

# Phnom Bakheng Conservation Master Plan

## THE CONSERVATION AND PRESENTATION OF PHNOM BAKHENG



# 2

## Volume 2: Supporting Data

Phnom Bakheng, the mountain temple at the center of Angkor World Heritage site is a dramatic expression of the genius of the Khmer people and their king Yasovarman. Yasovarman named his new city Yasodharapura, which remained the official name of the capital until the end of the Angkor period.

Consecrated in 907 AD Bakheng is part of an unparalleled architectural and religious legacy of a group of monuments spanning five hundred years from the tenth to the fourteenth century. It represents a masterpiece of human creative genius for the high quality of its artistic work and the integration of its symbolic form with the natural landscape to create a physical manifestation of a Hindu cosmological template of the perfect universe.



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World Monuments Fund / APSARA Authority Collaborative Project

# **Phnom Bakheng Conservation Master Plan: the conservation and presentation of Phnom Bakheng**

## **Volume 2: Supporting Data**

Phnom Bakheng is a 10th century mountain temple centrally located in the World Heritage site of Angkor, Cambodia



Prepared by the World Monuments Fund  
under the auspice of the APSARA Authority

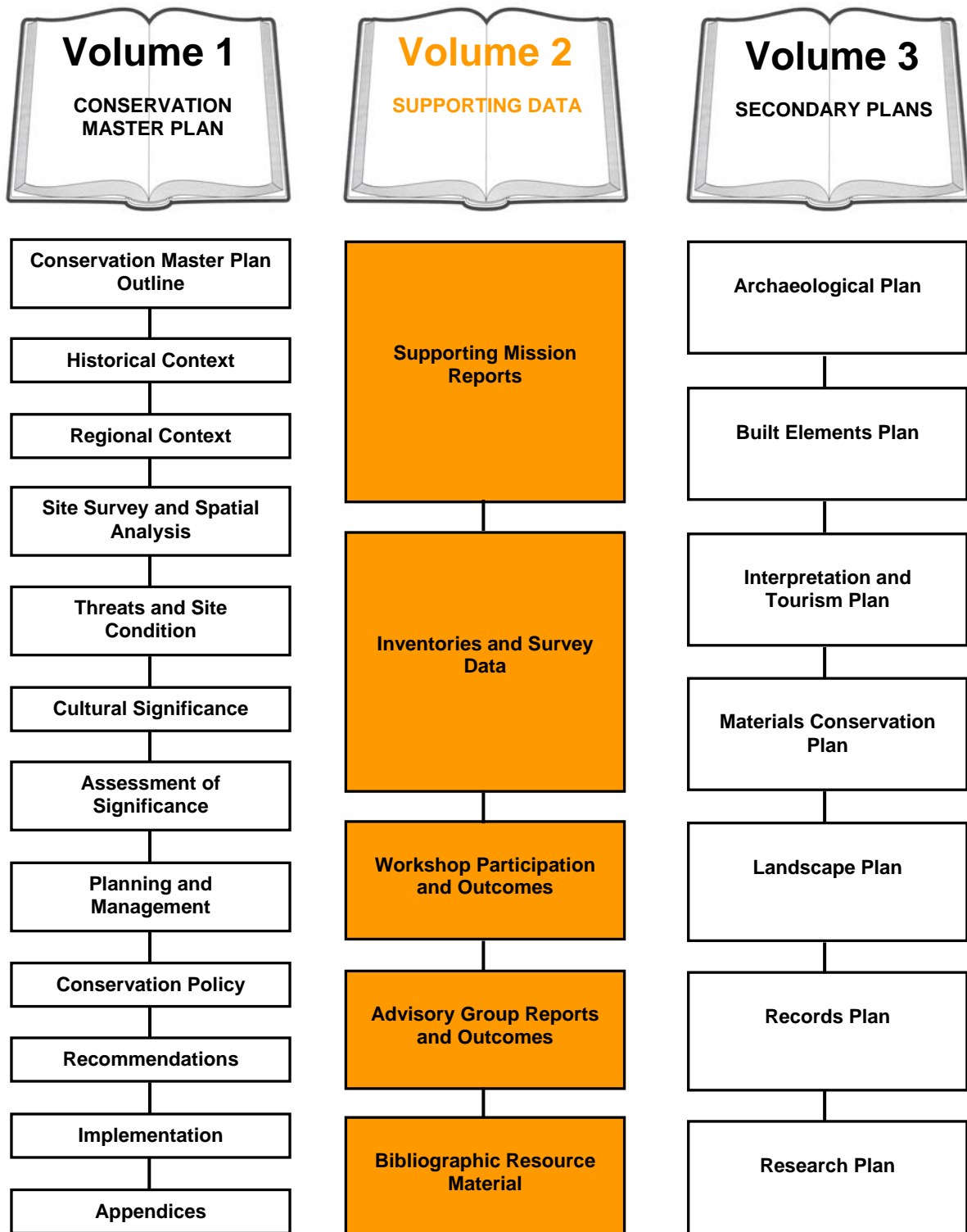
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Principle Author: Michael Ellis

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# PHNOM BAKHENG CONSERVATION MASTER PLAN

## REPORT STRUCTURE



Report Structure (  denotes current Volume).



THE PHNOM BAKHENG CONSERVATION MASTER PLAN  
WAS ENDORSED BY THE INTERNATIONAL COORDINATING COMMITTEE FOR THE  
SAFEGUARDING AND DEVELOPMENT OF THE HISTORIC SITE OF ANGKOR  
ON [CURRENTLY NOT ENDORSED]

**This Plan was edited by:**

Michael Ellis Cultural Heritage Planner, World Monuments Fund

**Technical assistance provided by:**

Bonnie Burnham	President, World Monuments Fund
John Stubbs	Vice President, Field Projects, World Monuments Fund
John Sanday	Architect, WMF Conservation Program in Angkor Field Director
Michael Ellis	Cultural Heritage Planner, World Monuments Fund
Jane Clark Chermayeff	Interpretation Consultant, Principal, Jane Clark Chermayeff Associates LLC
Jill Gilmartin	Interpretation Consultant, Jane Clark Chermayeff Associates LLC
Glenn Boornazian	WMF Technical Team, Director and Principal Architectural Conservator
David Flory	WMF Technical Team, Conservation Architect
Barbara Weider	WMF Technical Team, Architectural Conservator
Predrag Gavrilovic	Consultant Engineer
Michael Schuller	Engineer, Non-Destructive Testing, President, Atkinson Noland & Associates
Kimball Koch	Landscape Architect, National Park Service
Michael Martin	Hydrologist, National Parks Service
Charlie Pepper	Landscape Preservation Expert, National Park Service
Stephen Yarabek	Arborist and Landscape Architect, Hudson & Pacific Designs
Gamini Wijesuriya	Projects Manager – 'Living Heritage', ICCROM

**WMF Siem Reap Team:**

Prasanna Weerawardane	Archaeologist and Assistant Field Director
Chhan Chamroeun	Archaeologist
Hem Sinath	Architect
Sam Kimheng	Architect
Cheam Phally	Architect
Chhun Soma	Staff Architect and Projects Archivist

**APSARA Authority Team:**

H.E. BUN Narith	General Director of APSARA Authority
H.E. ROS Borath	Deputy Director General, APSARA Authority
MAO Laar	Director, Department of Monuments and Archaeology 1
KHUON Khun Neay	Director, Department of Monuments and Archaeology 2
CHAU SUN Kérya	Director, Department of Angkor Tourism Development
PEOU Hang	Director, Department of Water and Forestry
Cecile Califano	Landscape Architect
Celine Ricart	Architect
Lyin Sovath	Engineer
Ven Sophorn	Archaeologist
An Sopheap	Archaeologist
Vong Dara	Hydrologist
So Peang	Archaeologist
Sy Banith	Engineer
Cluistelle Seng	Archaeologist
Heng Jeudi	Archaeologist
Kim Chay	Engineer
Kev Davine	Architect
Keo Mony	Architect

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## **SUPPORTING MISSION REPORTS**

### **1.0 STRUCTURAL ENGINEERING SITE SURVEY**

Mission I: Phnom Bakheng Conservation and Presentation Project  
Mr Predrag Gavrilovic and Mr Michael Schuller  
December 2004

### **2.0 LANDSCAPE PLANNING AND ANALYSIS REPORT**

Mission I: Phnom Bakheng Conservation and Presentation Project  
U.S. National Park Service  
December 2004

### **3.0 INTERPRETIVE PLAN OUTLINE**

Mission I: Phnom Bakheng Conservation and Presentation Project  
Jane Clark Chermayeff Associates  
Draft, January 2005

### **4.0 INFORMATION MANAGEMENT INITIAL NEEDS ASSESSMENT**

Mission I: Phnom Bakheng Conservation and Presentation Project  
Phase I: Preliminary Survey & Analysis  
WMF Technical Team  
February 2005

### **5.0 MATERIALS CONSERVATION INITIAL NEEDS ASSESSMENT**

Mission I: Phnom Bakheng Conservation and Presentation Project  
Phase I: Preliminary Survey & Analysis  
WMF Technical Team  
Draft, February 2005

### **6.0 HYDROLOGIC ANALYSIS AND STORM WATER/EROSION MITIGATION ASSESSMENT**

Phnom Bakheng Stabilization and Restoration Project Angkor, Cambodia  
Mission III: Phnom Bakheng Conservation and Presentation Project  
U.S. National Park Service  
June 2005

## INVENTORIES AND SURVEY DATA

### 7.0 STRUCTURAL RISK MAP INVENTORY

7.1.1 **Sandstone Shrines:** 60 sandstone shrines, 12 per terrace at Bakheng temple were evaluated for structural risk during *Mission II*, March 2005. Observations were made on site to evaluate the level of structural damage for each structure, including measurements of wall plumb, crack mapping, evaluation of foundations for movement, and collapse of adjacent structures. Information was input into a database for analysis.

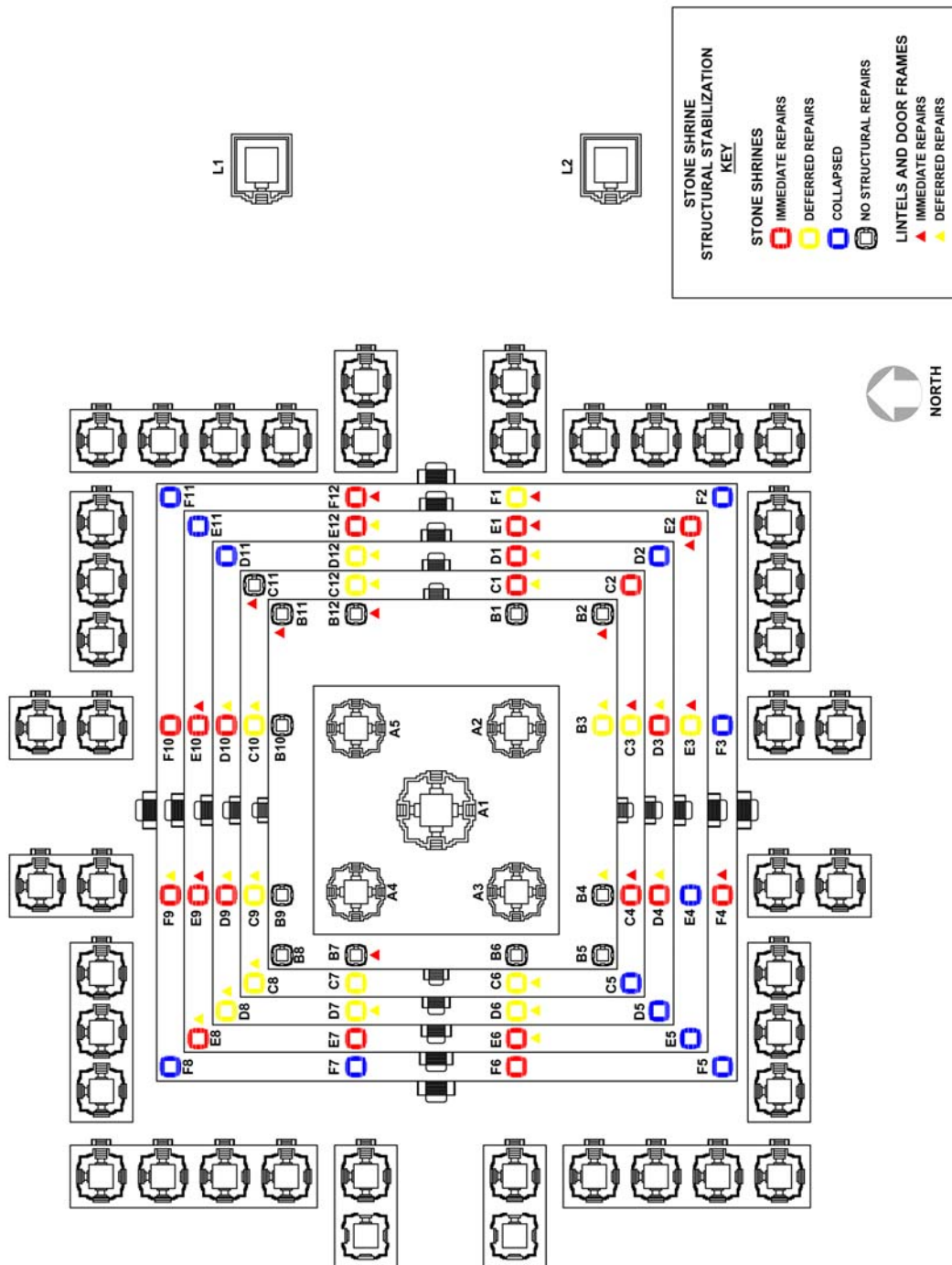


Figure 1 Structural Risk Map – Sandstone Shrines (MS 2006)



Table 1 Sandstone Shrines: listing of prioritized repairs for stone shrine structures.

Sandstone Shrine No. <sup>1</sup>	Risk Index	Foundation Risk Index	Measured Lean (degrees)	Repair No.	Notes
C4	1.00	0.75	6	1	Severe movement, tilting to north, foundation movement.
F6	0.55	1.00	6	2	Foundation collapsing, overhang up to 45 cm, severe wall leaning, stones missing at south.
F12	0.45	1.00	8	3	Foundation movement, no longer supporting shrine, severe wall leaning.
E10	0.40	1.00	7	4	Foundation moved/collapsed, up to 20 cm overhang, severe leaning, many crushed stones (replace between 18 and 24), old concrete props.
E2	0.35	1.00		5	Foundation collapsed, concrete props in place.
E7	0.30	1.00		6	Major foundation movement, settlement; stone damage/crushing.
E9	0.30	1.00	4	7	Major foundation movement, up to 40 cm overhang, moderate lean. Reset foundation stones at north, provide foundation bearing.
F10	0.30	1.00	2	8	Foundation collapsed, 20 cm overhang, wall above leaning on shrine, moderate lean.
D1	0.30	0.75	2	9	Wide cracks, leaning, foundation movement.
E12	0.30	0.75		10	Foundation settlement, wide joints.
D3	0.28	0.75		11	Foundation movement at west (moderate leaning), crushed stones, bullet damage.
E1	0.25	1.00	2	12	Major foundation movement, wide joints, minor leaning, stone ready to fall.
C1	0.23	1.00		13	Large displacement, some foundation movement.
C2	0.20	1.00		14	Foundation collapse, potential for future movement.
E8	0.20	1.00		15	Foundation collapsed, 29 cm overhang.
F4	0.20	0.25	5	16	Wall above leaning on shrine, severe lean. Unload by rebuilding wall above.
D4	0.18	0.50		17	Foundation movement, minor leaning, 2 stones ready to fall.
D10	0.18	0.25	3	18	Minor joint opening; displaced stone.
F9	0.15	1.00		19	Foundation collapsed, concrete prop installed to support wall, 12 cm overhang.
E6	0.15	0.50	2	20	Minor foundation movement, wide joints.
D9	0.13	0.25	1	21	Slight foundation movement, minor joint opening. Old concrete props at missing stones.
E4	0.10	1.00		22	90% collapsed, foundation collapsed.
C8	0.10	0.75		23	Foundation movement on west.
C9	0.10	0.75		24	Wide cracks, stone rotation, foundation movement at north.
D6	0.10	0.50	4	25	Wide cracks, moderate lean to east, stone at north ready to fall.
D8	0.10	0.25		26	Slight foundation movement, minor joint opening.
C3	0.10			27	Mostly collapsed. Stones remain as rubble; stockpile for possible rebuilding.
C6	0.10			28	Wide cracks. Stone crushing at northwest corner, spalls.
C7	0.10		2	29	Wide cracks. Stone crushing at northwest corner, spalls.
D7	0.10			30	Wide cracks, stone displacement.
B3	0.10			31	Prior concrete repair failed
E3	0.08	1.00		32	Foundation collapsed, overhangs 26 cm, stone ready to fall at north.
F1	0.05	0.75	2	33	Foundation movement, poor bearing on wall below, stone crushing, wide joints.
D12	0.05		1	34	
C12	0.05			35	Minor movement.
C10	0.03			36	Bullet damage, stone spalls.
D5	0	0.75		37	80% collapsed, foundation movement.
B1	0			38	

Sandstone Shrine No. <sup>1</sup>	Risk Index	Foundation Risk Index	Measured Lean (degrees)	Repair No.	Notes
B2	0			39	
B4	0			40	
B5	0			41	
B6	0			42	
B7	0			43	
B8	0			44	
B9	0			45	
B10	0			46	
B11	0			47	
B12	0			48	
C5	0			49	95% collapsed.
C11	0			50	Prior cement patches.
D2	0			51	85% collapsed.
D11	0			52	95% collapsed.
E5	0			53	100% collapsed.
E11	0			54	100% collapsed.
F2	0			55	100% collapsed.
F3	0			56	100% collapsed.
F5	0			57	90% collapsed.
F7	0			58	100% collapsed.
F8	0			59	90% collapsed.
F11	0			60	100% collapsed.

<sup>1</sup>See Risk Map Figure for the relationship between shrine no. and location.

**Table 2 Sandstone Shrines: listing of prioritized repairs for stone lintels and door frames.**

Stone Shrine No. <sup>1</sup>	Risk Index	Repair No.	Lintel/Door Frame Repair Notes
E2	1.00	1	Cracked lintel and threshold. Old concrete prop installed.
F4	1.00	2	Cracked lintel and threshold.
C4	0.70	3	Jambs failed, severe movement of door frame.
E1	0.45	4	Cracked lintel, jambs, threshold, some material deterioration.
E10	0.30	5	Crushing at north jamb, poor bearing condition at lintel.
F12	0.30	6	Spall, crack at jamb near lintel bearing.
F1	0.30	7	Poor lintel bearing, cracked jamb stone at north.
E3	0.25	8	Crack forming in lintel near bearing.
C3	0.20	9	Threshold cracked and displaced, stone deterioration at jambs.
C11	0.20	10	Deteriorated stone at lintel, jamb, concrete beam.
E9	0.20	11	Crack in lintel at north bearing, spall at jamb.
B2	0.20	12	Cracked lintel.
B7	0.20	13	Cracked lintel.
B11	0.20	14	Cracked lintel.
B12	0.20	15	Cracked lintel.
D10	0.15	16	Stone deterioration at door frame.
F9	0.15	17	Stone deterioration, spall at north jamb.
D1	0.13	18	Stone deterioration at jambs.
B4	0.10	19	Severe stone deterioration at door frame.

Stone Shrine No. <sup>1</sup>	Risk Index	Repair No.	Lintel/Door Frame Repair Notes
C1	0.10	20	Stone deterioration at jambs.
C12	0.10	21	Deteriorated stone at door frame.
D4	0.10	22	Deteriorated stone at threshold and jambs.
D8	0.10	23	Minor frame movement, crushing and spall at jamb.
D9	0.10	24	Stone deterioration at jambs.
D12	0.10	25	
E8	0.10	26	Stone deterioration at jambs.
B3	0.05	27	Prior concrete repair failed.
C6	0.05	28	Minor frame deterioration.
C8	0.05	29	Frame cracked at base.
C9	0.05	30	Cracked threshold.
C10	0.05	31	Crack, spall at frame.
D3	0.05	32	Lintel movement at south bearing.
D7	0.05	33	Minor stone deterioration at south lintel bearing.
E6	0.05	34	Crack, spall in jamb near base.
E12	0.05	35	Slight stone deterioration at door frame.
D6	0.03	36	Slight stone deterioration at door frame.
B1	0.00	37	
B5	0.00	38	
B6	0.00	39	
B8	0.00	40	
B9	0.00	41	
B10	0.00	42	
C2	0.00	43	
C5	0.00	44	
C7	0.00	45	
D2	0.00	46	
D5	0.00	47	
D11	0.00	48	
E4	0.00	49	
E5	0.00	50	
E7	0.00	51	
E11	0.00	52	
F2	0.00	53	
F3	0.00	54	
F5	0.00	55	
F6	0.00	56	
F7	0.00	57	
F8	0.00	58	
F10	0.00	59	
F11	0.00	60	

<sup>1</sup>See Risk Map Figure for the relationship between shrine no. and location.

7.1.2 **Platform Walls:** the original bedrock of the *phnom* was excavated and shaped to fit the general form of the temple. Dry-laid sandstone was used as a veneer to face the bedrock at each of the five platform levels. Platform walls range in height from 1.79 m (top level, or Level 5) to 3.5 m (bottom Level 1). The total length of all platform walls is nearly 1,200 m.

Platform Walls, Level 5: No immediate or deferred repairs required.

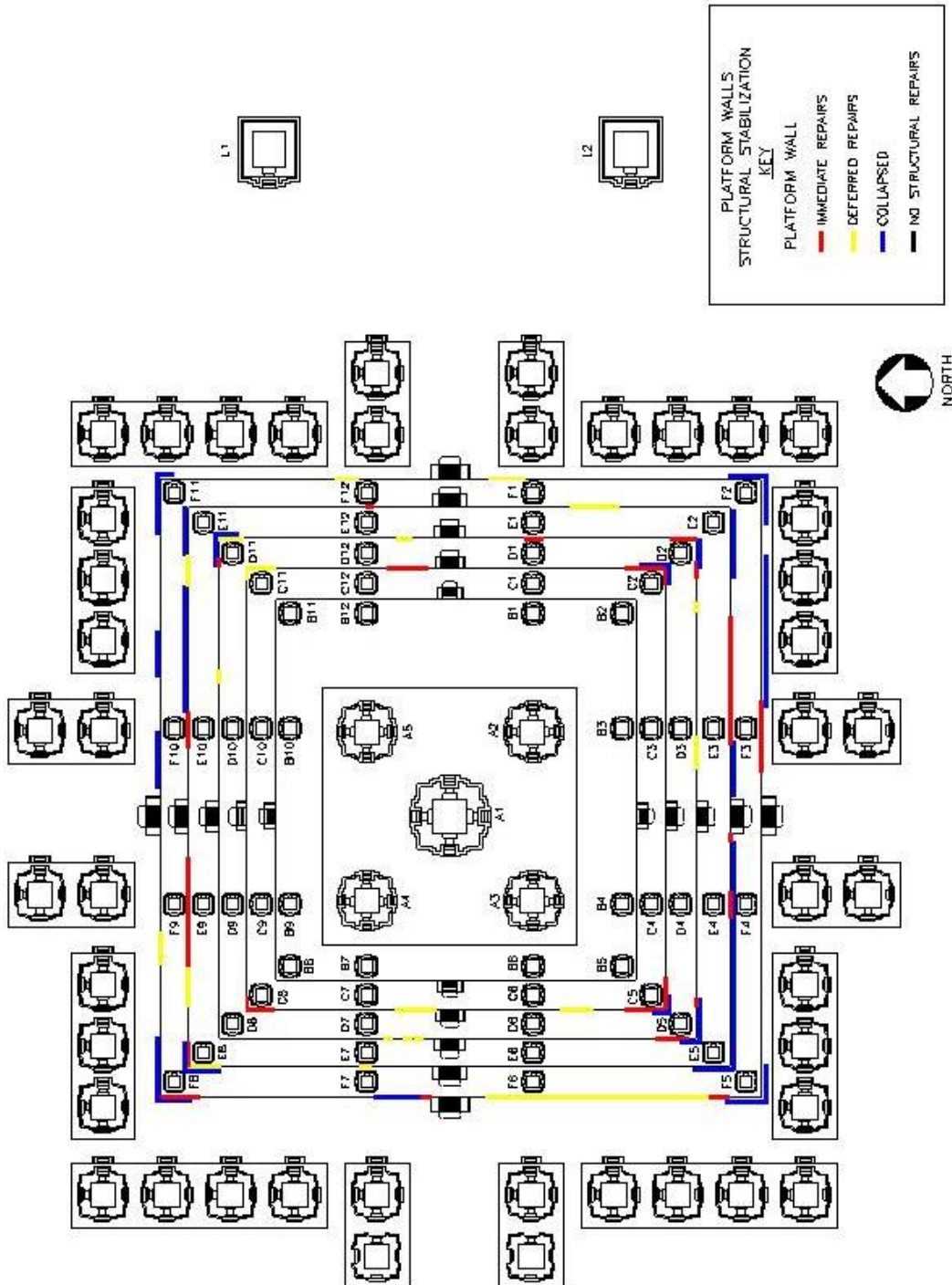


Figure 2 Structural Risk Map – Platform Walls (MS 2006)

**Table 3 Platform Walls, Level 1: listing of prioritized repairs.**

Elevation	Location	Measured Lean (degrees)	Repair No.	Notes	Repair Type
South	3 to 12 m east of stairs	5 - 14	1	Leaning, under shrine bearing	Immediate
West	4 to 6 m from south corner	11	2	Leaning near collapsed area	Immediate
West	4 m from north corner	9	3	Leaning outward	Immediate
West	1 m north of stairs		4	Wall bulging out	Immediate
West	2 m from stairs to south corner	6	5	Top 1 - 2 courses rotated inward	Deferred
East	21 to 24 m from north corner	6	6	Bulged area	Deferred
North	14 m west of stairs	5	7	Bulged area	Deferred
East	2 to 8 m south of stairs	2 - 5	8	Bulged area	Deferred

**Table 4 Platform Walls, Level 2: listing of prioritized repairs.**

Elevation	Location	Measured Lean (degrees)	Repair No.	Notes	Repair Type
South	7 to 10 m west of stairs	~30	1	Leaning on shrine below	Immediate
North	0 to 3 m from west corner		2	Top courses missing at shrine bearing	Immediate
North	7 to 12 m east of stairs	4	3	Leaning on shrine below	Immediate
East	8 m north of stairs	3	4	Stone fallen, resting on shrine below	Immediate
South	7 to 23 m east of stairs	9 - 14	5	Bulged, shoring in place, needs stabilization	Immediate
South	1 m west of stairs	9	6	Leaning, adjacent to collapsed zone	Immediate
North	5 to 16 m west of stairs	5 - 9	7	Leaning, shoring in place	Immediate
North	6 to 10 m from east corner		8	Adjacent to collapsed sections, stabilize	Deferred
West	Below north stone shrine	5	9	Top course rotated, wall leaning	Deferred
West	0 to 4 m from north corner		10	Partially collapsed, leaning	Deferred
North	4 to 9 m from west corner	8	11	Bulging	Deferred
East	14 to 20 m from south corner	6	12	Bulged area	Deferred

**Table 5 Platform Walls, Level 3: listing of prioritized repairs.**

Elevation	Location	Measured Lean (degrees)	Repair No.	Notes	Repair Type
South	0 to 5 m from west corner	13 - 19	1	Collapsed, rotated stones	Immediate
North	3 to 4 m from east corner	12	2	Leaning near collapsed area	Immediate
West	1 to 4 m from south corner	11	3	Leaning near collapsed area	Immediate
East	0 - 3 m from south corner	10	4	Stabilize at corner	Immediate
East	8 - 9 m south of stairs		5	2 Stones fallen, leaning on shrine below	Immediate
South	4 to 5 m from west corner		6	Collapsed at corner, displaced near collapse	Immediate
North	15 m north of stairs	4	7	Stones displaced outward 14 cm	Deferred
East	3m north of stairs		8	Stones displaced 15 cm, reset	Deferred
South	8 m from west corner		9	Stone displaced 15 cm	Deferred
South	4 to 8 m east of stairs	5 - 6	10	Bulge	Deferred
East	0 to 3 m from north	4	11	Collapsed, leaning section, laterite fill decayed	Deferred
West	1.5, 2.5, 5 m north of stairs		12	Stones displaced outward	Deferred

**Table 6. Platform Walls, Level 4: listing of prioritized repairs.**

Elevation	Location	Measured Lean (degrees)	Repair No.	Notes	Repair Type
West	0 to 3 m from northwest corner	14 (inward) 5 (outward)	1	Top course tipped in, severely where stone shrine above bears on wall. Leaning somewhat at corner. Shore/rebuild wall at shrine foundation.	Immediate
North	0 to 1.6 m from northwest corner		2	Movement, bulging, stone shrine directly above.	Immediate
East	1-5m north of stair wall	10	3	Prop top course at missing stone (immediate). Relay stones at top 2 courses where tilted outwards (no repair/defer).	Immediate
South	0 to 4 m from southwest corner	10	4	Collapsed, bulged at adjacent area. Rebuild at corner.	Immediate
East	0 to 5 m from southeast corner	9	5	Collapsed section; severe lean adjacent to collapse. Rebuild at bulged zone	Immediate
South	0 to 2 m from southeast corner		6	Collapsed, displaced stones. Rebuild at corner.	Immediate
West	0 to 5 m from southwest corner	4	7	Collapsed, bulged at adjacent area. Rebuild at corner.	Immediate
West	0 to 5 m north of stair wall		8	Stone rubble piled on wall, overhanging. Remove.	Deferred
North	Northeast corner		9	Several stones missing, stone shrine above.	Deferred
West	12 to 16 m south of stair wall	6	10	Bulged section; rebuild	Deferred
East	0 to 3.5 m from northeast corner	4 - 6	11	Minor damage, some displacement	Deferred

**7.1.3 Stone Steps:** Bakheng's Sandstone Steps: a series of stone steps on each cardinal axis provide access to the platform levels. A total of 20 stone step structures are built integral with the platform walls at mid-point along the east and west sides of the temple and offset towards the west on the south and north sides. Each stone step structure rises to the next platform level with between 7 and 11 steps, flanked with integral buttresses projecting out from the platform walls.

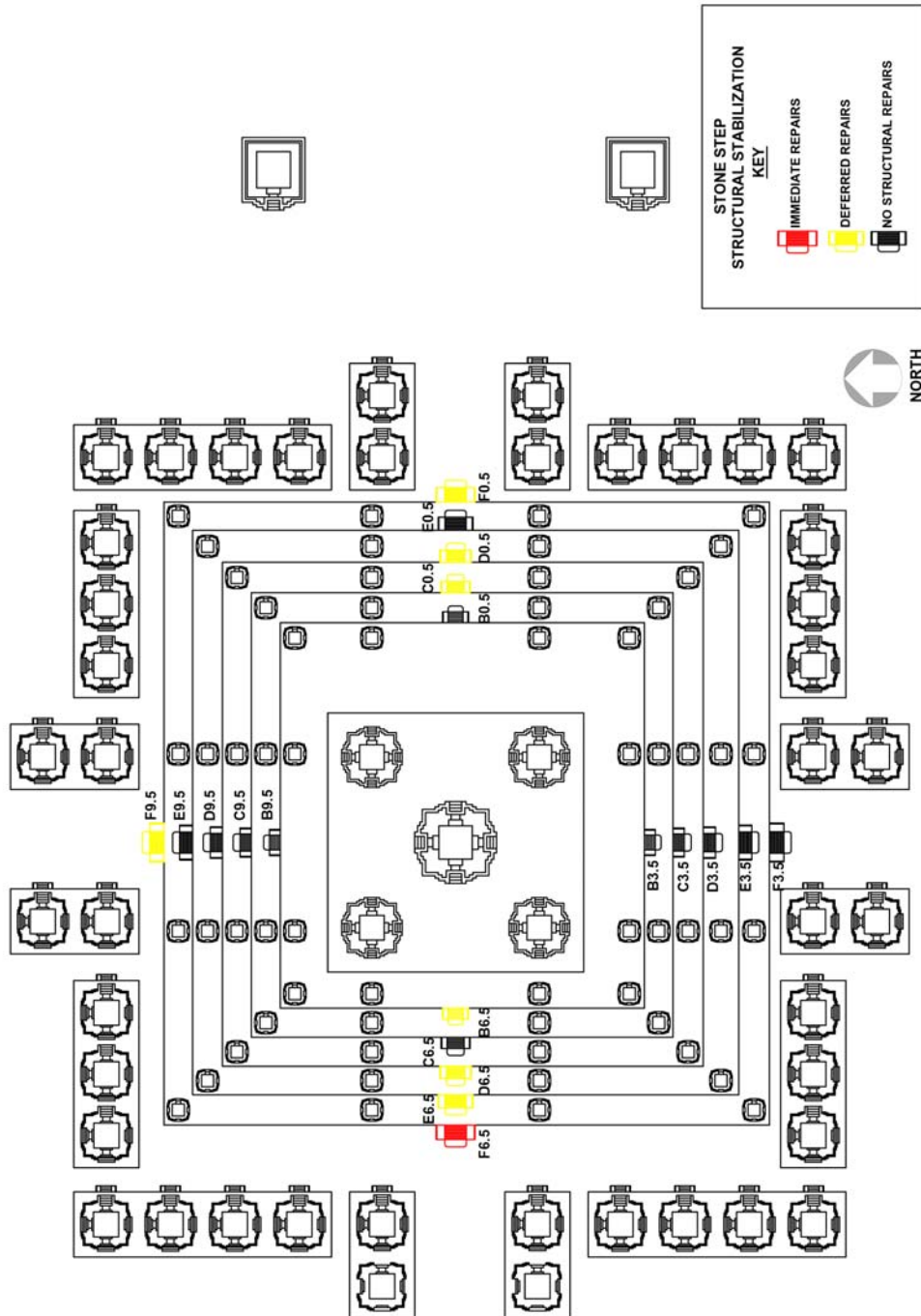


Figure 3 Structural Risk Map – Stone Steps (MS 2006)



**Table 7 Stone Steps: listing of prioritized repairs for stone step structures**

<b>Stone Step No.<sup>1</sup></b>	<b>Risk Index</b>	<b>Repair No.</b>	<b>Notes</b>	<b>Repair Priority</b>
F6.5	0.73	1	Westernmost wall portions built on fill. Large movement (8-15 cm), rebuild west portion of wing walls to vertical crack.	Immediate
E6.5	0.65	2	Reset falling stone at north, repair 2 steps with deep spalls	Deferred
B6.5	0.50	3	Broken/spalled step	Deferred
D6.5	0.15	4	Reset stone at south, 2nd course from top: 24 cm movement	Deferred
C0.5	0.10	5	South wall: stone pushed out 6 - 10 cm, reset stones at top 2 courses.	Deferred
F9.5	0.05	6	Replace concrete props at east wall with stone? Top step missing but bedrock forms good step. Landing stones at bottom step scattered - reposition.	Deferred
D0.5	0.05	7	Replace missing stone at south, 2nd course	Deferred
F0.5	0.05	8	Missing stone at north wall, 2nd course. Top step spalled.	Deferred
B9.5	0.50	9	26 cm deep spall at west wall. Cracks wide but stable.	None
C3.5	0.33	10	Wide cracks, stone displacement. Stable but consider resetting stones.	None
C9.5	0.30	11		None
C6.5	0.20	12	Rotated, displaced stones at top 2 courses	None
E3.5	0.15	13		None
D3.5	0.14	14	Several deep spalls, patching needed	None
D9.5	0.10	15		None
F3.5	0.08	16	2 broken steps - climbing hazard	None
B3.5	0.06	17	Place stones back in position, remove improper mortar patches at joints (which are hard, cracked)	None
E9.5	0.05	18		None
B0.5	0.05	19	2nd step from top: spall at one end	None
E0.5	0.00	20		None

<sup>1</sup>See Risk Map Figure for the relationship between stone step no. and location.



7.1.4 **Brick Shrines:** a total of 44 brick shrines are constructed around the lowermost platform wall of Bakheng. Brick shrines were evaluated for structural risk during the Mission II, March 2005. Observations were made on site to evaluate the level of structural damage for each structure, including measurements of wall plumb, crack mapping, evaluation of foundations for movement, and condition of lintels and door frames. Information was input into a database for analysis.

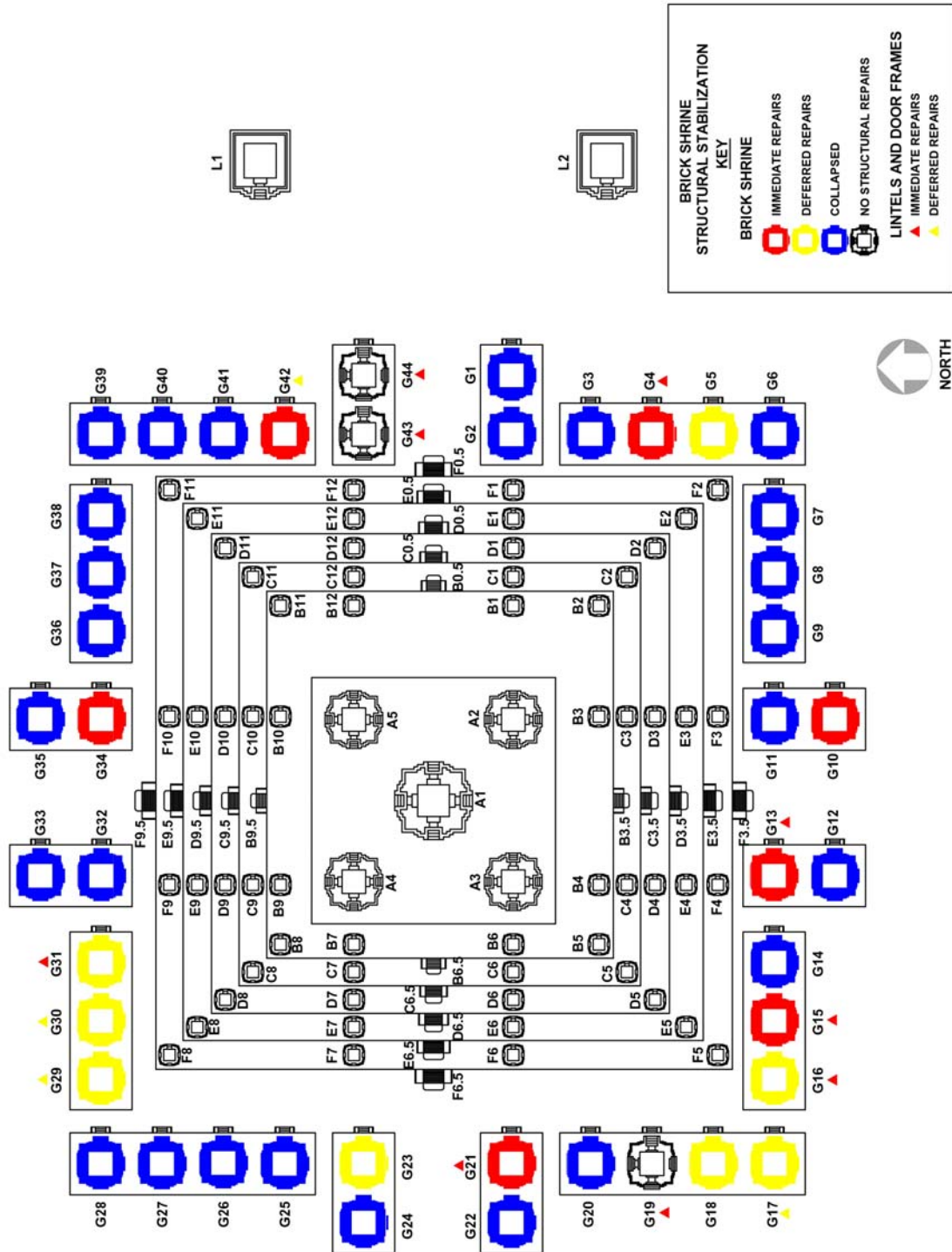


Figure 4 Structural Risk Map – Brick Shrines (MS 2006)

**Table 8 Brick Shrines: listing of prioritized repairs for brick shrine structures.**

Brick Shrines No. <sup>1</sup>	Risk Index	Foundation Risk Index	Measured Lean (degrees)	Repair No.	Notes	Repair Type
G-21	0.55	0.80	4	1	Walls: leaning, wide crack opening. Many foundation perimeter stones missing, partial collapse at corners. Brace/stabilize walls; stabilize foundation.	Immediate
G-42	0.50	0.45	2 to 15	2	Severe lean of north wall above door frame: brace. Foundation settlement, stabilization required.	Immediate
G-13	0.45	0.75		3	Replace or rebuild stones at foundation perimeter.	Immediate
G-10	0.30	0.85	4	4	Foundation repairs critical, collapsing, undermined. Walls leaning, damaged. Stabilize/rebuild foundation	Immediate
G-15	0.30	0.60		5	Remove large growing tree from west elevation. Check foundation for stabilization need.	Immediate
G-4	0.30	0.05		6	Stabilize brick corbel above east entry.	Immediate
G-34	0.10	0.20		7	Loose brick in danger of falling: remove or stabilize in place.	Immediate
G-23	0.45	0.20	2	8	Walls leaning, wide cracks.	Deferred
G-5	0.40	(buried)	5	9	Check existing concrete props. Brace upper portion of north wall?	Deferred
G-30	0.40	0.75	6	10	Foundation collapsing, especially at north and southeast corner. Concrete infill and props are in place. Check for adequacy. North wall has severe lean.	Deferred
G-29	0.35	0.95	4	11	Foundation very poor, stone deteriorated: check existing concrete infill for adequacy.	Deferred
G-17	0.20	0.80		12	Stabilize falling stones at southwest corner near base.	Deferred
G-16	0.15	0.80		13	Foundation in poor condition; stabilize.	Deferred
G-31	0.10	0.70	5	14	North wall leaning. Foundation collapsing under north wall, concrete prop in place. Rebuild foundation perimeter.	Deferred
G-18	0.10	0.60	5	15	Wall section rotated, brace. Foundation stabilization required.	Deferred
G-19	0.30	0.80		16	Foundation perimeter stones missing, stabilization required.	No Repair
G-43	0.25	0.30	6	17	Walls leaning, foundation settlement, stabilization required.	No Repair
G-44	0.05	0.55	3	18	Walls essentially collapsed. Severe foundation settlement at corners.	No repair
G-1				19	Collapsed	
G-2				20	Collapsed	
G-3				21	Collapsed	
G-6				22	Collapsed	
G-7				23	Collapsed	
G-8				24	Collapsed	
G-9				25	Collapsed	
G-11				26	Collapsed	
G-12				27	Collapsed	
G-14				28	Collapsed	
G-20				29	Collapsed	

Brick Shrines No. <sup>1</sup>	Risk Index	Foundation Risk Index	Measured Lean (degrees)	Repair No.	Notes	Repair Type
G-22				30	Collapsed	
G-24				31	Collapsed	
G-25				32	Collapsed	
G-26				33	Collapsed	
G-27				34	Collapsed	
G-28				35	Collapsed	
G-32				36	Collapsed	
G-33				37	Collapsed	
G-35				38	Collapsed	
G-36				39	Collapsed	
G-37				40	Collapsed	
G-38				41	Collapsed	
G-39				42	Collapsed	
G-40				43	Collapsed	
G-41				44	Collapsed	

<sup>1</sup>See Risk Map Figure for the relationship between shrine no. and location.

**Table 9 Brick Shrines: listing of prioritized repairs for stone lintels and door frames.**

Brick Shrines No. <sup>1</sup>	Risk Index	Repair No.	Lintel/Door Frame Repair Notes	Repair Type
G-19	1.00	1	Severe damage to east frame, steel strap repair in place. Check for adequacy.	Immediate
G-15	0.80	2	Concrete lintel in place, check for adequacy	Immediate
G-21	0.50	3	West lintel: fractured, dropped. Brace and repair.	Immediate
G-43	0.45	4	Leaning 10 degrees. Brace/stabilize frame at south. West fronton stone collapsed, on site in vicinity.	Immediate
G-16	0.40	5	Repair cracked, spalled frame at lintel bearing.	Immediate
G-31	0.30	6	Frames at east and west racked up to 9 degrees; brace.	Immediate
G-13	0.28	7	Stabilize east door frame - south column falling, stones heavily deteriorated	Immediate
G-44	0.20	8	Critical damage to door frame at west, loose stone ready to fall. Remove or stabilize loose stone.	Immediate
G-4	0.10	9	Replace fronton and lintel stones plus columns at east, stones resting on ground. Brick corbels at east entry in critical condition and require brick removal, shoring or new lintel	Immediate
G-30	0.30	10	Lintel spalled/fractured at bearing: shore/pin.	Deferred
G-42	0.25	11	Minor material deterioration, leaning.	Deferred
G-17	0.20	12	East frame leaning, held in place by strap tie. Check adequacy of tie.	Deferred
G-29	0.20	13	Lintel fractured at bearing: shore/pin.	Deferred
G-10	0.15	14	Brace east frame - leaning out 4 degrees	No Repair
G-5	0.10	15	Brace east frame - leaning out 2 degrees	No Repair

Brick Shrines No. <sup>1</sup>	Risk Index	Repair No.	Lintel/Door Frame Repair Notes	Repair Type
G-23	0.10	16	West frame: jamb cracked (pin). North frame leaning 6 degrees. Brace/stabilize	No Repair
G-34	0.00	17	Stone deterioration at frame.	No Repair
G-1		18	Collapsed	
G-2		19	Collapsed	
G-3		20	Collapsed	
G-6		21	Collapsed	
G-7		22	Collapsed	
G-8		23	Collapsed	
G-9		24	Collapsed	
G-11		25	Collapsed	
G-12		26	Collapsed	
G-14		27	Collapsed	
G-18		28	Collapsed	
G-20		29	Collapsed	
G-22		30	Collapsed	
G-24		31	Collapsed	
G-25		32	Collapsed	
G-26		33	Collapsed	
G-27		34	Collapsed	
G-28		35	Collapsed	
G-32		36	Collapsed	
G-33		37	Collapsed	
G-35		38	Collapsed	
G-36		39	Collapsed	
G-37		40	Collapsed	
G-38		41	Collapsed	
G-39		42	Collapsed	
G-40		43	Collapsed	
G-41		44	Collapsed	

<sup>1</sup>See Risk Map Figure for the relationship between shrine no. and location.

**7.1.5 Sandstone Libraries:** the two stone libraries stand within the laterite wall enclosure on the east side of the temple. The structures were evaluated on site to approximate the level of structural damage for each structure, including measurements of wall plumb, crack mapping, condition of the lintels and door frames, and laser level measurements at the base stone course. Information from the site survey, including photographic documentation, was input into a database for analysis.

**Table 10 North Library: listing of prioritized repairs.**

Location	Repair No.	Notes	Repair Type
West entry	1	Lintel deteriorated: replace, or patch/repair existing stone	Immediate
East entry	2	Corbel at interior above lintel: repair cracked stones, reset dropped "key stone"	Immediate
East entry	3	Stone frame missing, may be on ground in vicinity. Replace, including lintel	Immediate
West entry	4	Corbel at interior above lintel: repair cracked stones.	Immediate
Southeast Corner	5	Stone displacement: provide support, rebuild or install permanent props.	Immediate
Northeast corner	6	Stone displacement: provide support, rebuild or install permanent props.	Immediate
West Elevation Roof	7	Partial collapse, stones may be present on ground in vicinity. Replace missing stones.	Deferred
Northwest corner	8	Old concrete prop, functioning. Consider rebuilding corner, repairing many cracked/crushed stones.	Deferred
South Elevation Roof	9	Stone displacement: reset stones, replace missing stones	Deferred

**Table 11 South Library: listing of prioritized repairs.**

Location	Repair No.	Notes	Repair Type
West entry	1	Lintel cracked. Shore, repair	Immediate
Southwest corner	2	Displacement and crushed/spalled stones at corner, reset/support stones	Immediate
East entry	3	Lintel collapsed, supported by rubble infill. Stabilize	Deferred
East elevation	4	Corbels at southeast corner displaced; rebuild	Deferred
Southeast corner	5	Minor displacement	No repair
West elevation	6	Entry fronton collapsed, stones on ground	No repair

## **WORKSHOP PARTICIPATION OUTCOMES**

### **8.0 PHNOM BAKHENG WORKSHOP ON PUBLIC INTERPRETATION**

Forthcoming

**ADVISORY GROUP REPORTS AND OUTCOMES**

Forthcoming

## **BIBLIOGRAPHIC RESOURCE MATERIAL**

**9.0 ICOMOS CHARTER FOR THE PROTECTION AND MANAGEMENT OF ARCHAEOLOGICAL HERITAGE**

**10.0 ENGLISH HERITAGE POLICY STATEMENT ON RESTORATION, RECONSTRUCTION, AND SPECULATIVE RECREATION OF ARCHAEOLOGICAL SITES INCLUDING RUINS**