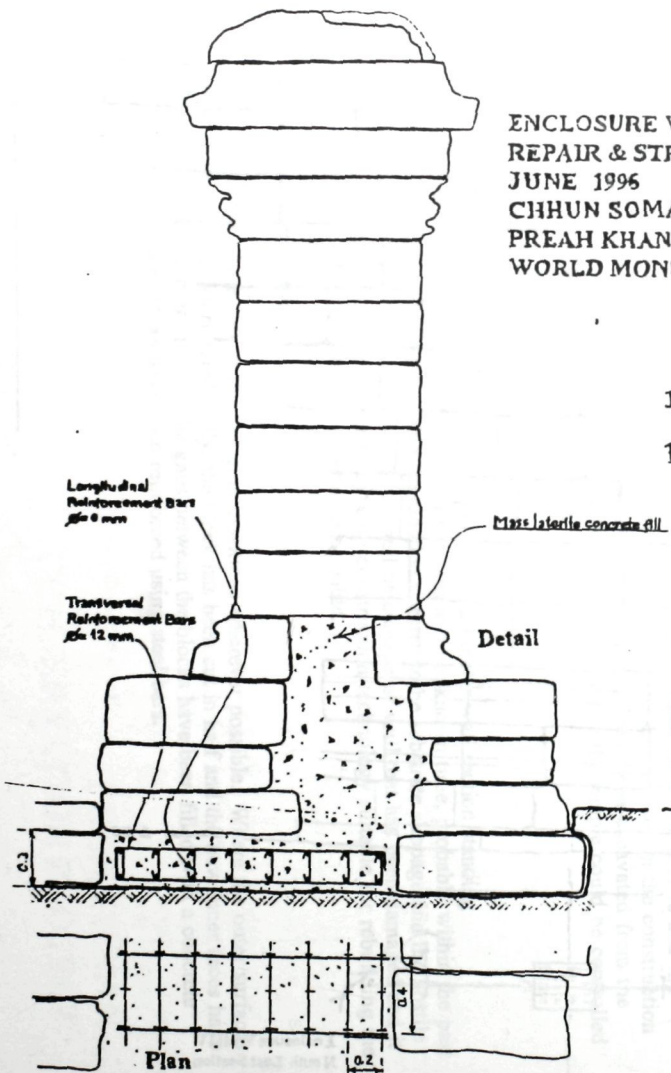


WEST ELEVATION

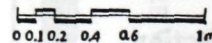


Enclosure Wall IV  
North East Section  
North of East Gopura IV

ENCLOSURE WALL IV, NORTH EAST SECTION  
REPAIR & STRENGTHENING  
JUNE 1996  
CIHUN SOMA  
PREAH KHAN CONSERVATION PROJECT  
WORLD MONUMENTS FUND



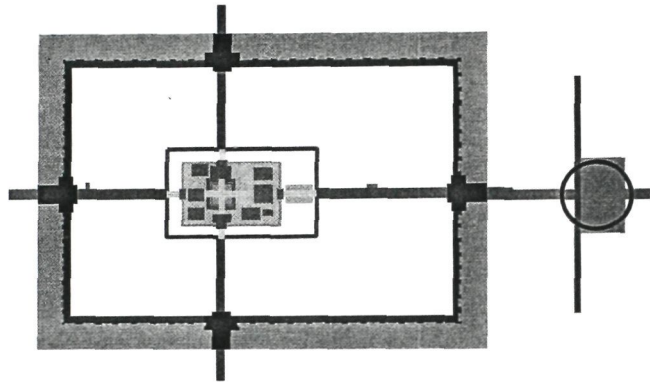
WEST ELEVATION



Scale: 1/20

Enclosure Wall IV  
North East Section  
North of East Gopura IV

## 2.2.7 ARCHAEOLOGICAL INVESTIGATIONS - EASTERN JETTY



*(Based on archaeological notes prepared by team archaeologist, Chan Chamroen)*

### **Summary**

The East Jetty is located at the far East end of the Processional Way leading into Preah Khan. It is between the bund and the Northern Baray (reservoir) and served as the point of egress for the temple known as Prasat Neak Pean located in the middle of the Baray.

No below ground archaeology has been previously undertaken at Preah Khan. Initial work consisted of disengaging the structures from the jungle and clearing the vegetation; this was undertaken to better understand the jetty structure and its relationship to the Baray. It is possible to see the outlines of the original structure which consists of sculpted sandstone over a laterite core. The original structure has been disturbed by the growth of several small trees and shrubs but it appears that there is sufficient evidence to be able to re-establish the basic format of the original structure.

### **Excavations Undertaken**

In order to discover a general view of the jetty structure and the original materials used for its construction, vegetation and topsoil were removed from the surface of the structure as well as its surroundings. Special drainage channels were also prepared to remove storm water.

The jetty base is built of a mixture of stones: the northern side of the jetty was built of laterite and the southern side used sandstone. The sandstone was occasionally decorated with incomplete bas-reliefs; this observation suggests that the sandstone was taken from other parts of the temple and recycled to build the jetty. Several post holes have been identified in the stone base indicating that there was probably a timber super structure supporting a tiled roof. Test pits have revealed pieces of burnt clay roof tiles.



Following general clearance, a small excavation pit was dug across the top of the embankment to establish the relationship between the steps leading from the Processional Way and the jetty itself. A test pit 30 cm. deep and 60cm wide revealed only sand and some pieces of laterite.

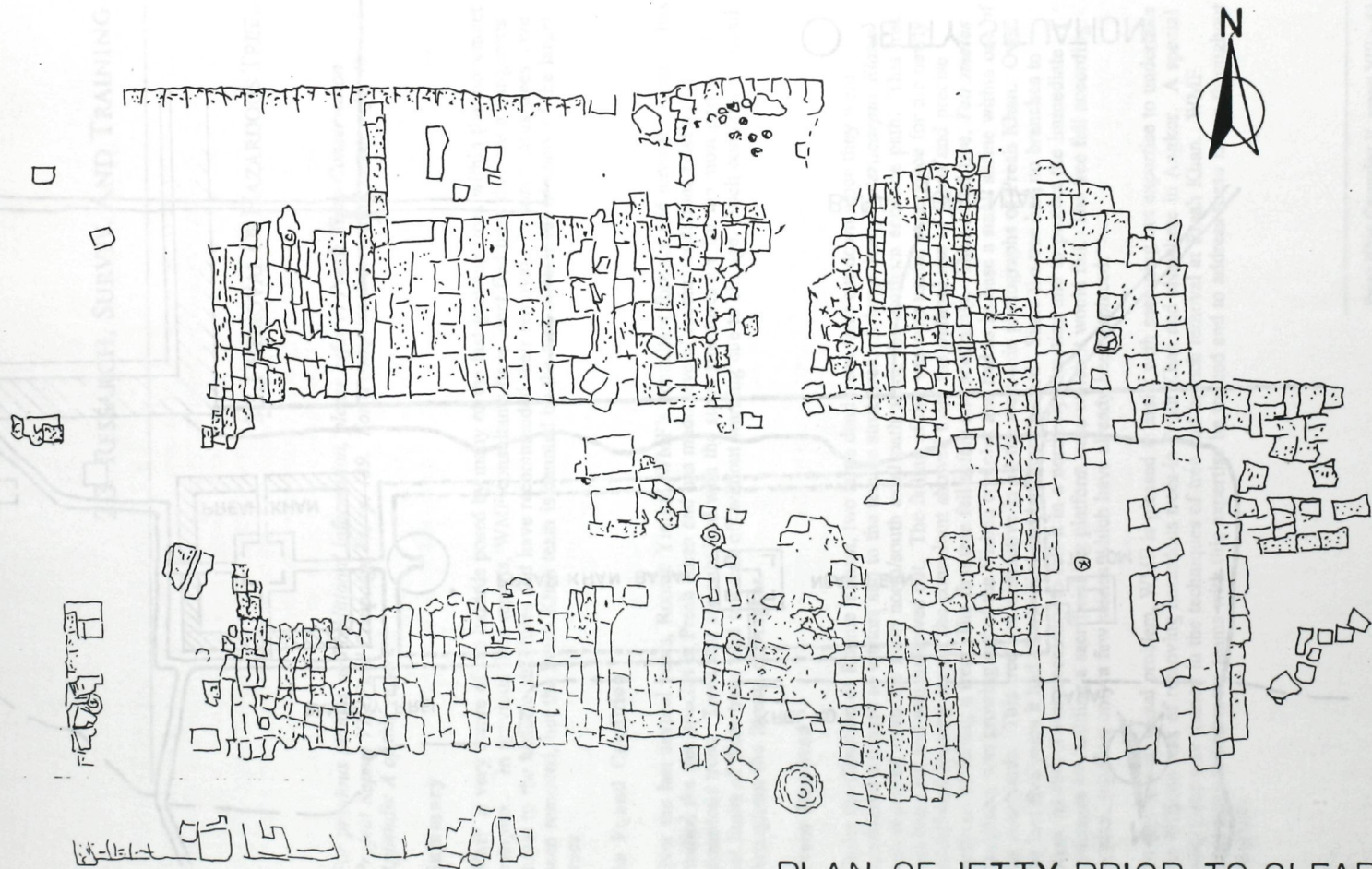
Following these initial investigations, excavations took place on Preah Khan Jetty Unit 1, located on the Jetty itself, and Jetty Unit 2 located between the Jetty and the Processional Way.

Excavations to Unit 1 were undertaken in order to understand the exact structure of the jetty and the excavation pit is located in the central way between the two raised platforms built in laterite. The pit running north south measures 1 meter X 2 meters. During excavations of the 1.40 meter deep pit, many pieces of ceramic shards were found. In the upper layer (80 cm. in depth) finds included some interesting fragments of roof tiles decorated with a lotus pattern. At a depth of 40cm, rammed sandstone chips indicated an occupation level together with special drainage points; this may have been the original foundation level of the Jetty. Above the rammed sandstone layer there was evidence of charcoal, indicating human occupation.

Excavations to Unit 2 on the embankment was carried out with the intention of establishing a relationship on the southern side between the steps from the Processional Way to the jetty and the jetty itself. The unit measured 3 x 8 meters and was excavated to a depth of 1 meter. The floor of the excavation sloped to the west following the line of the present embankment. Similar examples of rammed stone and laterite chips were found in this trench. During these excavations the chronology of construction and the purpose of the rammed stone surfaces was given consideration; it is thought that they could have been applied to protect the stone from rain.

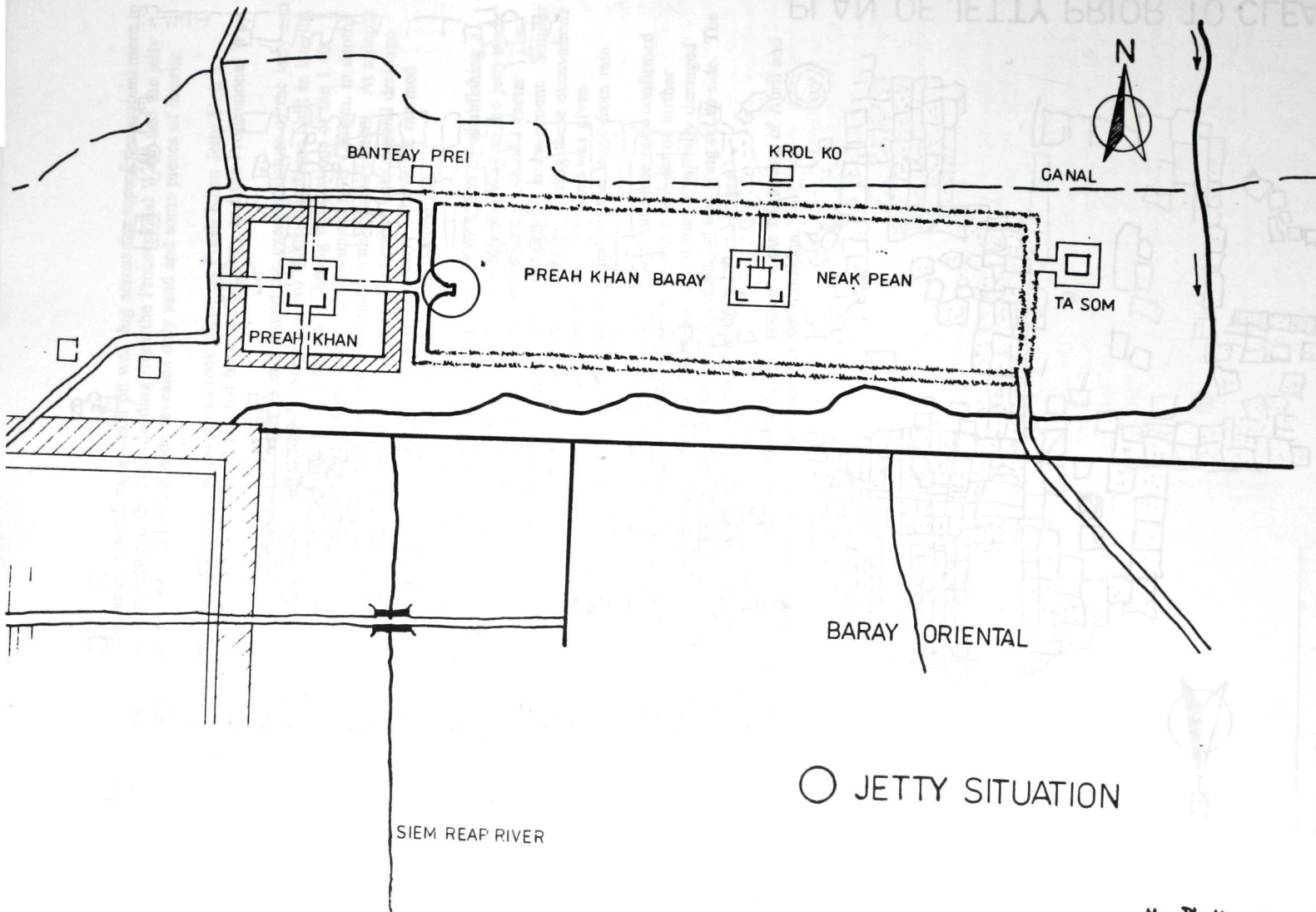
A further four units have been excavated about 1 meter deep in May, but these only confirmed details already identified in previous months. Additional evidence came to light of further laterite flooring and steps leading to the jetty. Also in the south east unit a partially damaged sculpted Naga measuring approximately 100 x 50 cm was found buried and lying on its side. The sculpture, forming the end of a balustrade, had fallen from the platform above.

The excavations at the East Jetty were completed for the season at the beginning of April and the excavation pits have been back-filled in readiness for the monsoon.



PLAN OF JETTY PRIOR TO CLEARING  
PREAH KHAN CONSERVATION PROJECT  
WORLD MONUMENTS FUND

OCTOBER 1996 BY NETH PHOLSA



Ms Phally



## 2.3 RESEARCH, SURVEY, AND TRAINING

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### 2.3.1 REMOVAL OF HAZARDOUS TREES

*For previous actions and additional information, please refer to Preah Khan Conservation Project Report VII, Field Campaign VI, p. 139. For a complete description, please refer to Appendix A of this report.*

#### Summary

WMF is very aware of the hazards posed by many of the fast growing trees within the monument complex. In previous field reports, WMF consultants have identified trees that are a dangerous threat to the historic structures and have recommended their removal. In some cases trees have been removed, but the Preah Khan team is daunted by the task of removal of many of the larger trees.

#### As Found Condition

Over the last several years, Ronnie Yimsut, WMF's consultant forester and environmentalist, has studied the tree species in Preah Khan and has made several recommendations relating to the hazardous trees. Trees that are entwined with the stone structures are for the most part sound, but limbs of these trees tend to break off without warning due to old age. Such conditions prevail throughout the forests of Angkor.

#### Trees Removed

Under the direction of Ronnie Yimsut, two large dead trees were cut down since they were considered a hazard to visitors and to the temple structures. A large dead *Dipteracarpus Elatus* was removed from the main north/south axial path along the northern entrance path. This tree had heart rot and was hollowed out. The felling of this tree was useful experience for the newly established forestry team; the consultant showed them the optimal use of ropes and precise methods of felling a tree. The first tree fell safely and accurately. The second tree, *Tetrameles Nudiflora*, was growing out of the Vishnu complex and had as its base a small shrine within one of the courtyards. This tree was distinctive in all the west side photographs of Preah Khan. Over the last five years it had slowly died and become a hazard. Since the tree had no branches to break its fall, it was necessary to fell it in a northerly direction and to protect the immediate structures by building a sacrificial log platform onto which it would fall. The tree fell according to plan, toppling only a few stones which have already been replaced.

As this is a universal problem, WMF is pleased to assist with searching out expertise to undertake the difficult task of removing hazardous trees in Preah Khan and elsewhere in Angkor. A special workforce was trained in the techniques of tree and branch removal at Preah Khan. WMF recommends that more teams with this expertise be trained and to address these issues throughout Angkor.

## 2.3.2 STONE CONSERVATION TRAINING

### **The UNESCO/ICCROM Stone Conservation Course, Venice**

The Stone Conservation Course is held once every two years under the auspices of UNESCO and ICCROM. It is a practical course suitable for conservators with hands on experience and a basic knowledge of chemistry. In November, Stone Conservation Consultant Paolo Pagnin recommended WMF's assistant architect Var Morin for the course and ICCROM awarded Morin a scholarship to attend from April to June 1997. Morin was the first student to attend from Cambodia, and was warmly received by ICCROM.

Consultant Pagnin, with assistance from a volunteer German stone mason (Christof Rewaver), has trained two of the Preah Khan stone masons in the principles and procedures of stone cutting, fixing and dressing.

### **Informal Site Training for WMF Staff by the Fahochschule, Cologne**

The Fahochschule, Cologne started a field project at Angkor Wat in 1997. Stone Conservator Dr. Hans Leisen and Microbiologist Dr. Thomas Warscheid have twice provided the WMF team demonstrations related to on site analysis of sandstone. They have also taught the team various methods of taking samples for laboratory testing.

## 2.3.3 ON-SITE TRAINING

### **On Site Training by WMF Consultants**

Consultant Gavrilovic provided an intensive on site training program working on the West Gopura Project with the professional team. They closely examined the structure, its defects and went through the process of calculation and design for the repair and consolidation of the fractured stone beams supporting the corbelled vaults. Detailed reports from expert consultants to the Preah Khan project are found in Appendix A.

### **The Expansion of WMF's Training Program in Siem Reap**

In November 1996, Professor William Chapman from the Historic Preservation Program, University of Hawai'i at Manoa visited WMF's program in Cambodia to help develop and recommend a suitable training program in architectural conservation. Prof. Chapman spent time with WMF's international and national staff discussing a variety of different ways to finance and provide suitable and applicable training for those working on the historic structures in Cambodia. A synopsis of Professor Chapman's Report is contained in Appendix A.

### 2.3.4 ASSISTANCE TO FACULTY OF ARCHITECTURE

WMF has set up and will continue to run a program assisting the Faculty of Architecture at the University of Fine Arts in Phnom Penh. At present WMF is funding one of the assistant architects to spend one week each month at the Faculty of Architecture to assist in the development and teaching of a workshop on architecture and providing release for the graduate returning from Taliesin

#### **Toyota Foundation Formal Training**

UNESCO and the Toyota Foundation are supporting a large training initiative at the Faculty of Architecture, Royal university of Fine Arts, Phnom Penh. WMF's Assistant Architect, Lek Sareth who has been appointed as an Assistant Lecturer to the Faculty of Architecture in The Royal University of Fine Arts in Phnom Penh is spending two weeks each month teaching a course in Computer Aided Design to architectural students. Both UNESCO which is administering the training program and the Faculty of Architecture are grateful for WMF's commitment to supporting the training program by giving Sareth the time to participate.

#### **WMF Staff at the Faculty of Architecture**

The Faculty of architecture has benefited this year from an informal arrangement with WMF for Assistant Architect Morin to spend one week each month at the Faculty at WMF's expense to teach the First year students in a series of practical workshops and to also introduce them to architectural conservation and project management.



## SECTION 3

### OTHER ACTIVITIES

3.1 MINOR INTERVENTIONS

3.2 PROJECT ADMINISTRATION

3.3 VISITORS TO PREAH KHAN

3.4 FILM CREWS VISITING PREAH KHAN

3.5 GLOSSARY

## 3.1 MINOR INTERVENTIONS

### **General**

During the Field Campaign, several smaller interventions took place which were carried out as part of an effort to secure loose stones or to prevent further damage or collapse.

### **East Gallery II South Sector**

In October, several loose laterite blocks in the corbelled vaults were identified as being a threat to visitors' safety and it was decided to consolidate them. A scaffolding was erected and the loose blocks were reset and in some instances tied back into the structure. One large stone which had previously fallen to the ground has been identified, but it was considered best to leave the stone at ground level.

### **Central South West Column - Hall of Dancers**

In December some stones at the top of the Central West Column were deemed unstable and it was decided to remove the stones in question and to consolidate them. Seven stones were stabilized and four were drilled and doweled to consolidate them and all the stones were set back in their original locations.

### **Repair of Guardian Lion - South East Portico East Gopura III:**

Under the Stone Conservator Pagnin's careful supervision, the guardian lion on the southern side of the East Portico was carefully repaired and a new piece of sandstone was pieced in to replace a hind leg. This was essential to the stability of the sculpture. Repairs were carried out as before using glass fiber dowels and epoxy resins to fix the new stone. The stone used as a replacement was an anonymous recycled stone from Preah Khan, which has been dressed so that it is easily recognizable as being a replacement. The lion is now reset on its original plinth. Its pair is in a very damaged state and until now it has not been possible to identify several of the missing parts of the sculpture.

## 3.2 PROJECT ADMINISTRATION

The project administration has undergone several changes this season a result of the development of a more mature experienced staff. All members of the team both at site as well as the professional staff have been given specific responsibilities as their individual contribution to the administration of the project as a whole. The result has been that the WMF Consultants have been able to expand their limited time to more specific and more complex interventions. The workforce has been carefully monitored and all those with initiative have been given positions of responsibility, often being appointed as a "chef de group".

### 3.2.1 PROFESSIONAL STAFF

Field Campaign V saw the introduction of a full time staff that had completed their academic training. The five architects who have been working for the Preah Khan Project since 1992 have all received masters degrees. The local Professional Staff at present working at Preah Khan are:

Lek Sareth	<i>Assistant Architect</i>
Var Morin	<i>Assistant Architect</i>
Chan Chamroen	<i>Archaeologist</i>
Ms Cheam Phally	<i>Architect-Supervisor</i>
Ms Chhun Soma	<i>Architect-Supervisor</i>
Heng Kimheng	<i>Architect-Supervisor</i>

### 3.2.2 ADMINISTRATIVE STAFF

The general administration of the project has been given handed to Kussom Sarun. The task of running such a project consists of numerous challenges of staff administration, materials acquisition, budget management, and maintenance of the WMF Project House. Sarun's efforts in meeting these challenges have been laudable.

The site is run by Chef de Chantier Ouk Samon who is responsible for the management of the entire work force and for translating the requirements of consultants and professional staff to the eleven different work groups. This system is now well established and runs smoothly.

Kussom Sarun	<i>Assistant Administration</i>
Ouk Samon	<i>Chef de Chantier</i>
Im Chenda	<i>Site Administrative Assistant &amp; Shopkeeper</i>
Ra	<i>Driver</i>
Ms Sun	<i>Housekeeping</i>
Ms Ari	<i>Housekeeping</i>



WMF has been fortunate in having three very special people providing special contributions to the Preah Khan Project. Kim Umemoto an American who has spent most of her life in Asia joined the team as general assistant and made a great contribution to the development of the Visitor Centre and became a well known guide to the many special visitors who visited the project.

### 3.2.3 VOLUNTEER STAFF

Andrew Dennis another American returned for a short period to volunteer having spent a season with the project already. Andrew's particular contribution before was in assisting in the development of an environmental program at Preah Khan and in particular a nature trail. Andrew continued his good work in this field assisted Kim in guiding visitors through Preah Khan and also produced an excellent brochure on the natural environment of Preah Khan.

Felicity Priest a British maritime artist, became Preah Khan's "Artist in Residence" and has spent a very successful six weeks in Angkor preparing canvasses for an exhibition. During her time in Preah Khan, Felicity plans to complete 15 large canvasses for a traveling exhibition. The proceeds from the exhibition will contribute to the Preah Khan Conservation Project. During her time at Angkor, Felicity was able to teach the professional staff techniques of drawing and painting. Heng, who was attached to Felicity full time, has made great progress and accomplished several excellent drawings himself. His skills will be very useful for illustrating the Preah Khan Project in progress.

### 3.3 VISITORS TO PREAH KHAN

Throughout the Field Campaign there was a constant flow of visitors to Preah Khan most of whom were fascinated by the whole presentation of the project. There is a Visitors Book at the site in which people can record their comments and views and these comments give the staff and other visitors a good indication of the success of the project. Listed below are the principal groups that visited the project during Field Campaign V.

#### **World Monuments Fund New York Sponsors Group:**

In November the WMF New York Sponsors group visited Angkor accompanied by Bonnie Burnham H.E Vann Molyvann welcomed the group and hosted a dinner in the group's honour. John Sanday guided the group and a special performance of classical dancing was put on at Preah Khan

#### **Australian Ambassador from Vietnam and Party:**

The Australian Ambassador Ms Sue Boyd with a party of five visited Angkor in November. Ms Boyd was impressed with the work at Preah Khan and offered to identify potential funding from Australia.

#### **Helen Jessup and Party:**

Ms Helen Jessup the curator of the Khmer Exhibition at the National Gallery in Washington visited Angkor in November, accompanied by Susan Alensburg from the National Gallery of Art in Washington and they were looking for promotional material and background information for the Khmer Exhibition.

#### **The World Monuments Fund in Britain Sponsors Group:**

At the end of November, a group arranged by the WMF in Britain, one of the first British groups to visit Angkor and certainly to visit Preah Khan brought a group of 15 people to Cambodia.. They were a very enthusiastic group of people led by Steppes East from the UK with Elizabeth Llewelyn as the WMF representative. Among the group was Mr. & Mrs. Christopher Brewer who had sponsored a Garuda - Christopher Brewer had visited Angkor in the 1950's

#### **World Monuments Fund New York Group:**

Ms Lois de Menil brought the first tour group of January 1997. Assistant Kim Umemoto arranged a tour for them and for the local classical dance group to perform.

### **The National Trust for Historic Preservation Group**

The National Trust for Historic Preservation sent a group at the beginning of January. This tour had been planned many months in advance and Kim Umemeto provided them with a guided tour and arranged a special classical dance performance for them.

### **The Waltburg Group:**

At the end of January a group from Austria and Germany who had read about the Project and asked their tour agent to contact the WMF house to arrange a special tour and classical dance programme.

### **The Art Gallery Group:**

A tour for the Art Gallery Group sent by Abercrombie & Kent, visited Preah Khan and made a donation to the project fund.

### **The Siam Society Group:**

A special group from the USA hosted by the Siam Society and Prince Diskul visited Preah Khan in January. President of the Siam Society Ms Ruth Punpocha who was with the group has invited WMF to introduce the Preah Khan project in a lecture to the society as she considered it an excellent forum for making WMF's activities at Angkor better known.

### **The Frank Lloyd Wright Foundation Group:**

Following a long association with WMF's project in Angkor, a group of five members from the Frank Lloyd Wright Foundation, Taliesin including the Dean, Tom Casey and the Chairman, Richard Carney, extended their trip to Thailand to visit the WMF at Preah Khan and to meet the prospective students hoping to study at the Frank Lloyd Wright School. The group appreciated the conservation activities and were particularly impressed by the recording and archival work the Khmer architects were doing at Preah Khan. They proposed the establishment of a Taliesin Educational Fund to support the training of architectural students at the Frank Lloyd Wright School of Architecture.

### **Mr. Richard Helfer, CEO Raffles International Hotels:**

Following Bonnie Burnham's meeting with Richard Helfer, and the WMF team's contacts with the architectural staff working on the Grand Hotel, provided an opportunity to invite Richard Helfer to visit Preah Khan. Mr. Helfer, who was intrigued with WMF's work as well as the presentation of the site, asked whether the WMF team could assist the hotel with an introduction programme to Angkor for their guests, as well as the possibility of special tours around Preah Khan including special dance programmes and events there. The hotel were very interested in helping to promote WMF's activities and assisting in fund raising for the Preah Khan Project.



### **The World President Organisation Academy:**

In February the WPO requested WMF to provide a resource person for their group of 42 visitors to show them around Preah Khan. As was to be expected they were a very demanding group and set in their ideas which were not always ideal for Angkor. The tour was organised by Abercrombie and Kent out of Hong Kong. The tour was given the accolade as the best tour provided.

### **Around the World by Private Jet Group:**

On 19th March five groups of approximately 20 people in each group were taken in relays through Preah Khan by Kim and Andrew. This rather exotic group came under the auspices of the National Trust Washington.

### **Ms Alberta Arthur:**

At the request of Cecily Cook from the Asian Cultural Council, the WMF team looked after Ms Arthur and she joined the WPO group's tour of Preah Khan.

### **Travel Trade Group Sponsored by Raffles:**

At the end of March, the Raffles Group staff asked me specifically to take this group of travel trade journalists over Preah Khan to introduce them to WMF's work. They were a very enthusiastic bunch and will publish details on the special by appointment Preah Khan Tours and Classical Dance performances.

### **The Fahochshule Mission:**

WMF team welcomed the return of its colleagues from Cologne. Dr. Jaro Poncar, who has generously given all profits for the sale of his book at Preah Khan returned with his cameras to record the Apsaras of Angkor Wat. His team of Dr. Hans Leisen and Dr. Thomas Warscheid are keen to collaborate with the WMF project and to extend their research activities to Preah Khan where appropriate.

### **The Natural History Museum New York:**

The Natural History Museum brought a large group back to Angkor and requested a special tour of Preah Khan, which was organised by the Preah Khan team. It was an excellent opportunity for promoting the project as this group was scheduled to join the Vietnam Cruise along with the At Institute of Chicago.

### **The Art Institute of Chicago:**

In March, a group of 29 members of the Art Institute of Chicago led by Avalon Tours visited Angkor. During this time the group was given a special tour of Preah Khan as well as a separate classical dance performance in the Hall of Dancers followed by a reception at the Preah Khan Depot. The group was enormously impressed with the Project. Following their visit to Angkor, Sanday was invited as guest lecturer for one week on a cruise shared by the Institute and the Natural History Museum Group along the coast of Vietnam. Mr. Edward Horner the Vice President for Development & Public Affairs, joined the group for the cruise and was very enthusiastic about the reactions of his group.

### **The National Trust for Historic Preservation:**

On Sunday 16th March a National Trust for Historic Preservation Group which was on a Round the World by Private Jet tour, requested a special tour in Preah Khan for its 87 members

### **Mr. and Mrs. Henry Grunwald:**

At the end of March, following a request from WMF New York, the Preah Khan team was pleased to receive Mr. and Mrs. Grunwald and show them over Preah Khan.

### **The Ambassador to the European Union for the Region:**

A tour was arranged for H.E. and Mrs. Caillouet from the European Union Delegation of the European Commission, around Preah Khan. Both were very pleased with the work being undertaken and strongly encouraged WMF to apply for funding through Mr. Caillouet's office in Bangkok.

### **The Wallace Alexander Gerbode Foundation:**

Thomas Leyton and party visited Preah Khan with Tour East and following discussions with the WMF team's work in Angkor, Mr. Leyton has offered to help prepare a proposal for grant assistance to the Ford Foundation with whom he is closely associated.

### **Eleanor Briggs:**

Eleanor Briggs, a member of the WMF has spent the month of March on the Tonlesap carrying out a study of bird life on the lake. However, during her time off Eleanor Briggs was able to join one of the tours of Preah Khan and was very excited with WMF's activities there. As a result of her visit, Eleanor Briggs has very generously adopted two Garudas.



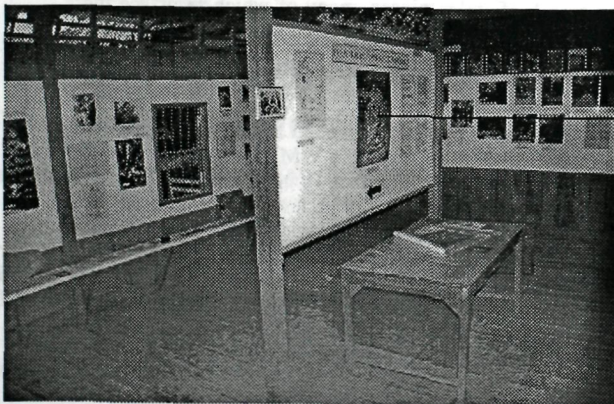
WMF's Preah Khan  
Visitors' Center

*above:* information gazebo

*below:* interior of Center



Previous WMF field  
campaign reports



Visitor displays related  
to conservation activi-  
ties, Khmer civilization,  
and local flora & fauna



### 3.4 FILM CREWS VISITING PREAH KHAN

WMF was host to two film crews in April 1997. The National Geographic Television department wished to make a documentary about the problems of looting in Angkor and the international effort to help conserve the monuments of Angkor. Edge Films whose director was inspired by the black and white photographs of Kenro Izu wished to contribute to the Angkor efforts by preparing a public services announcement to help raise funds for WMF's Preah Khan Project.

#### 3.4.1 The National Geographic Television Documentary:

Following extended correspondence, NGT visited Angkor in January to discuss their proposed documentary developed around the topics of recent efforts of conserving Angkor and the problems of theft and looting of Khmer artifacts. The NGT planned originally to shoot the story in March and to have the film released in time for the Khmer Exhibition in Washington.

NGT received moral and administrative support from APSARA and UNESCO and the WMF team provided the necessary field support. There were the inevitable delays and changes in their schedule as well as a change of director. The crew finally arrived in Siem Reap mid-April. NGT asked John Sanday to act as the "anchor" man in Cambodia and also brought consultant environmentalist, Ronnie Yimsut, from the US to participate.

The theme of the documentary was focused on the issues of looting, the efforts of Cambodia and the international community to stem it and the conservation efforts at Angkor with special reference to WMF's contribution at Preah Khan. The filming called for some air shots two hours were spent over Angkor in a helicopter. There was a fly over shot taken of Preah Khan, but most of the time was spent over Angkor Wat. The crew spent about one week filming in and around Preah Khan. They were interested in WMF's training efforts and the appropriate conservation technology demonstrated by the work force. Also WMF's unique approach to the conservation of the jungle environment as seen through Ronnie Yimsut's eyes. The documentary which is planned for release on 31st August. It should become a valuable fund raising tool for Preah Khan. The final stages of the shoot took place in Bangkok where the crew visited the antique shops in search of stolen pieces, many of which resurface there.

#### 3.4.2 Edge Films:

The purpose of Edge Film's visit was to make a 30 second Public Announcement on the Public Broadcasting Service to promote and fund raise for the WMF Cambodian Projects and also for a Children's Hospital which is being built with assistance from Kenro Izu. Kenro Izu is a Japanese photographer of some renown who has photographed architecture around the world. He has produced a book of black and white photographs of Angkor using a large format camera. For his exhibitions the photographs have been printed using the platinum process. The producer was inspired by Mr Izu's photography and they have been used as the basis for filming the clip. Fourteen different locations were identified in Angkor and amongst these were Preah Khan and Neak Pean. Edge films completed their shooting schedule in seven days. The crew used 35 colour negative film but the end product will be in black and white.

### 3.5 GLOSSARY

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*anastylosis*: a method of restoring a monument distinguished by rebuilding the structure using the original methods and materials

*Angkor*: ('city or capital') an ancient capital in Cambodia that was the main center of the Khmer Empire from AD 802 to 1432

*apsara*: a female divinity; heavenly dancer; celestial nymph who entertains the gods and is the sensual reward of kings and heroes who die bravely

*Banteay*: ('fortress') the name given to a temple with an enclosing wall

*baray*: ('lake') a large man-made body of water surrounded by banks of earth; reservoir

*causeway*: a raised road across a body of water

*corbel*: a method of spanning an opening used by the Khmers for arches; it consists of a overlapping arrangement of stones, each course projecting beyond the one below

*dvarapala*: a guardian often standing and holding a club or mace; sculpted in the round and frequently at the entrance to a temple

*fronton*: the triangular vertical face used decoratively above a lintel or over a portico or other entrance

*Garuda*: a mythical creature depicted in Khmer art with the arms and torso of a human and the beak, wings, legs, and claws of an eagle; an enemy of the naga; Vishnu's mount

*gopura*: an elaborate gateway to a temple in the south of India; it serves as an entrance pavilion in walls enclosing a temple

*Khmer*: the ancient indigenous people of Cambodia

*laterite*: a residual product of rock decay abundant in the soil of Cambodia and Northeastern Thailand; characterized by a porous texture and a red color; harden on exposure to air; used as a building material, particularly for foundations of Khmer temples

*lintel*: a crossbeam resting on two upright posts; on a Khmer temple the lintel is above the door or window opening, directly below the pediment

*Phnom*: the Khmer word for 'hill' or 'mount'

*pilaster*: a column used on the side of an open doorway that projects slightly from the wall

*portico*: an entrance porch

*preah*: 'sacred' 'holy'

*stele*: an upright slab bearing an inscription

*stucco*: a plaster used decoratively for covering walls (brick wall in Khmer architecture)

*Tonle Sap*: ('sweet water') a freshwater sea in western Cambodia that is linked with the Mekong River by the Tonle Sap River

*vault*: an arch extended in depth

*Vishnu*: one of the three major Hindu gods; the preserver and protector

*wat*: a Thai word meaning 'temple'