

# RELIGIOUS CONCEPT IN THE LAYOUT OF THE ANCIENT KHMER CITY OF KOH KER

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## INTRODUCTION

The Angkor Monuments, spread throughout modern Siem Reap Province Cambodia, served as the seat of the royal capital of the Khmer Empire almost entirely throughout the 500 year Angkor Era. However, there is a group of archaeological remains in Koh Ker where Jayavarman IV transferred his capital in AD 921.<sup>1</sup> The city was called “Chok Gargyar” in ancient Khmer inscriptions and “Lingapura” in Sanskrit. Surveys carried out to date have confirmed the remains of temples and religious facilities, but have found no solid traces of royal palaces or residential communities. Much still remains unknown about the nature and urban plan of the ancient city.<sup>2</sup>

Ancient Khmer cities were considered symbols of royal power, and were generally composed of a pyramidal “state temple” in the center of the city, a large rectangular reservoir, and multiple temples surrounding the central temple and reservoir. This naturally also applied to Koh Ker. The city was composed of many temples surrounding a rectangular man-made pond called “Rahal” (“sacred pond” in Pali) which stretched in a north-south direction, and Prasat Thom (KK01), featuring a five-tiered step pyramid temple conventionally called “Prang”, which stood at the rear of the state temple.

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<sup>1</sup> Jayavarman IV remained in Koh Ker until his death in AD 941. His successor Harshavarman II also maintained his throne at Koh Ker from AD 941-944. Ishanavarman II and Jayavarman IV reigned simultaneously until the death in 928 of Ishanavarman II. Ishanavarman II reigned in Angkor and Jayavarman VII in Koh Ker. Almost all temples in this group of monuments are considered constructed by Jayavarman IV who upon the death of Ishanavarman II expanded and renovated his royal city. With the exception of Prasat Andong Kuk, considered built by Jayavarman VII because of the temple layout and reused stone blocks, the architectural and artistic design common to this group of temple complex indicate a short construction period of no more than twenty years.

<sup>2</sup> The Royal Palace of this city was identified by Aymonier near Andong Preng (KK6) (Aymonier 1900: 410-411), according to one popular theory. In 1933, Parmentier (1939: 17, n.1) conducted an excavation survey in this place and reported multiple laterite structures. Many tiles and pottery shards are still scattered in the area.

As the symbolic center of religion and politics, it is assumed that Prasat Thom also served as the central axis in the overall design of the city plan. In fact, the positional relationship between a number of temples and civil structures seem to support the existence of such a design. Moreover, the Rahal reservoir, which lies across the religious axis of the city, also appears to have served an important role in the design of the city.

This paper reports on the newly recorded remains in this archaeological site in a recent research project<sup>3</sup>, and discusses the archaeological remains at Koh Ker that have a significant relationship with Prasat Thom and the Rahal. Given the extremely limited facts that could be obtained from traces of the past remaining on the ground surface, these relationships will provide important insight into the configuration of the ancient city.

## 1. DISTRIBUTION OF ARCHAEOLOGICAL REMAINS AND THE CITY'S DOMAIN

The first survey of the ancient city at Koh Ker was carried out in 1873 by an expedition headed by L. Delaporte. Delaporte's mission did not create a map showing the entire city, but it documented the plan view of Prasat Thom for the first time, and made the significance of the ancient city known to the world (Delaporte 1880). Thereafter, surveys were conducted by Harmand in 1876 (Harmand 1879), Aymonier in 1882 (Aymonier 1900), and Lajonquière in 1900, and the archaeological layout of Koh Ker area gradually emerged.

The Khmer monument inventory created by Lajonquière documented nineteen archaeological remains (Lajonquière 1902). In 1935, Parmentier implemented aerial survey techniques that were originally introduced to the study of the Angkor Monuments by Goloubew (Goloubew 1933). Through the aerial survey and local investigations, Parmentier increased the number of monuments documented at Koh Ker to forty-four (Parmentier 1939). Large-scale surveys were not implemented thereafter because of a series of conflicts. In recent years, the Cambodian Ministry of Culture and Fine Arts and the *École Française d'Extrême-Orient* (EFEO) conducted a joint study to update the past surveys, and documented a total of sixty-five archaeological remains including temples, man-made ponds, boundary stones and other artifacts<sup>4</sup>. The recent research projects of the JAYA Koh Ker Project by the Angkor Royal Foundation and the

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<sup>3</sup> This research project is jointly conducted by Waseda University, Meijo University and JASA under the "Study of urban monuments and temple remains based in the regions of the Khmer Empire (representative: Mizoguchi Akinori)" with funding from the Grant-in-aid for Scientific Research of the Ministry of Education, Culture, Sports, Science and Technology of Japan in 2007-2010. Thanks to Uchida Keiji (Leica Geosystems) and Kanazawa Makoto (Waseda University) who technically support the measurement survey. The local surveys were made possible with considerable cooperation from APSARA Authority, namely Messrs. Seung Kong and Ly Vanna as well as Mr. Sam Nang who guided us at the site. The authors are grateful to Robert McCarthy who provided erudite commentary on this paper.

<sup>4</sup> "CISARK (Carte Interactive des Sites Archéologiques Khmers)" research team led by B. Bruguier of the *École Française d'Extrême-Orient*. [Http://www.cisark.org](http://www.cisark.org).

Greater Angkor Project by the University of Sydney also pursued further investigation (Evans, 2009). Additionally, temples, other religious facilities, and civil structures such as embankments, roads, reservoirs, and stone quarries were newly documented in the Waseda, Meijo, JASA survey conducted from 2007 to 2010.

Part of the ancient city at Koh Ker is difficult to access on foot due to dense vegetation and explosive remnants of war (ERW) that lie buried in the vicinity, and field work is frequently subject to severe climatic and geophysical conditions. The removal of ERW has commenced, but only around major temples and roads, thus making the implementation of any wide-area survey extremely hazardous.<sup>5</sup>

Under this situation, a large part of our survey involved the confirmation of vestiges of documentation amassed from aerial photographs and the onsite documentation of information of the city acquired from local villagers who know the region well. GPS was also used to accurately pinpoint the location of the ancient city,<sup>6</sup> and within the scope of the allowed survey time the relative positions of the archaeological remains were surveyed using a total station.<sup>7</sup>

Combined with those that have been documented in the past, one hundred twenty-seven archaeological remains have been confirmed (Figure 1, Table 1). Sites that were recorded in the project are classified as follows; a) 56 Temple sites with single or multiple shrines, b) 14 Pedestals on laterite or sandstone platforms, c) 8 Unknown function laterite structures, d) 13 Pedestal scatters, e) 9 Boundary stones, f) 10 Artificial ponds, g) 7 Earthen dikes (including ancient road), h) 3 stone quarry sites, i) 7 other artifact traces. In this paper, all archaeological remains mentioned hereafter will be referenced by a number system with the prefix KK thus avoiding any misidentification with those varied systems that have been documented in the past.

The majority of the documented temple remains, with the exception of four, are located within an area that spreads 10km in the north-south direction (UTM X: 1,520,000 – 1,530,000) and 5km in the east-west direction (Y: 447,500 – 452,500). Within the area, most temples, and almost all large temples, are concentrated in the southern half. The remains as a whole are located at altitudes of approximately 70m to 110m in a region that forms a gentle slope from south to north when viewed panoramically, and coincides with the watershed of the Sen River (Rongea River) which flows through the northern lowland toward the east.

A royal road from Angkor runs in the east-northeastern direction passing the northern boundary of the area. There are several temple remains along this royal road, but only two are found within the

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<sup>5</sup> CMAC (Cambodian Mine Action Center) closed their demining efforts surrounding the Koh Ker area in 2010.

<sup>6</sup> The data used in this paper to analyze temple positions is based on a map prepared from the results of a ground plan survey conducted from GPS reference points obtained via short static observation times of 20 to 30 minutes near each temple. This method guarantees 1cm horizontal position accuracy and 2cm height accuracy. Traces of civil structures were surveyed using either a GPS receiver supported by SBAS accuracy of approximately 1m, or two GPS receivers for kinematic post-processing. In other words, the analyses presented are based on sufficiently accurate data.

<sup>7</sup> Waseda-Meijo-JASA project completed the measurement of the plan by total station in 31 temples.

survey area to the north. If the distribution of temples is considered an indicator of the domain of the ancient city, it is likely that no major administration districts existed to the north of the royal road. Additionally, as will be discussed later, most of the temples in the area are strategically located on a high elevation, and very few stand outside the high elevation or in the watershed of small tributaries of the Sen River. In other words, the area in the watershed at the south side and the royal road at the north side is approximately 4,500ha, and is thought to comprise the main domain of the royal city.<sup>8</sup>

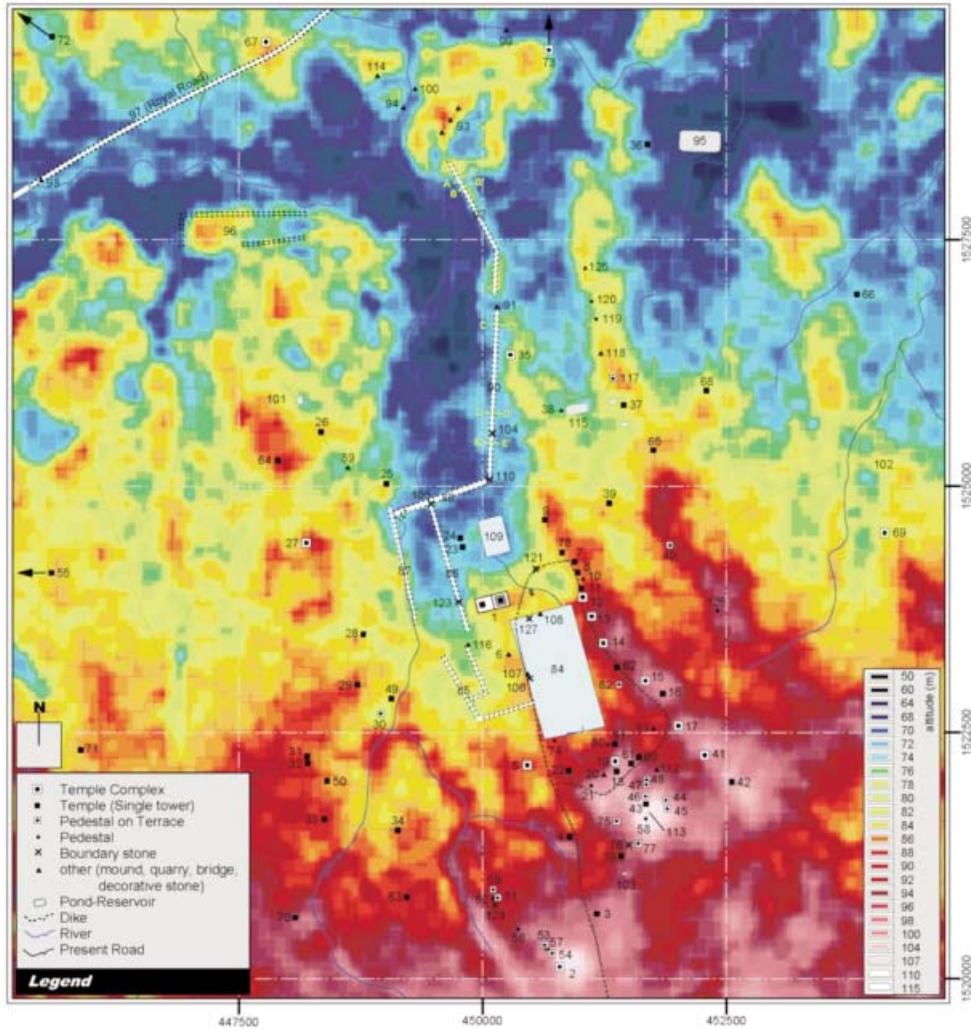


Figure 1: Distribution map of the archaeological remains in Koh Ker

<sup>8</sup> Because large temple complexes are located at the northern side of the ancient road equidistant from Koh Ker's relation to the ancient road, consideration should be given to a potentially bigger picture for understanding regional authority boundaries. For example, the large pyramid temple, Prasat Choan Sram is located 15 km from Prasat Thom (8km north from the ancient road), and the temple complex Prasat Prateal Hang is located at 20km, while Phnom Sandak is located 21km from Prasat Thom.

*Religious Concept in the Layout of the Ancient Khmer City of Koh Ker*

KK	No. in IK	Cisark	Name (by Parmantier/Cisark)	Type	KK	No. in IK	Cisark	Name	Type
1	282,00/283,00	270/271	Prasat Thom	Temple Complex	65	-	-	-	Single Temple
2	265,00	261	Prasat Prām	Temple Complex	66	-	862	Kok Kroel	Temple (Single tower)
3	266,00	262	Prasat Nan Khmau	Temple (Single tower)	67	281,05	691	Ta Maen (Pr.)	Temple (Single tower)
4	267,00	854	Prasat Bāk (= B)	Temple (Single tower)	68	-	-	-	Temple (Single tower)
5	271,00	265	Prasat Čan	Temple Complex	69	-	1624	Chamreh (Pr.)	Temple Complex
6	273,00	267	Andon Freng	Artificial pond	70	-	4790	Kuch (Pr.)	Temple (Single tower)
7	280,00	860	Prasat Balan (=H)	Temple (Single tower)	71	-	4801	Veal Kriel (Pr.)	Temple (Single tower)
8	279,00	859	Prasat Thnen (=I)	Temple (Single tower)	72	-	4807	Muoy Kom (Pr.)	Temple (Single tower)
9	281,00	861	Prasat Trapan Rosei (=K)	Temple (Single tower)	73	-	1625	Kākoh (Pr.)	Temple Complex
10	279,02	3719	-	Pedestal	74	-	-	-	Pedestal
11	278,00	858	Prasat G	Temple (Single tower)	75	-	-	-	Pedestals on Terrace
12	277,00	857	Prasat Andon Kōk	Temple (Single tower)	76	-	-	-	Boundary stone
13	276,00	269	Prasat Kračap (= E.)	Temple Complex	77	-	-	-	Pedestals on Terrace
14	275,00	856	Prasat D	Temple Complex	78	-	-	-	Temple (Single tower)
15	274,00	268	Bantāy Pir Čan	Temple Complex	79	-	-	-	Temple (Single tower)
16	274,02	684	Prasat Čamreh	Temple (Single tower)	80	-	-	-	Pedestal
17	274,03	685	Prasat Črap	Temple Complex	81	-	-	-	Temple (Single tower)
18	270,00	855	Prasat Khtom (=C)	Temple (Single tower)	82	-	-	-	Pedestals on Terrace
19	269,00	264	Prasat Damrei	Temple (Single tower)	83	-	-	-	Stone Scatter
20	268,03	682	An Khnā	Stone quarry and sculpture	84	266	272,00	Rahal	Artificial pond
21	268,00	263	Prasat Khnā	Pedestal	85	-	-	-	Dike
22	268,02	681	Prasat Kraham	Temple (Single tower)	86	-	-	-	Dike
23	281,10	696	Prasat Dan Ton S.	Temple (Single tower)	87	-	-	-	Dike
24	281,11	697	Prasat Dan Ton N.	Temple (Single tower)	88	-	-	-	Dike
25	281,04	690/3901	Prasat Rolam	Temple (Single tower)	89	-	-	-	Laterite structure
26	281,03	689	Prasat Dān	Temple (Single tower)	90	-	-	-	Dike
27	281,02	688	Prasat Bei	Temple Complex	91	-	-	-	Laterite structure
28	-	5855	Kruos (T.)	Temple (Single tower)	92	-	-	-	Dike
29	-	5854	Kantop (T.)	Temple (Single tower)	93	-	-	-	Laterite structure
30	281,08	694	Balan Kuk Sokum	Pedestal on Terrace	94	-	-	-	Laterite structure
31	281,06	692	Prasat Trapan Ta N.	Temple (Single tower)	95	-	-	-	Artificial pond
32	281,07	693	Prasat Trapan Ta S.	Temple (Single tower)	96	-	-	-	Artificial pond
33	281,14	1628	Prasat Sōrphi	Temple (Single tower)	97	-	-	-	Earthen road
34	281,13	1623	Prasat Bōh Lohān	Temple (Single tower)	98	-	-	-	Bridge
35	281,18	1622	Trapan Ven	Temple Complex	99	-	-	-	Sandstone quarry
36	-	-	-	Temple (Single tower)	100	-	-	-	Mound
37	281,17	1629	Prei Prasat (Pr.)	Temple (Single tower)	101	-	-	-	Artificial pond
38	-	-	-	2 Pedestals	102	-	-	-	Artificial pond
39	-	-	-	Temple (Single tower)	103	-	-	-	Artificial pond
40	281,16	5091	Pr. Dei Chhnam	Pedestal on Terrace	104	-	7075	Phlov Boeng Veng	Boundary stone
41	274,05	687	Trāpeang Svay (Pr.)	Temple (Single tower)	105	-	3826	Tomnop Boeng	Boundary stone
42	274,04	686	Sampear (Pr.)	Temple (Single tower)	106	-	-	-	Boundary stone on Terrace
43	268,04	683	Kōk Krong (Pr.)	Temple (Single tower)	107	-	-	-	Terrace
44	-	-	-	Pedestal on Terrace	108	-	-	-	Terrace
45	-	-	-	Pedestal on Terrace	109	-	-	-	Artificial pond
46	-	-	-	Pedestal on Terrace	110	-	-	-	Boundary stone
47	-	-	-	Pedestal on Terrace	111	-	-	-	Latente quarry
48	-	-	-	Pedestal on Terrace	112	-	-	-	Latente alignment
49	281,09	695	Khlong Thvear (Pr.)	Temple (Single tower)	113	-	-	-	Artificial pond
50	-	3695	Prich (T.)	Temple (Single tower)	114	-	-	-	Stone Scatter
51	-	3592	Balang Chrap (Pr.)	Pedestals on Terrace	115	-	-	-	Artificial pond
52	-	-	-	Stone Scatter	116	-	-	-	Mound
53	-	3559	Kroes Ling	Pedestal on Terrace	117	-	-	-	Pedestal on Terrace
54	-	-	-	Pedestal on Terrace	118	-	-	-	Stone Scatter
55	-	4804	-	Temple (Single tower)	119	-	-	-	Pedestal
56	-	-	-	Pedestal	120	-	-	-	Pedestal
57	-	-	-	Terrace	121	-	-	-	Boundary stone
58	-	-	-	2 Pedestals	122	-	-	-	Pedestal
59	-	6720	Kroes Chrap Thnong Cheung	3 Pedestals	123	-	-	-	Boundary stone
60	-	4818	Toch (Pr.)	Temple (Single tower)	124	-	-	-	Boundary stone
61	-	3723	Kroes (T.)	Temple (Single tower)	125	-	-	-	Pedestal
62	-	7400	Kroes Ling	Temple (Single tower)	126	-	-	-	Pedestal
63	-	1630	Pr. Tok Kraham	Temple (Single tower)	127	-	-	-	Boundary stone
64	-	-	-	Temple (Single tower)					

Table 1: List of the documented remains in Koh Ker

Although temples appear to be irregularly located, their locations are selected carefully in alignment with geological features. A gentle ridge rising to an altitude of about 80-100m extends along the eastern side of Rahal from a north-northwestern to south-southeastern direction. Sixteen temples are situated on the top or slightly western side of this ridge; from the north KK35, 9, 78, 7, 8, 10, 11, 12, 13, 14, 62, 15, 16, 17, 41, 42. Of these temples, nine, KK35, 7, 8, 11, 13, 14, 15, 17, 41 face west. These west facing temples are relatively large complex units. Another ridge that is almost parallel is confirmed at the eastern side of the Rahal. Nine temples or pedestals are located on this elevated line; from the north KK125, 120, 119, 118, 117, 37, 65, 40, and 126.

On the southern side of the Rahal is a hill rising to more than 90m, where a small river flows between them from a southeastern to northwestern direction toward the Rahal. The western side of the shallow valley rises to an altitude of more than 90m, and gently peaks to an altitude of 110m. Pedestal KK58 and brick shrine KK43 are located almost at its peak and many other pedestals are distributed on the laterite platform. Several temples are located on the northern slope between this peak and Rahal.

Another gentle rising peak is located to the southwest. Temple complex KK2 is situated on the top of this peak, and KK54, 57, 53, 56, 124, 52, 51, 59 sites are located on the northern slope. Within them, five sites consist of a pedestal on a platform.

The western side of the Rahal is characterized by a smooth slope and there is no concentration of temples. Except for the KK71 and 55 that are far west from Rahal, the structures located in the dividing ridge of water tank Rahal face to the east.

As described above, categorization of the distribution of the temples equates to the five predominant geological features. It is interesting to note that the simple structures of pedestal on the platform are concentrated on the two south gentle sloping peaks. Temple complexes that face west are found on the eastern ridge of Rahal except for KK3 far south of the Rahal.

## 2. CHARACTERISTICS OF THE RELIGIOUS STRUCTURE

In fifty-five temple remains, the majority of the temples have a single sanctuary. The multi-sanctuary layout vary from two sanctuaries on the same platform (KK14, 69), three sanctuaries on a parallel alignment (KK2, 5, 17, 27, 73), one main sanctuary with four corner sub-sanctuaries (KK13), one main sanctuary surrounded by eight sub-sanctuaries (KK15), and nine sanctuaries on a single platform (KK1).

In addition to temples whose sanctuaries still exist, there are fourteen archaeological remains at Koh Ker where only a pedestal exists on the laterite platform. In this paper they are referred to simply as "Pedestal on platform". The presence of these archaeological remains has been mentioned in past records, and it was thought that they initially provided a foundation for a wooden sanctuary. However, they are severely damaged and it is not possible to confirm clear traces of pillar holes in the platform remains. A structure such as a sanctuary or some type of cover may have been built on the platform, but no details

are known.

There are thirteen archaeological remains that have a pedestal and show no traces of having had a platform. However, in places where laterite blocks are scattered in the surrounding area it is highly likely that those blocks composed part of a structure. In future excavation surveys, it may be possible to discover the platform structure.

The majority of the platform remains, like the sanctuaries, have a square plan view. However, there are some that have a rectangular plan view (KK48, 54), and some that have a front porch (KK53, 57) (Photo 1). Even those that have a square plan view differ in appearance from each other. For example, KK45 has steps on all four of its sides, while KK44 looks like a three-tiered pyramid. Additionally, among remains where only pedestals exist, it seems it was typical for each pedestal to have a different structure. In cases where two pedestals (KK58) or three pedestals (KK59) were built close together different structures existed.



*Photo 1: Pedestal on platform KK53. All structure is destroyed and does not retain original form*

### 3. PRASAT THOM AND ITS SATELLITE TEMPLES

Today, the ancient city at Koh Ker is almost entirely covered by tall trees and jungle undergrowth. However, when envisioning the original appearance of the city without the overgrowth of the trees, it is apparent that Prasat Thom was a landmark. It is believed that the Prang pyramid temple rose to a height of more than 35m and could be seen throughout the city.

The main axis line of Prasat Thom is shifted in a counterclockwise direction from due east. More precisely, the angle of the axis, as confirmed by survey, is  $14^{\circ}0'7''$ . This direction is exceptional in Khmer temples that traditionally face east.<sup>9</sup>

<sup>9</sup> Temple orientation varied from -1.2 degrees to 17.2 degree from east to counter clockwise in the major 32 temples at the Angkor Archaeological Park. Except for Prasat Prei that faces to 17.2 degrees, Pre Rup is the biggest angle at 7.2 degrees (Eguchi 2005: 402). Generally, the ancient method for measurement of orientation is thought to be the use of a solar clock as described in the Indian architectural text, *Silpa Sastra*, but recent survey on geomagnetism in Cambodia estimated approximately 14 degrees west inclination in the 10<sup>th</sup> century (Hirooka 2009: 39-44). This coincidence with the orientation of Prasat Thom should not be neglected, and the use of a magnetic compass to align the site is worthy of consideration.

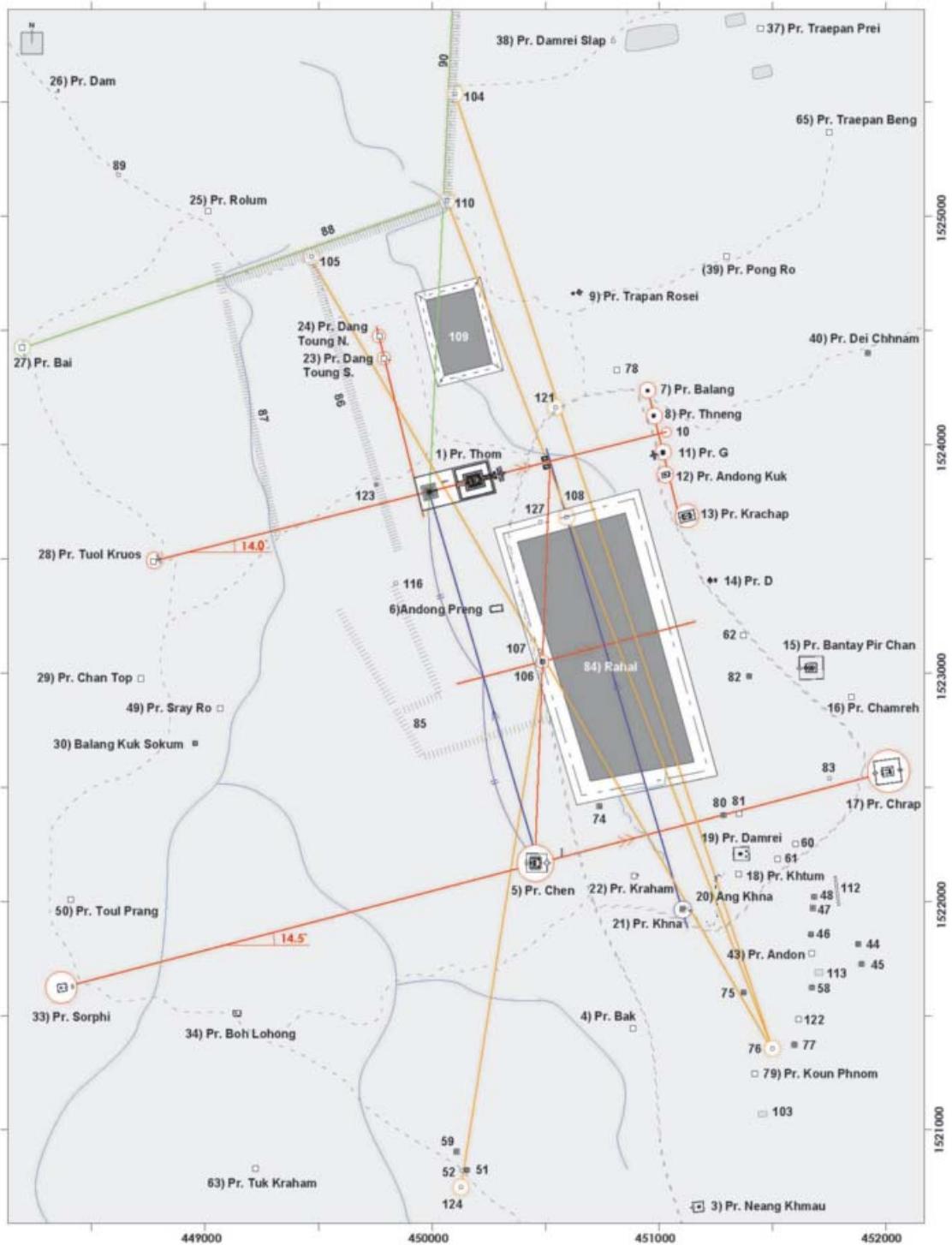
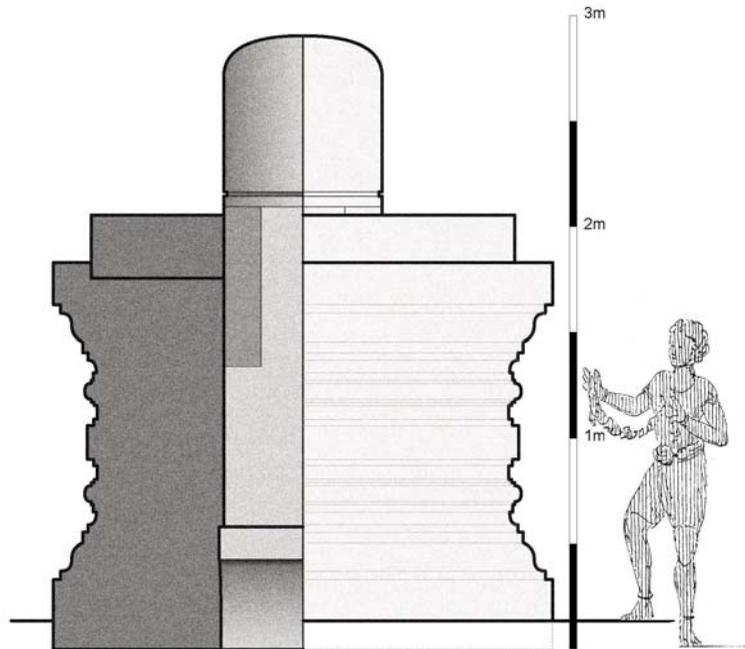


Figure 2: Detected alignment among temples, pedestal on platforms, and boundary stones

If the main axis line of Prasat Thom is extended from the front of the temple, it passes over KK10 at a point about 700m east-northeast (Figure 2). KK10 is a linga pedestal (Figure 3). While the elements of the pedestal have been disturbed and are damaged, it is unlikely that it was brought from a different place. It has apparently been installed in its present location from the beginning. The KK10 pedestal is large compared to the numerous platform remains that have been found particularly from the southern side of the ancient city. Its moldings with engraved decorations also appear more elaborate. This suggests the possibility that the pedestal had a special significance among all pedestals of its type.



*Figure 3: Conjectural image of the pedestal KK10 which is placed on the main axis of Prasat Thom*

If the main axis of Prasat Thom is extended from the back side of the temple it reaches temple KK28. This temple consists of a main sanctuary and a library within a walled enclosure that has a gate or gopura which opens to the east. The simplistic main sanctuary is scattered with stone fragments of a pedestal. It is a small temple, and does not appear to have held any particular significance because of its simplistic design, but its orientation suggests otherwise.

### *3.1 TEMPLES SITUATED ALONG A LINE INTERSECTING THE MAIN AXIS LINE OF PRASAT THOM*

Temples KK7, 8, 11, 12, and 13, are situated to the north and south of KK10 (Figure 4). The respective centers of the sanctuaries of KK7, 8 and 11 fall on a single line (Figure 2). This line also passes through

the walls of KK12 (roughly through the center of the library within the enclosure) and coincides with the western side of the outer enclosure of the double enclosure of KK13. In this way, the line that passes through these temples crosses the main axis line of Prasat Thom at a right angle. KK8 and KK11 stand in symmetrical positions across the main axis line, and the main sanctuaries of KK7 and KK12 appear to be intentionally placed in symmetrical positions from each other although they stand at slightly different distances from the point of intersection.



*Figure 4: Conjectural initial phase of the monument KK8 before constructing the wall on its platform (left half), and present condition (right half). Three shrines KK7 (Prasat Balang), KK8 (Prasat Thneng), and KK11 (Prasat G) that are aligned on a perpendicular line of the main axis of Prasat Thom, are quite similar in architectural design and show signs of unfinished renovation.*

KK7, 8, and 11 very closely resemble each other in appearance. Measurements of each part of those archaeological remains show that KK11 is the largest (12.9m square plan), followed by KK8 (9.7m square plan), then KK7 (8.6m square plan). All three of these temples remain unfinished. Made of sandstone, they have been completed up to the masonry of the walls, and display no sculptures. However, there are engraved decorations on the platform and the pedestal inside the sanctuary. Parmentier proposed a very acceptable hypothesis stating that the un-engraved walls were added construction on the engraved platform and pedestal. Construction of the roof, however, appears to have been abandoned after the construction of the wall. In fact, there are no traces of any sandstone having been placed on the topmost stone layer of

the walls, or traces of a wooden roof. This does not preclude a temporary placement of a covering in order to use the building after construction work was abandoned.

Pedestals in these temples are carved from one stone and are very large. The smallest pedestal in KK7 is 3.2m square and 3.8m in height to the top of the linga. The largest pedestal in KK11 is 4.3m square and 4.8m high. Because of this size, Harmand was of the opinion that these pedestals were carved from natural rock (Harmand 1879: 369-370), and Aymonier (1897: 20-21, 1900: 400) and Parmentier (1939: 54) also concurred with his idea. In addition, Aymonier (1897: 20) insisted that this natural rock location enforced this anomalous orientation of Prasat Thom. Although this idea is hard to accept because of the geological conditions and precision of the layout, the clearance of accumulated soil in the shrine will confirm any connection between pedestal, pavement and bedrock.

Judging by the fact that KK7, 8, and 11 are based on roughly the same design plan and their construction had been abandoned at the same stage, there is hardly any doubt that these sanctuaries were built during the same period and were positioned according to the same plan.

The main sanctuary of temple KK12 may not fall precisely on the line connecting the above three temples, but it is almost symmetrical in position to KK7 across the main axis of Prasat Thom. This seems to suggest that some type of relationship existed with those temples. However, unlike the other temples at Koh Ker, KK12 (Prasat Andong Kuk) has a typical ground plan of the 12<sup>th</sup>-century “Chapel of the hospital” from the reign of Jayavarman VII. Many stones were reused material including a doorjamb that has inscription K.676 telling of Jayavarman IV (Parmentier 1930: 223, Cœdès 1937: 52). Because of these reused materials, it is possible that the previous temple location was in alignment with KK7, 8, and 11, but the current layout did not respect the original placement as Evans (2009: 58-59) also presumed.

KK13 (Prasat Krachap) is a unique temple among all though at Koh Ker insofar as it contains numerous inscriptions still. The line connecting KK7, 8, and 11 passes through the western wall of its enclosure. Interestingly, if the line that passes through the pedestal of KK10 at a right angle with the main axis line of Prasat Thom is extended southward, it passes through the center of this temple.

KK23 and KK24, located north of Prasat Thom, stand along a line extended northward from the western wall of the enclosure surrounding the Prang, Prasat Thom’s pyramid temple. More specifically, the line that forms a right angle with the main axis line of Prasat Thom passes through the center of temple KK24 and the eastern side of the outer enclosure of temple KK23 (the center of the KK23 sanctuary is shifted slightly to the west of this line). Both temples are noticeably collapsed, but an elaborately engraved pedestal still exists in each sanctuary. KK23 extends the long causeway eastward.

### *3.2 ANOTHER MAIN AXIS OF PRASAT THOM AT THE SOUTH OF RAHAL*

In addition to the main axis of Prasat Thom that sets the layout of surrounding temples, another group of temples, KK33, 5, and 17, located at the south of Rahal, are also located in remarkable relationship. These three sites are temple complexes surrounded by enclosure walls, with KK5 and KK17 being the

largest complexes after Prasat Thom. The center of these sites are aligned<sup>10</sup> (Figure 2). This line is almost parallel to the main axis of Prasat Thom. The line is 14.5 degrees counterclockwise from the east direction, and its difference is 0.5 degrees from the axis of Prasat Thom. Furthermore, this line is almost symmetrically positioned via the center of Rahal.<sup>11</sup> Points of commonality among these three temples do not appear in the inscriptions, stone carving, or architectural style. The further study of the layout and geographic position may reveal a significant relationship among them.

*3.3 ANGLES OF THE TEMPLES' MAIN AXIS LINES*

As the main axis line of Prasat Thom is rotated counterclockwise 14.0 degrees from due east, other temples' angles also vary. Interesting results have been acquired from an analysis of the angles of the main axis line in a number of major temples (Table 2). This summary shows the angles of the temples' main axis line from an east-west direction counterclockwise.<sup>12</sup> The angles differed by as much as 21 degrees; ranging from 21.5 degrees in KK4 to -0.4 degrees in KK18. However, among them the angles of the main axis lines of a group of nine temples were found to be more or less the same, ranging only slightly from 16.4 degrees to 13.5 degrees. This directional alignment may be potentially attributable to magnetic inclination.

By studying the respective positions of these nine temples whose main axis lines run in roughly the same direction, it is apparent that nine temples had some form of meaningful relationship with Prasat Thom. In other words, the angles of the main axis lines of these temples support the theory that the temples have been precisely positioned according to a common plan centered on Prasat Thom with building commencing at approximately the same time. Though these temples are located a distance from Prasat Thom, they were probably intended to undertake part of the functions of the central temple and play a satellite role.

No.	Name	Orientation	Angle
KK4	Pr. Bak	E	21.5
KK28	Pr. Toul Kruos	E	16.4
KK8	Pr. Thnen	W	16.4
KK7	Pr. Balan	W	16.0
KK23	Pr. Don Ton S	E	15.9
KK11	Pr. G	W	14.9
KK1	Pr. Thom	E	14.0
KK12	Pr. Andon Kuk	E	14.0
KK24	Pr. Don Ton N	E	13.7
KK13	Pr. Kracap	W	13.5
KK9	Pr. Trapan Rosei	E	9.6
KK31	Pr. Trapan Ta N	E	8.4
KK32	Pr. Trapean Ta S	E	7.7
KK17	Pr. Krap	W	7.6
KK33	Pr. Sorphi	E	6.9
KK3	Pr. Nan Khmau	W	6.4
KK25	Pr. Rolum	E	4.8
KK22	Pr. Kraham	E	4.5
KK14	Pr. D	W	3.3
KK2	Pr. Pram	E	2.8
KK34	Pr. Boh.Lohon	E	2.8
KK26	Pr. Dan	E	2.7
KK15	Pr. Bantay Pir can	W	1.2
KK5	Pr. Chin	E	0.3
KK19	Pr. Damrei	E	0.2
KK18	Pr. Khtum	E	-0.4

*Table 2: Angles of the major temples' main axis lines from due east to counterclockwise.*

<sup>10</sup> The distance between KK33 and KK17 is 3,773m. The central point of the KK5 site located between KK33 and KK17 is 3m south from the connecting line between them.

<sup>11</sup> Precise survey shows that the distance from the center of Prang in Prasat Thom and the center of Rahal (KK106) is 9m shorter than the distance from KK5 to the center of Rahal.

<sup>12</sup> Each value in this table is the average measured angle of many parts; for example, the angle at the sides of the enclosure wall is slightly different because of construction error, and orientation of the shrine and gopura sometimes do not match.

#### 4. PILGRIMAGE ROUTE TO PRASAT THOM

Khmer temples generally have a long causeway extending from the front entrance, but there are no traces of such a causeway at Prasat Thom. As mentioned earlier, the KK10 pedestal is situated in front of Prasat Thom. While it is possible that a causeway had stretched to KK10 or that it passed through this spot and continued eastward, no structure has been discovered to date.

##### *4.1 LINEAR TRACES NEAR PRASAT THOM*

Aerial photographs of the ancient city at Koh Ker show a number of line traces. A local examination of these traces revealed that they are all traces of embankment remains. Some well-known embankments identified in the past include KK86, KK87, and KK88, which run in areas to the north and west of Prasat Thom (Fig.1). Other archaeological remains have also been confirmed, such as KK85, KK90 and KK92 which pass through the laterite structure of KK91 and form a single continuous embankment.

With the exception of KK85, these embankments characteristically have a row or rows of small irregular shaped laterite blocks on one side of the shoulder only. The blocks do not appear to be placed or stacked with particular care. The width of the rows of laterite blocks differ according to the embankment. Some embankment slopes are fully paved with laterite blocks while others display only a narrow row of laterite blocks less than 1m in width.

Rows of laterite blocks cover the western face of the KK86 embankment, the eastern face of KK87, the northern face of KK88, and the western face of KK90 and KK92. If a level difference existed between the two sides of the embankment or there was water immersion on one side of the embankment only, it could be assumed that the laterite revetment was installed to prevent erosion of the embankment. However no such circumstances are evident, and it is difficult to decipher any functional meaning to installing rows of laterite blocks on only one side of the embankment.

These embankments are interconnected. Since KK86, 87, and 88 are arranged as though they were meant to surround the northern area of Prasat Thom, it was once thought that they were part of an enclosure (Parmentier 1939: 15-17). However, because no traces of the eastern and southern sides of such an enclosure have been found, they are apparently not part of a full enclosure. Rather, it might be prudent to consider them as the remains of a road built in a region subject to floods during the rainy season. A number of embankments probably provided access to the central temple of Prasat Thom from the royal road<sup>13</sup>. In

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<sup>13</sup> Evans has also discussed the function of these linear embankments (Evans 2009: 42-56). He concluded that these lines are multi-functional structures of roads and dykes for the control of water. Our survey fundamentally agrees with his interpretation, but the east side of dyke KK90 is a naturally gentle ridge-like geological formation. Therefore it was easier to construct a dam by reinforcing this land feature. As we discuss later, this straight dyke was strictly selected and placed in relation to Prasat Thom. This means this structure was constructed with vivid awareness of the religious aspect and utilitarian purposes for water management.

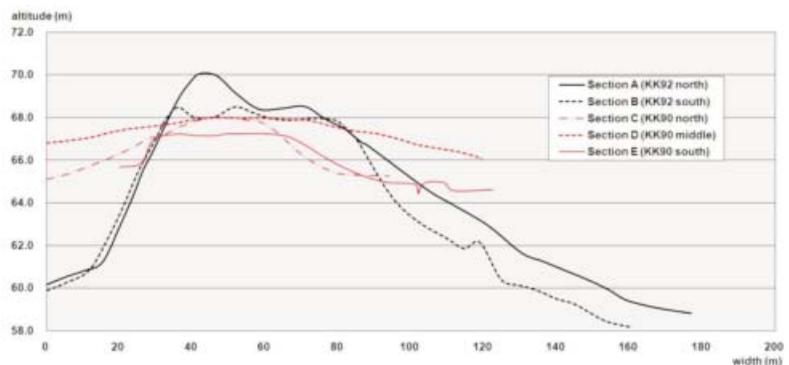
other words, a continuous embankment road may have existed for the purpose of providing access to Prasat Thom from a royal road that ran from the west-southwest to the east-northeast direction about 7km north of the temple. No line traces of a road have been found between the northern end of KK92 and the royal road, and the route between them remains unknown. It is possible to reach the back side of Prasat Thom by passing through KK92 > KK90 > KK88 > KK86.

#### 4.2 EMBANKMENT KK90 AND KK92

Embankment KK92 and KK90 cover most of the access route between the royal road and Prasat Thom. KK92 bends once along the way, but it extends a total distance of about 1,400m. KK90 is a straight embankment that stretches a total distance of about 1,700m. A boundary stone numbered KK104 has been found on KK90. A laterite structure numbered KK91 separates the two embankments, so that KK92 is to the north of KK91 and KK90 is to the south. Moreover, the structures of the two embankments differ from each other. As shown in Figure 5, the height of KK92 is almost 10m and slopes steeply at the western side. On the other hand, KK90 is gently sloping and has a height of 2-3m. Ground level at the east and west side of KK92 is different. The east side is 1 or 2m lower than the west. This configuration supports the idea that this structure also worked as a dam. The Sen river (Rongea river) detours to the north from this embankment.

KK90 is a linear embankment confirmed from aerial photographs and field walking. A survey of the rows of laterite blocks on the western side of the embankment has verified that it is almost exactly a straight line. The embankment basically runs in the north-south direction, angled about 3 degrees in the clockwise direction. At this angle, if the line formed by KK90 is extended southward, it would reach roughly the center of the Prang, the pyramid temple of Prasat Thom (Fig.2). A closer examination shows that if the line passing through the row of laterite blocks on the western shoulder of KK90 is extended southward, it would run roughly 7m to the west of the top of the pyramid. The width of the embankment is estimated at around 40m. If one were to stand slightly west of the center of the embankment, it would have been possible to observe the pyramidal appearance of the central sanctuary straight down that road. A jungle of tall trees obscure the site today, but if the surrounding area had been open land in the past, worshippers heading to Prasat Thom were probably able to keep the pyramid temple in view of them as they traveled along the embankment road.

*Figure 5:  
Cross-section of embankment KK92 and KK90*



#### 4.3 EMBANKMENT KK88

Embankment KK90 does not take worshippers all the way to Prasat Thom, but abruptly stops at a point about 1km from the temple. From there, it bends to the west and connects with another embankment road numbered KK88. At the bend of KK90 and KK88, KK110, a sandstone element, has been determined to be a boundary stone from its size, shape, and band of decorations. Today, it lies immediately on the side of the road, possibly moved there, but apparently not far from its original location.

Embankment KK88 does not extend due west, but is shifted about 19 degrees in a counterclockwise direction. When standing on KK88, looking back toward worshippers walking forward along the embankment road, it would have been possible to see temple KK27 straight down the road. The temple is situated on a hill that rises slightly from its surroundings, so if there was nothing to shield the view between one's position on KK88 and the temple, the temple would have been in clear view (Photo 2).



*Photo 2: Front view of KK27 (Prasat Bei) which is placed on the extending line of embankment KK88.*

As a possible route to Prasat Thom, one may have proceeded along embankment KK90 up to the point of intersection with another embankment road numbered KK86, turned southward, and entered Prasat Thom from behind. Ultimately, one was able to reach the back of the hill located west of Prasat Thom. At the T-junction with embankment road KK86, another boundary stone numbered KK105 was found. One more stone object with the appearance of a boundary stone is scattered on embankment KK86 at the west side of the Prasat Thom near what is traditionally called the Mountain of the White Elephant (known as Phnom Damrei Saw) (Fig.6, Photo 3). This stone is a unique configuration; it is cruciform in shape from a top view, with a long tenon undersurface. Although we could not find any platform structure to support this tenon, it is unlikely that this big stone was transported far from its original location. This location is the final corner to access to Prasat Thom from the embankment road. It seems that this type of stone element was placed at each bend in the road guiding worshippers to Prasat Thom.

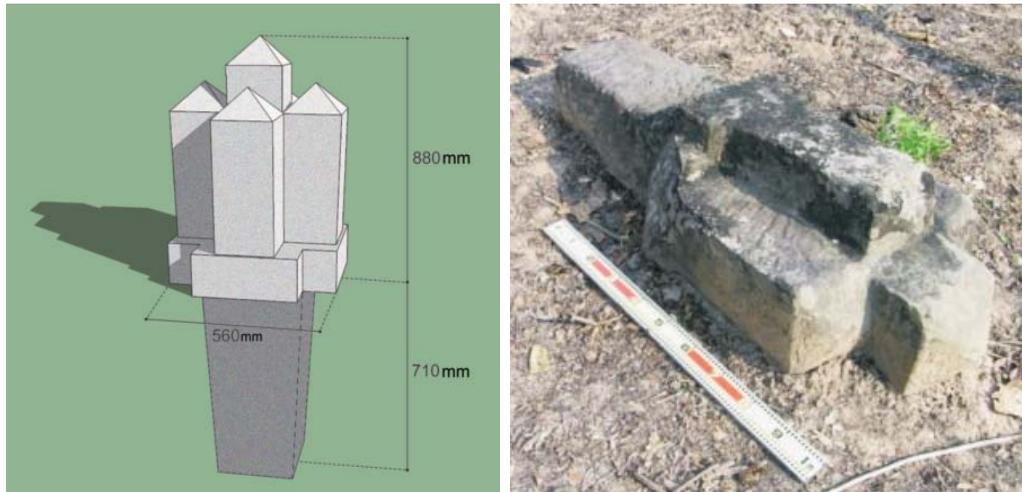


Figure 6, Photo 3: Stone scattered KK105 at the west side of Prasat Thom on the embankment KK86. This unique cruciform column is presumed to be an anomalous type of boundary stone.

A line of the embankment accesses the back of Prasat Thom, however in typical Khmer religious design the causeway should be leading to the front of the temple. Some pioneers who studied this group of monuments in the late 19<sup>th</sup> century draw the straight embankment to access near the front of Prasat Thom from the north side (Aymonier 1900: 401, Fig.74, Lajonquière 1902: 375, Fig.186). However, the current survey could not find any such traces. Further study is required to identify the main route with the possibility that the above-mentioned route was the primary access.

## 5. BOUNDARY STONES

Four boundary stones were confirmed by the survey on the line from KK90 to Prasat Thom. Additionally, more boundary-like stone objects were found in this monument group. Two boundary stones were recorded by Parmentier in 1935 (Parmentier: Unpub.); these were reported by Bruguier as No.3826 (Tomnop Boeng) and No.7075 (Phlov Boeng Veng).<sup>14</sup> Bruguier documented about 20 boundary stones in the entire Khmer domain. These stones apparently have some common characters: about 500mm wide square prism or rectangular prism shape, cross ridge lines (four or eight directions) on the upper surface, and band line on the lateral surface. As inscriptions describe, many of them were dated to the 10<sup>th</sup> and 11<sup>th</sup> centuries. The boundary stones (“gol” in Khmer) were placed to determine and delineate the temple domain. The most popular example is a carved map on the doorjamb of North Kleang (K.542). The

<sup>14</sup> Refer to Cisark web site. <http://www.cisark.org>.

corners of each land are defined by the stone marker “gol (çila)” (Cœdès 1951: 221-224). Although it has not been proven that these stones at the site are identified as the stone markers in the map or inscription, the relation between these stones and description should be pursued by further survey.<sup>15</sup>

Including the four boundary stones described above, a total of nine boundary stones were documented in the survey. They have the same characteristics as previously described except for cruciform shaped stone KK123 and laterite composition KK121.

The location of these stones are identified with three geographic areas: [A] on the embankment (KK104, 105, 110, 121, 123), [B] on the embankment of Rahal (KK 106, 127), [C] on the gentle sloping southern hills (KK76, 124). Stones [A] match the character of a stone marker that defines a corner of territory as per inscriptions. As previously indicated, these stones were placed on the road to Prasat Thom. They may also serve as distance or religious way station points, or possibly the equivalent of a modern day survey point. Stones [B] seem to have a close relation with the construction or religious purpose of Rahal. Except for KK127 all of them were moved from their original position, and may be close to the originally installed location. If the boundary stones on Rahal (KK106 and 127) were installed in the middle of sides, as KK106 at the middle of the west side, it would be acceptable that stone KK127 was originally installed on the laterite terrace KK108 located about 100m to the east. Stones [C] appear to have no relation with any structure in their current and possibly altered location. [A] and [B] markers align on four lines; KK104-121-76, KK110-108-76, KK105-106-76, and KK108-106-124 (Figure 2). The location of KK76 near the peak of a gentle hill appears as the lynchpin of three lines. KK76 site has a boundary stone, but there are also stone structures at the east side of this stone. This structure has already collapsed and it is difficult to conjecture the original shape, but the straight line of the stone scatter gives rise to the possibility of an ancient structure (figure 7).

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<sup>15</sup> Inscription K.449 (Stèle de Palhal) is the single example with a mention of ground size (width 1200 and length 1000) in Koh Ker (Cœdès 1913: 27-36). Although the inscription does not describe any unit for these numbers, Cœdès interpreted the unit implicitly mentioned as “fathom/vyama”, namely coudée (fathom) = ca. 50 cm (Cœdès 1924: 348-349). If 1 vyama (4 hasta) equals 1648mm, 1200 vyama and 1000 vyama are 1977.6m and 1648m respectively. We can find similar distance in between boundary stones KK106-110 (1973m) with the former 1977m, but a significant layout does not appear from this position.

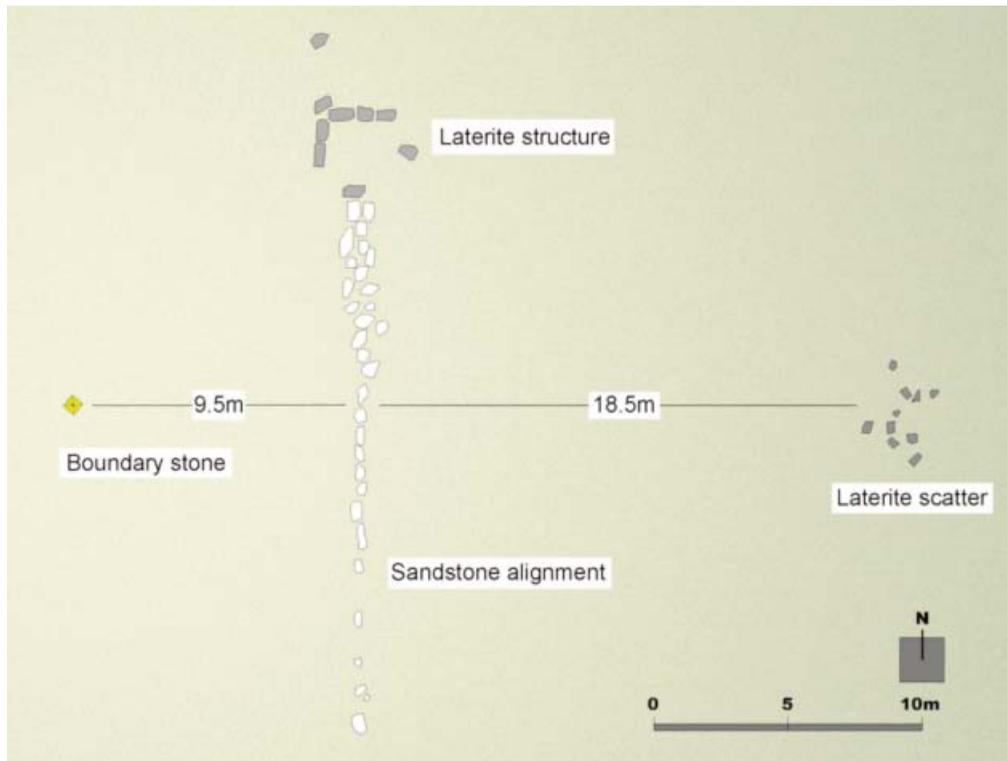


Figure 7: Sandstone and laterite distribution at the eastern side of boundary stone KK76

## 6. RAHAL AND RELATED ARCHAEOLOGICAL REMAINS

The Rahal reservoir (KK84), situated southeast of Prasat Thom and surrounded by major temples, is a central core structure in this group of monuments. The sections below discuss the structure of Rahal and related archaeological remains.

### 6.1 SIZE AND SHAPE OF RAHAL

The accurate size and shape of the Rahal has never been adequately described and measured in detail. As a result of the project survey, it was found that the Rahal has an almost rectangular plan view that is slightly angled in the counterclockwise direction relative to Prasat Thom. The southern side is a natural hill that slopes slightly upward. The existence of any man-made embankment at the south side was previously dismissed, however an embankment was found in the recent investigation. Rows of laterite block were found in some areas on the embankment, and suggested that a laterite revetment may have been originally built around the entire Rahal.

To accurately confirm the shape of the Rahal, examinations were carried out and a topographical survey was conducted in the four corners to pinpoint the corner locations. A sectional survey was conducted along the eastern side (Figure 8). Based on these surveys, it was found that the northeastern corner of the Rahal corresponds to a point where X: 1,523,763, Y: 450,889 and the southeastern corner corresponds to a point where X: 1,522,573, Y: 451,218, and the northwestern corner corresponds to a point where X: 1,522,463, Y: 450,314. The southwestern corner is difficult to precisely define, and it may correspond to X: 1,522,463, Y: 450,661. The quadrangle shape formed by these four corners is not an exact rectangle, but is within 50m from forming a right angle. Although a rectangular plan of the reservoir may have been originally conceived, the geological features dictated a deviation in plan.



Figure 8: Surveyed area on the surrounding embankment of Rahal; topographical survey was conducted in 7 areas A to G, and a west-east cross section survey was conducted in area A to D.

By topographical measurement, the embankment is about 80m wide and 5m high (Figure 9). The ridgeline is slightly shifted toward the outer side, so that the embankment slope is about 30m wide on the outer side and about 50m wide on the inner side.

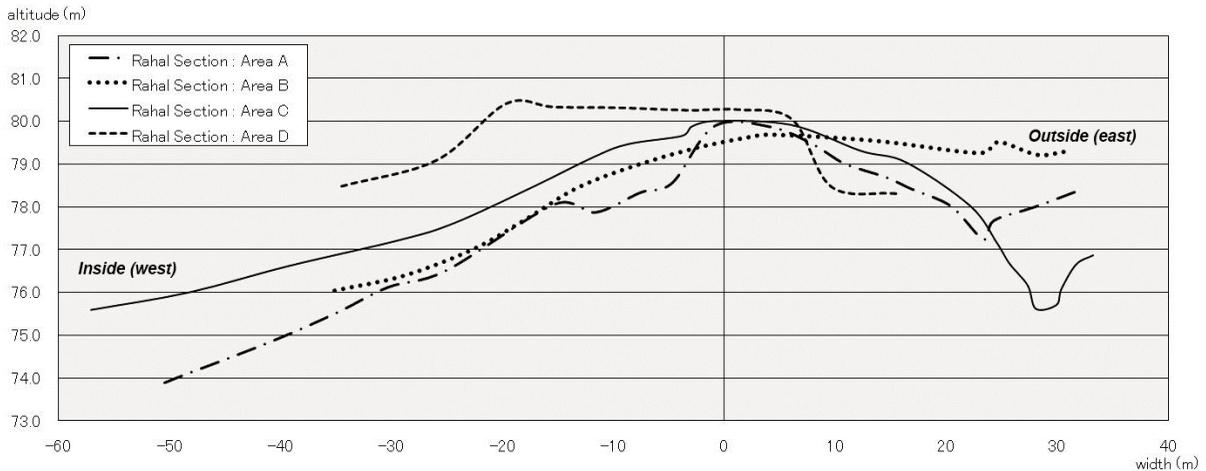


Figure 9: Cross sections of east side embankment of Rahal

It can be assumed that the northern and eastern embankments reflect the original plan without any deformation by geological features. The line that connects the ridgeline of the eastern embankment has a rotation angle of 15.5 degrees, and the northern embankment is 15.0 degrees, deviating from the above-mentioned angle of Prasat Thom’s main axis line by 1 or 1.5 degrees. The angle of Rahal must be classified in the same group with Prasat Thom. The length of the eastern side is approximately 1,235m on the ridge and the northern side is approximately 596m, thus forming a rectangle with approximately 2:1 proportion.

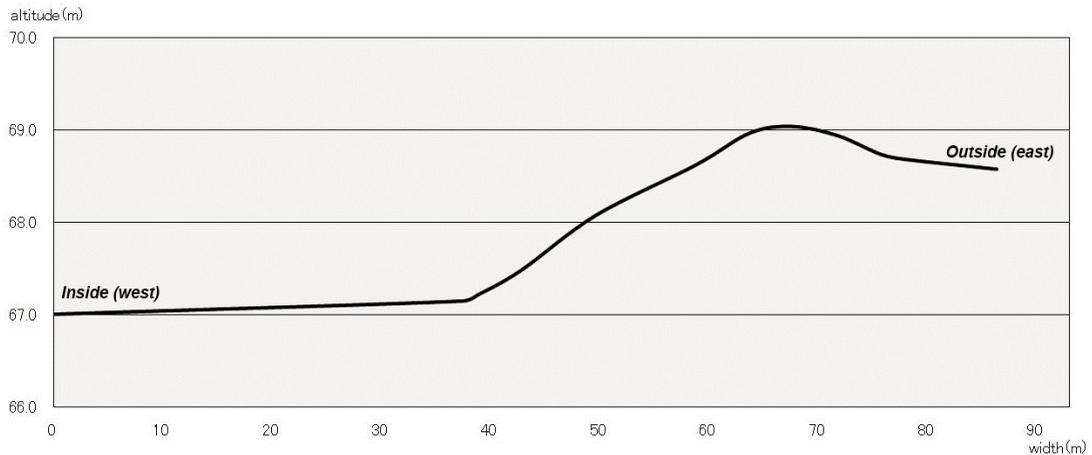
Most of the large Khmer baray like the Rahal have a basic structure and a small island in the middle of the reservoir with a temple Mebon on the island. Whether or not such archaeological remains exist in the center of the reservoir at Rahal is not known. By accurately estimating the shape of the Rahal in the recent study, we were able to identify the geometric center of the reservoir and examine that area in detail. As an exploration result, it was found that no remains of any type exist in the center of the Rahal.<sup>16</sup>

## 6.2 SECOND RESERVOIR UNDER RAHAL

A singular water outlet was confirmed near the eastern corner of the north embankment. Discharged water flows to the north and passes the east side of the eastern edge of a structure of Prasat

<sup>16</sup> Evans (2009: 57) also reported the absence of the Mebon.

Thom called the “Palace” (Parmentier 1939). This water flows to the north and reaches another reservoir at the north of Prasat Thom. This smaller reservoir (KK109) is surrounded by an embankment and is approximately 382m in length north-south by 260m in length east-west, and rotated counterclockwise 13.9 degrees. This angle is almost a match with Prasat Thom. By the topographical measurement at the middle of the eastern side, the embankment is about 40m wide and 2m high (Fig.10).



*Figure 10: Cross section of east side embankment of north reservoir KK109*

Near the western edge of the north side the embankment is cut. The original water outlet gate was placed here. Water was channeled from the gate to embankment KK88, past the east end of KK88 embankment and dispersed to the lower land to the west of embankment KK90.

### *6.3 THE LINGA AND THE RAHAL*

*Photo 4: Collapsed sandstone structure KK21 (Prasat Khna)*

KK21 (Prasat Khna) is another significant monument confirming the religious aspect of Rahal. It is located along the extension of the north-south central axis line of Rahal at a distance of 550m from the southern side (Figure 2, Photo 4).

Past studies interpreted this monument as that of a platform for a masonry sanctuary that was never built, or a platform for a wooden building that has been lost to time (Lajonquiere 1902: 358;

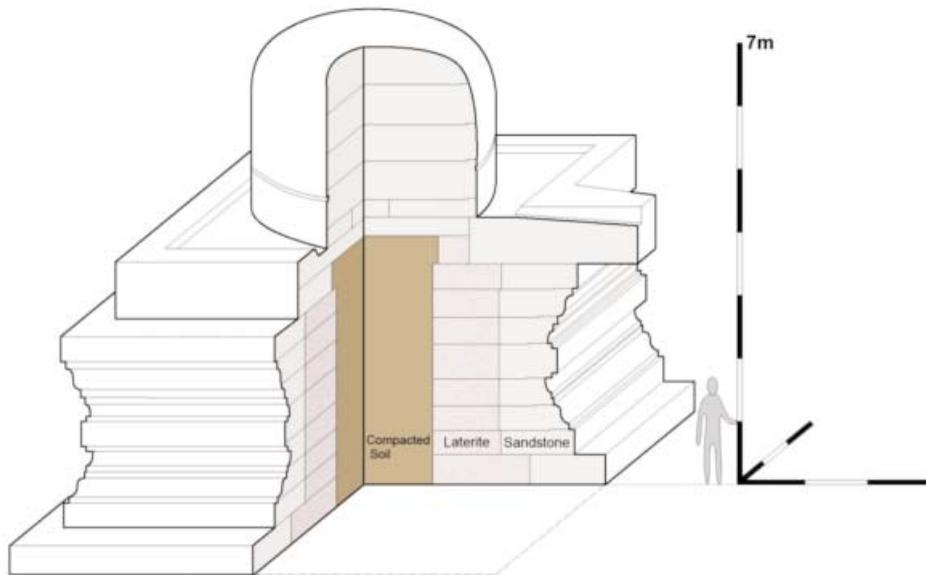


*Photo 4: Collapsed sandstone structure KK21 (Prasat Khna)*

Parmentier 1939: 75-76). However, in the recent study, the scattered sandstone blocks were documented and analyzed based on their shape. The conclusion was reached that Prasat Khna is the remains of a pedestal which provided a foundation for a large linga (Fig.11).

The structure shows signs of desecration in the past, and the northern and western faces, as well as the upper part of the pedestal is severely damaged. The southern face and part of the eastern face are in relatively good condition. Because of the damage to the central part, it is possible to see the inside of the pedestal. The pedestal is about 3m high and has a square plan measuring about 6m on each side. The exterior is composed of sandstone masonry with laterite masonry in the interior. Compacted soil layers can be seen further inside. Therefore, Prasat Khna conforms to a typical Khmer platform construction design. The sandstone elements of the pedestal have decorative moldings on the outer surface, and are basically rectangular in shape. However, a number of the scattered elements have a clearly curved surface. They vary in size, and when combined form a low cylinder in the shape of a linga. Twenty of these stone elements that appear to be linga fragments have been confirmed, and it is likely that the remaining majority lie buried in the vicinity.

The pedestal at Prasat Khna has a typical shape with a spout for draining water attached to the yoni. The spout element has fallen to the ground on the northern side of the existing pedestal. Since the element is large (1,940mm wide, 2,690mm long, and 850mm high) it cannot be easily moved. It is apparent that it was attached to the northern side of the pedestal. Water that was poured over the linga became sacred and was received by the yoni, and further traveled through the somasutra and drained to the north toward the Rahal.

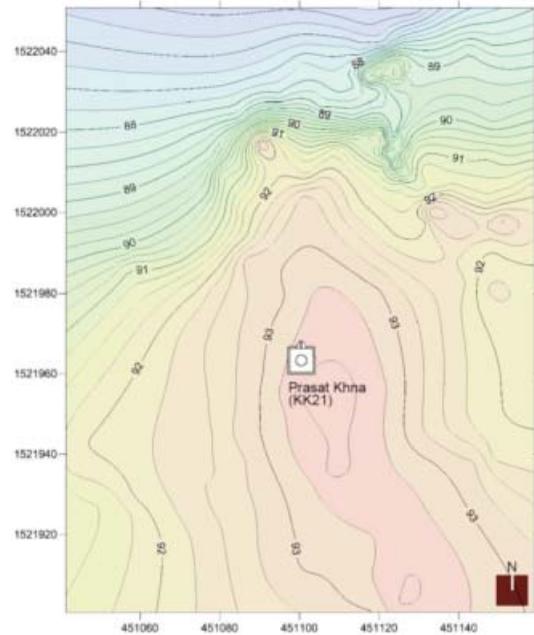


*Figure 11: Conjectural linga-yoni pedestal structure of KK21 (Prasat Khna)*

Prasat Khna is situated immediately above the ridge of a gently rising slope on the southern side of the Rahal (Fig.12). When envisioning the original appearance of the temple standing amid a forest clearing, it is possible to imagine that the temple commanded a wide view of the flow of scared water from the huge linga to the expansive Rahal reservoir below.

At the baray of other Khmer monuments, a central temple facility Mebon represented the source of the sacred water of the reservoir. The cruciform drainage channel at Lolei, the central temple of the Indratataka; the horizontal image of Vishnu unearthed from the West Mebon at the West Baray; and the Neak Pean at the North Baray, Jayatataka, all conjure a vision of the source of scared water.

At the Rahal, it appears that the sacred water of the reservoir did not flow from a ceremonial central facility, but rather it poured forth from a symbolic object located upstream of the reservoir. In the absence of a central facility, there may have existed a plan designed to purify water for the sacred reservoir according to a mechanism different from that of other monuments: the linga of Prasat Khna (KK21).



*Figure 12: Topographical map of the linga-yoni pedestal structure KK21 area. It is located near the south edge of high ground.*

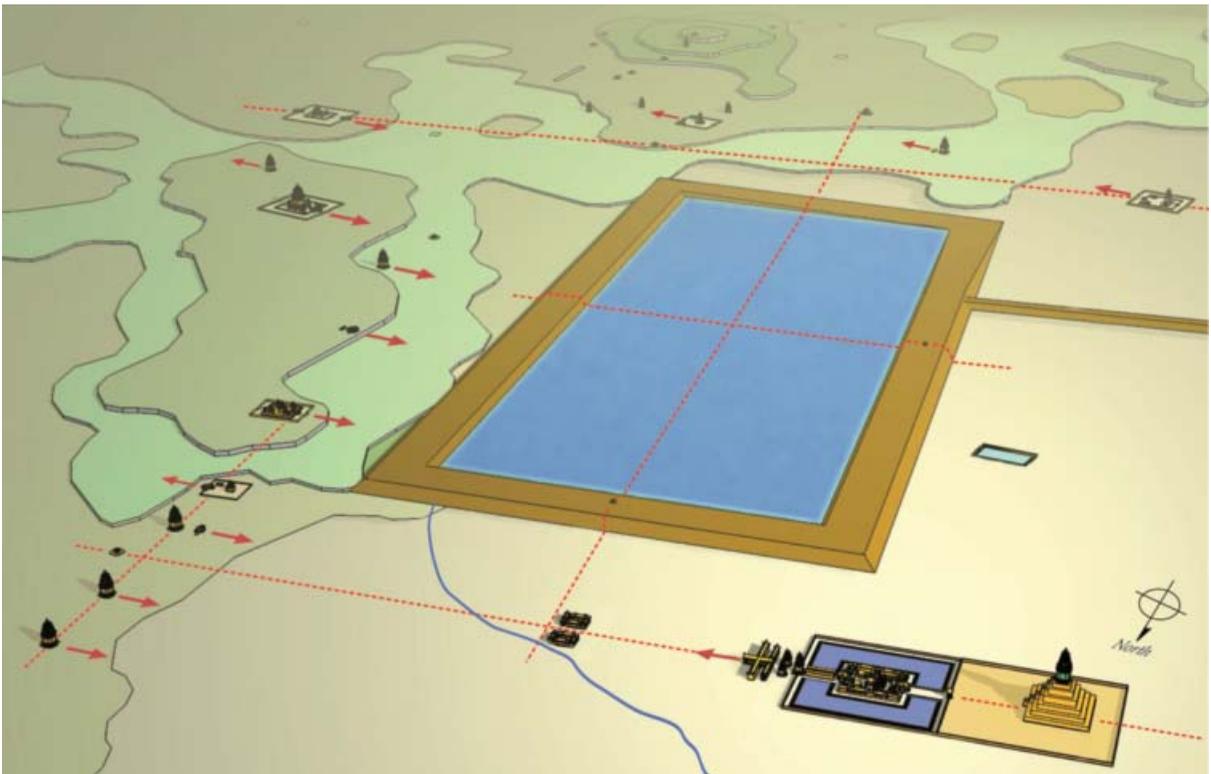
## 7. THE RAHAL AND SURROUNDING TEMPLES: A RELIGIOUS CONCEPT

The concept that the sacredness of the linga was aggregated into the Rahal allows for an effective interpretation of the orientation of the temples on the ridge east of the Rahal. Many temples faced to west in this area. Parmentier (1939: 18) assumed that these temples were constructed to face the ancient road that was assumed to penetrate this group of monuments. However through current research, the ancient road was found to pass by the northern side of this group of monuments.

If we follow the same theoretical relationship between the Rahal and the linga (KK21), other temples which are placed on the west slope of the eastern ridge facing the Rahal may provide a source for sacred water. Water poured on the linga flowing from the shrine through the somasutra and discharging down to Rahal provide the conceptual image.<sup>17</sup> The location of the many remains of linga-yoni pedestals on laterite platforms, a unique structure only found in this group of monuments, also contributes to the same

<sup>17</sup> KK3, Neang Khmau, which is also faced west but located in the south of Rahal is an exception to this theory. Interpretation of this temple requires additional research.

conceptual image. Many structures, except for KK40 and KK117, are placed on the northward down slope ground of the southern side of Rahal. Therefore, conceptually the sacred water from these lingas flowed down the natural terrain and into Rahal (Figure 13). Moreover, KK20 (Ang Khna) where there are many deities carved on the natural rock bed at the southeast of Rahal, may express the same concept. In order to purify rain water, these carvings possibly performed the same function as those carved in the river bed at the Kulen Hills and Kbal Spean. Thus the sacredness from each temple was aggregated and integrated in the reservoir Rahal. This sacred water drained north and passed in front of Prasat Thom, and was stored in a second reservoir at the north. Finally, sacred water dispersed to the north and was utilized as agricultural water in the low land.



*Figure 13: Aerial view of the central area of Koh Ker. Many religious facilities, temple complexes, pedestals on platforms, and boundary stones surrounding the Rahal, are unified with a state temple Prasat Thom and reservoir Rahal in an accurate layout.*

Conceptually this water management view has similarities with the Angkor area. Generally speaking, water management in the Angkor area is considered divided into three principal zones. Higher land between the Kulen region to the north of the temple area, in an altitude of more than 28m is called a “collector zone”. The area where there is a concentration of many temples and large reservoirs from 18 to 28m in altitude is called the “aggregator and holding zone”, and finally the lower area between the temples

and flooded land of the Tonle Sap lake is called the “drainage and dispersal zone” (Fletcher 2008: 58-59, Kummu 2009: 1416-1418). This three-step formation from a sacred north area to the Angkor capital religious facilities to the south agricultural field was the basic model of the Angkor water management system.

Using the three step configuration perspective of Angkor, water management in Koh Ker can be understood on a smaller scale but following a similar fundamental idea. However, unique characteristics are found in Koh Ker. Although the temples and baray had one-on-one relationships in the Angkor monuments,<sup>18</sup> in Koh Ker a number of temples in addition to the central temple of Prasat Thom were arranged around the Rahal, and connected in a parallel relationship with Rahal. These temples are the conceptual representation of the sacred water source for the Rahal. The temples around the Rahal had the same religious functionality as the headspring temple of the Mebon common in the Angkorian Khmer context.

## CONCLUSION

In addition to the previous recorded structures in this group of monuments, a number of remnants of structures and civil engineering works were newly confirmed by the recent pedestrian survey. Because these monuments were established within a relatively short time in the 10<sup>th</sup> century in contrast to the Angkor monuments that were continuously added to the urban landscape by successive kings, Koh Ker might represent a consistent application of specific complex urban planning. We might say that in this plan may be found a pure form of the religious and utilitarian concept of the Khmer urban complex. As many stone images from this group of monuments show a distinctive and dynamic style, this unique artistic sense represents the religious and aesthetic ideas working in unison with the unique architecture and urban designing of this period.

One of the characteristics of the Koh Ker monuments is the repetitive nature of the linga religious complex. The significant layout of the temples and civil remains in this group of monuments has been understood through spatial analysis, and as Parmentier (1939: 104) insisted, the entire city formed a magnificent Siva temple. This reputation was formed by evidence of intensive worship of the linga installed on the top of the pyramid-shaped Prang of Prasat Thom. Several satellite temples and a long pilgrimage road are specifically related with this supreme linga. Another important religious concept portrayed at Koh Ker is the accumulation of water passed over the linga, sanctified, then channeled into the Rahal. This reservoir worked as a basin for collecting the sacred water from each temple around the Rahal and integrated these temples into a homogeneous sacred landscape.

The sovereign who realized the rare relocation of the capital from Angkor seems to have used the linga as the overwhelming religious centripetal force in the new capital. With such a powerful religious

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<sup>18</sup> Sometimes the baray might be connected with a newly constructed temple as in the case of Ta Keo and maintain a relationship with an existing reservoir, the East Baray.

motivator, the elaborate and complicated city plan of Koh Ker was consolidated and realized.

As described, the temple layout may follow a specific religious abstraction, and represent an idiosyncratic interpretation of the sacred world. However, our knowledge of the structures is limited by the accumulated soil and jungle cover. A great number of structures and civil works may still be buried. While clearly connected at the conceptual level, relationships between Rahal and surrounding temples, and the relationship with the state temple Prasat Thom and satellite temples, might be further connected by unidentified tangible structures. A complex urban development of stone structures and long perished wooden structures filled the religious and functional confines of Koh Ker. Design of the complex layout should be evaluated with these overall structures including buried, decayed, and missing components. An overall archaeological research design is needed that considers not only the existing structures and civil works, but also considers the utilitarian structures and elements that comprise the urban secular and religious landscape.

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សង្ខេប

*Religious Concept in the Layout of the Ancient Khmer City of Koh Ker*  
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ក្រុមអ្នកស្រាវជ្រាវ Waseda/Meijo/JASA បានរកឃើញសំណល់បុរាណជាច្រើននៃប្រាសាទ, នៃអាការបូជាផ្សេងៗ ព្រមទាំងសំណង់ស៊ីវិល ក្នុងការរុករករបស់ខ្លួននាឆ្នាំ២០០៧-២០១០នៅកោះកេរ្តិ៍ដែលជាក្រុងបុរាណមួយរបស់ខ្មែរ។ អត្ថបទនេះបង្ហាញថាទីតាំងផ្សេងៗនៃសំណល់បុរាណនៅទីនានាក្នុងក្រុងចាស់នេះមានន័យវែងឆ្ងាយក្នុងទស្សនៈសាសនានិងសង្គម។ បើមើលតែមួយភ្លែត ប្រាសាទជាច្រើនហាក់ដូចជាតាំងទីរំពឹងរាយការណ៍បញ្ចប់។ តែសព្វថ្ងៃនេះ គេយល់ថា ទីតាំងខ្លះជ្រើសរើសឡើងឱ្យមានទំនាក់ទំនងជាមួយ ទ្រាស្វានធំ ។ មួយភាគនៃផ្លូវទៅប្រាសាទជំបាញ់ត្រង់ឆ្ពោះទៅរក ទ្រាង្គ នៃប្រាសាទជំនោះ។ រហាល ដែលជាបារាយណ៍នៅកណ្តាលបុរាណដ្ឋាននេះ មាននាទីសាសនាសំខាន់ណាស់ចំពោះក្រុមប្រាសាទយ៉ាងច្រើនដែលឧទ្ទិសទៅព្រះឥសូរក្នុងរូបភាពជាលិង្គ។ មានលិង្គមួយមានទំហំនិងរូបរាងពិសេស។ បើយើងគិតពីទីតាំងរបស់វាទាក់ទងទៅនឹងរហាលពិតជាមានន័យអ្វីមួយជាប្រាកដ។ ដោយសារភូមិសាស្ត្រទីនោះមានអំណោយផលផង ការរៀបចំតាំងទីសំណង់សាសនានាលេចធ្លោឡើងឱ្យឃើញជាលោកធាតុគួរស្វែង។ សម្រេចបានរបៀបនេះ ក៏ដោយសារការរៀបចំតាំងទីសំណង់សាសនានោះ ធ្វើឡើងដោយគិតគូរមធ្យតជាទីបំផុត។

Abstract  
*Religious Concept in the Layout of the Ancient Khmer City of Koh Ker*  
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In the ancient Khmer city of Koh Ker, many archaeological remains of temples, other religious facilities, and several types of civil structures have been newly documented by the Waseda/Meijo/JASA survey in 2007-2010. This paper shows there are certain significant religious and secular implications to the positions of archaeological remains distributed throughout this ancient city. At a glance, the temples appear to be distributed irregularly, but some are now interpreted as sharing a mutual plan with the state temple Prasat Thom. A part of the embankment leading to Prasat Thom runs straight to the pyramid temple “Prang” of Prasat Thom. The large reservoir, Rahal, at the center of the monument area played an important religious role of integrating the many temple complexes that were mainly dedicated to Shiva in the form of the linga. One particular linga of exceptional size and structure occupied a significant location relative to the Rahal. While taking advantage of the topography of the area, a new religious cosmic view was created in this city. This idea was expressed by the precise layout of a unique set of religious facilities.

Résumé

*Religious Concept in the Layout of the Ancient Khmer City of Koh Ker*

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De l'ancienne cité khmère de Koh Ker, bien des vestiges des temples, d'autres structures religieuses et de plusieurs types de structures civiles ont été récemment enregistrés par Waseda/Meijo/JASA en 2007-2010. Cet article montre qu'il y a des implications religieuses et profanes en ce qui concerne la situation des vestiges trouvés dans l'espace de cette cité antique. Au premier coup d'œil les temples apparaissent comme implantés de façon irrégulière, mais quelques-uns sont maintenant interprétés comme partageant le même plan que le temple d'Etat de Prasat Thom. Une partie de la chaussée menant au Prasat Thom se projette tout droit sur le « Prang » du Prasat Thom. Le Rohal, grand réservoir situé au centre de l'aire du monument, joue un important rôle religieux dans l'intégration de plusieurs complexes de temples dédiés principalement à Shiva sous la forme du linga. Un linga particulier, exceptionnel par sa taille et par sa forme, était installé dans un endroit significatif du Rohal. Bénéficiant d'une situation topographique favorable, une vue religieuse cosmique fut créée dans cette cité. L'idée fut exprimée par une répartition raisonnée des installations religieuses.

