

การศึกษาเปรียบเทียบชุมชน โบราณที่ใกล้ในประเทศกัมพูชาและพนมเปญในประเทศไทย



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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต

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THE COMPARATIVE STUDY OF ANCIENT SETTLEMENTS AT  
KOL IN CAMBODIA AND PHNOM RUNG IN THAILAND



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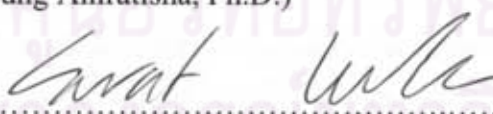
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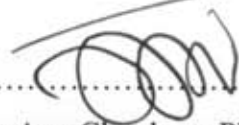
  
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กิม สามานาง: การศึกษาเปรียบเทียบชุมชนโบราณที่โกลในประเทศกัมพูชาและพนมรุ้งในประเทศไทย. (A COMPARATIVE STUDY OF ANCIENT SETTLEMENTS AT KOL IN CAMBODIA AND PHNOM RUNG IN THAILAND) อ. ที่ปริกษาวิทยานิพนธ์หลัก: อ. ดร. ไกล่รุ่ง อามระดิษ. อ. ที่ปริกษาวิทยานิพนธ์ร่วม: พ.อ. ผศ. ดร. สุรัตน์ เลิศล้ำ, ๑๕๓ หน้า.

การปรากฏขึ้นของอาณาจักรพระนครตั้งแต่คริสต์ศตวรรษที่ ๙ ถึงคริสต์ศตวรรษที่ ๑๓ ส่งผลให้เกิดบริเวณซึ่งมีการตั้งถิ่นฐาน โบราณ เมืองขนาดใหญ่และเล็ก รวมทั้งเมืองบริวารในชนบทจำนวนมากในดินแดนอันกว้างขวางซึ่งอยู่ภายใต้อำนาจอิทธิพลของอาณาจักรพระนคร ชุมชนโกลและพนมรุ้งได้รับการพิจารณาว่าเป็นชุมชนโบราณที่สำคัญอันตั้งอยู่บนราชมรรคาจากกรุงยโสธรปุระ (ศูนย์กลางของอาณาจักรพระนครในกัมพูชา) ถึงหัวเมืองชนบทคือวิมายปุระ (เป็นที่ตั้งของปราสาทหินพิมาย ในภาคตะวันออกเฉียงเหนือของประเทศไทยในปัจจุบัน) ชุมชนแห่งแรกตั้งอยู่ใกล้กับศูนย์กลางของอาณาจักรพระนคร ในขณะที่ชุมชนอีกแห่งหนึ่งจัดได้ว่าอยู่ในเขตชนบท

งานวิจัยชิ้นนี้เป็นการศึกษาเปรียบเทียบพัฒนาการของการตั้งถิ่นฐานโบราณในสมัยพระนครซึ่งกระจายตัวอยู่รอบบริเวณโกลและพนมรุ้ง โดยใช้แนวทางและเครื่องมือในการศึกษา ๓ ประการคือ ระบบสารสนเทศทางภูมิศาสตร์ ระบบสำรวจเก็บข้อมูลเกี่ยวกับพื้นผิวโลกด้วยเครื่องรับรู้ และการศึกษาทางโบราณคดี โดยได้นำภาพถ่ายทางอากาศ (ตั้งแต่ค.ศ. ๑๙๔๕, ๑๙๕๔-๗, ๑๙๖๗, ๑๙๗๖ และ ๒๐๐๔) ภาพถ่ายจากดาวเทียม (ค.ศ. ๒๐๐๐ และ ๒๐๐๗) รวมทั้งข้อมูลทางภูมิศาสตร์อื่น ๆ มาใช้ในการตีความหลักฐาน โบราณร่วมกับข้อมูลที่ได้จาก การเก็บข้อมูลภาคสนามด้วยระบบสารสนเทศทางภูมิศาสตร์และระบบสำรวจเก็บข้อมูลเกี่ยวกับพื้นผิวโลกด้วยเครื่องรับรู้ นอกจากนี้ยังได้นำข้อมูลจากศิลาจารึกและลักษณะทางศิลปะและสถาปัตยกรรมของทับหลังของปราสาทต่าง ๆ มาพิจารณาประกอบเพื่อศึกษาอายุและเหตุการณ์ทางประวัติศาสตร์แวดล้อม

การศึกษพบว่า ได้มีการตั้งถิ่นฐานที่โกลและพนมรุ้งมาตั้งแต่ยุคก่อนประวัติศาสตร์ ดังมีร่องรอยของชุมชนโบราณหลงเหลืออยู่มากและกระจายทั่วบริเวณทั้งสอง ต่อมาพื้นที่บริเวณโกลและพนมรุ้งต่างพัฒนาเป็นชุมชนขนาดใหญ่ซึ่งมีประชาชนอยู่อาศัยอย่างหนาแน่นในสมัยพระนครตามแนวทางการตั้งเมืองแบบเดียวกันซึ่งได้รับมาจากราชสำนักพระนคร ลักษณะคล้ายคลึงที่พบในบริเวณโกล และพนมรุ้งอันเป็นผลมาจากอิทธิพลของราชสำนักพระนคร ได้แก่ แคนผังพื้นที่โดยทั่วไปของศาสนสถาน ที่กักเก็บน้ำ โกลหรือเนินที่ตั้งบ้านเรือน และโครงสร้างทางวิศวกรรมโยธาของร่องรอยเส้นทางคมนาคม ลักษณะที่แตกต่างได้แก่ สถาปัตยกรรมทางภูมิศาสตร์โดยรวมและโครงสร้างทางวิศวกรรมโยธาของสะพานหินโบราณ

## จุฬาลงกรณ์มหาวิทยาลัย

สาขาวิชา เอเชียตะวันออกเฉียงใต้ศึกษา

ปีการศึกษา 2552

ลายมือชื่อนิติ.....

ลายมือชื่อ อ. ที่ปริกษาวิทยานิพนธ์หลัก.....

ลายมือชื่อ อ. ที่ปริกษาวิทยานิพนธ์ร่วม.....

ไกล่รุ่ง อามระดิษ

Surat Leethum

## 5187653720: MAJOR SOUTHEAST ASIAN STUDIES

KEYWORDS: ANCIENT SETTLEMENT/ KOL/ PHNOM RUNG/ ANGKOR/ PHIMAI/ CAMBODIA, THAILAND.

KIM SAMNANG: A COMPARATIVE STUDY OF ANCIENT SETTLEMENTS AT KOL IN CAMBODIA AND PHNOM RUNG IN THAILAND. THESIS ADVISOR: KLAIRUNG AMRATISHA, Ph.D., THESIS CO-ADVISOR: COLONEL ASSIST. PROF. SURAT LERTLUM, Ph.D., 153pp.

As a result of the emergence of the Angkorian Empire from the 9<sup>th</sup> to 13<sup>th</sup> Century A.D., there were many ancient agglomerate areas, small towns/cities, and other satellite provincial towns established over the huge territory under the influence of the Angkor imperial power. The Kol and Phnom Rung areas have been identified as crucial ancient agglomerate areas along the royal road from *Yashodharapura* (the Angkor center in Cambodia) to the provincial town of *Vimayapura* (the Phimai temple in today's north-east Thailand). One is located close to the Angkor center, while the other one would be considered as in the provincial sphere.

Using these ancient agglomerate areas established during the Angkor period, a new knowledge of comparative study of development of ancient settlements scattering at the Kol and Phnom Rung areas was introduced by utilizing the Geographic Information System (GIS), Remote Sensing (RS) and archaeological study approach. A series of aerial photographs (from 1945, 1954-7, 1967, 1976 and 2004), satellite images (from 2000 and 2007) and other topographic vector data were applied to interpret ancient traces that were analyzed together with survey data from the field gathered using GIS and RS applications. In addition, the architectural features of artistic lintel of temples and inscription sources were also examined to study the dates and histories/events from the past.

Due to the density of remaining ancient settlements spread over these regions, the results indicate that both Kol and Phnom Rung has been occupied since the prehistoric times, with both of them being noticeably developed as crowded and large agglomerate areas during the Angkor period. In this aspect, Kol and Phnom Rung were influenced by a similar program of urbanization from the Angkor court. Additionally, under the same domination of the Angkor court, similarities and differences were discovered in these two areas. Those similarities are: general space lay-out of (1) worship places, (2) water reservoirs, (3) *Kok(s)* or elevated areas/mounds (residential places) and (4) the civil engineering structure of traces of road networks. The differences are: (1) general environment and geography, and (2) the civil engineering structure of ancient stone bridge.

Field of Study: Southeast Asian Studies

Student's Signature:  .....

Academic Year: 2009

Advisor's Signature:  .....

Co-advisor's Signature:  .....

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จุฬาลงกรณ์มหาวิทยาลัย

# CHAPTER I

## INTRODUCTION

### 1.1 Rationale

During the second half of the nineteenth century, French scholars and explorers made several expeditions to Angkor and other parts of mainland Southeast Asia. Since then, valuable archeological records concerning the Khmer edifices, particularly those belonged to the Angkor period, have gradually become known. Two of the most important scholars, who pinpointed significant sites, made hand-drawn archaeological maps, produced plans of the monuments and revealed traces of ancient settlements, were E. Lunet de Lajonquière and Etienne Aymonier. Between 1901 and 1911, the École Française d'Extrême-Orient (EFEO) published three volumes of Lajonquière's *Inventaire Descriptif des Monuments du Cambodge* which gave an inventory and description of Khmer monuments. Lajonquière's archaeological maps explicitly demonstrated the historic sites and their settlement structures in mainland Southeast Asia, particularly in the Angkor plain.<sup>1</sup> His map also showed a trace of an ancient route which linked the capital city of Angkor in Cambodia to Phimai in northeastern Thailand, also mentioned in one inscription of King Jayavarman VII<sup>2</sup> and the archaeological remains in ancient

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<sup>1</sup> The Angkor plain refers to an important area stretched between the Kulen mountain range in the North and the Tonle Sap Lake in the South. From the 9<sup>th</sup> to 15<sup>th</sup> century A.D., the capital cities were Mahendraparvata (Kulen Mount), then Hariharalaya (Roluos region, 9<sup>th</sup> century), Yashodharapura (Angkor, late 9<sup>th</sup> – before mid-15<sup>th</sup> centuries), with a short interruption in the 10<sup>th</sup> century when the capital was moved to Chok Garrgyar (Koh Ker).

<sup>2</sup> The stele inscription of Preah Khan was made between 1211 and 1213 A.D. during the reign of King Jayavarman VII. It contains significant information concerning Preah Khan and other shrines and temples built on the command of this king. Lines 122-126 on side D of this inscription describe the establishment of fire shrines along the roads that linked the capital city of Angkor to other cities in several directions. The inscription goes as follows:

122. On the roads from Yasodharapura (Angkor) to the [capital] city of Campá (Vietnam),



agglomerate areas along this royal road were also described. For example, the ancient sites in the Phnom Rung were described in the second volume of his publications (pp. 213-218) while those in the Kol were mentioned in the third volume (pp. 328-333). The monumental works of Etienne Aymonier, *Le Cambodge*, which were based on extensive surveys carried out over several years, also came out at the beginning of the twentieth century. Aymonier's works emphasized the Khmer heritage in the fields of archeology, inscriptions and the etymology of place names. Apart from giving descriptions and floor plans of temples in the whole region of Angkor, his second volume also provided descriptions of other ancient settlements outside the capital. For instance, some temples and archaeological sites situated in the Kol and Phnom Rung areas were described in terms of the characteristic of the sites, with histories and plans also provided (Aymonier 1999a:156-161, Aymonier 1999b: 176-181).

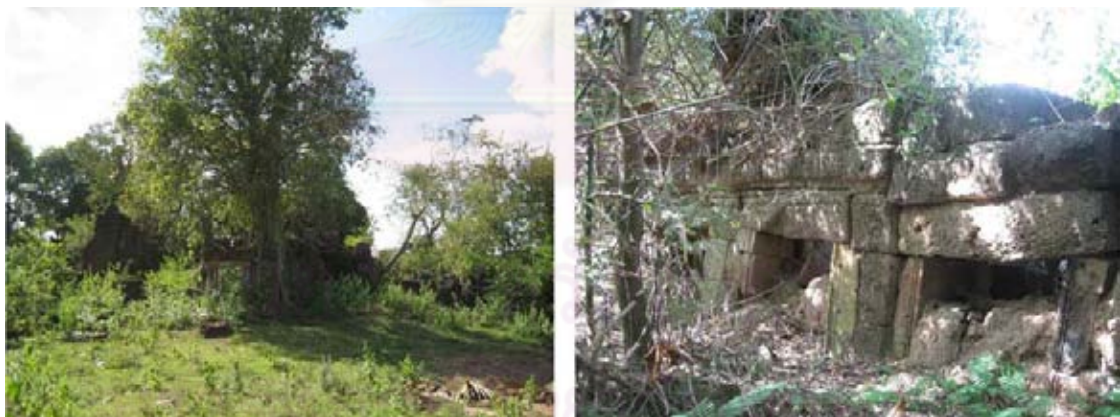
In 2004, interest in the ancient route, and the associated structures along the route, was revived when a Khmer-Thai joint research project, "Living Angkor Road Project-LARP", was established. The aim of this multi-disciplinary research approach was to utilize the archaeological and anthropological knowledge, together with modern geoinformatics technology, information technology, and geo-physic technology to identify and pinpoint the ancient road from Angkor to Phimai, as well as the temples, water structures, canals/dikes, ancient areas and ancient industries along the route. The LARP team produced a series of detailed archaeological site maps illustrating traces of the route

---

there are fifty-seven buildings that are staging posts with fire.

123. [On the road] from the city (Angkor) to Vimāyapura (Phimai, in north-east Thailand), there are seventeen houses of fire. [On the road] from the city (Angkor) to Jayavatí, and from thence to Jayasiṃhavatí,
124. thence to Jayavāravatí, thence to Jayarājagiri, and from Jayarājagiri to holy Suvīrapurí,
125. and thence up to Yaśodharapura (Angkor), there are forty-four fire-houses; and there is one on holy Sūryaparvata,
126. one at holy Vijayādityapura, and one at Kalyācasiddhika. Altogether, there are one hundred and twenty-one. (Maxwell 2007: 84-5)

and its associated structures in the study area from Angkor to Phimai. Similar to the works of Lajonquière and Aymonier, one of the ancient settlements identified as a crucial ancient agglomerate area during the Angkor period by LARP was the one at Kol, located approximately 50 kilometers to the northwest of the Angkor center (Im et al. 2007). Noteworthy, at the Kol area there was a significant hospital chapel (*Arogyasala*) and rest-house (*Dharmasala*) which were built or re-built on existing sites during the reign of Jayavarman VII (Figure 1-1). In addition to these important chapels built during his reign, there were many crucial archaeological remains that were found in the vicinity of this area, such as worship temples, water reservoirs, residential mounds, ancient stone bridges and local roads connecting to the royal route of Angkor to Phimai. A number of archaeological artifacts in the vicinity of Kol in Siem Reap studied by the LARP team pointed out that this area was occupied since pre-historic times and expanded continuously into a larger ancient agglomerate area during the Angkor period (Im et al. 2007).



**Figure 1- 1:** Laterite building of (left) Prasat Kdei Takam (hospital) and (right) Prasat Achrong (Dhamasala) (photo in 2009)

Meanwhile, with similar characteristics in terms of some of the archaeological structural patterns, Phnom Rung, which is located around 162 kilometers northwest of Angkor city on the Korat plateau in Thailand, was revealed as an important ancient

agglomerate area (Preeyanuch, 2005; LARP 2007, 2008). Again, it has been noted that the ancient settlement and its artifacts in the vicinity of Phnom Rung could be dated in the similar period as Kol from the pre-historic and pre-Angkorian periods and rapidly developed into a larger agglomerate area during the Angkor period (Preeyanuch 2005). For instance, two hospital and one rest-house chapels have the same structural patterns and characteristics as those found at the settlements in the Kol area (Figure 1-2). Both of the chapels mentioned earlier, and other ancient patterns of archaeological evidences have some similar patterns, including large worship temples (Phnom Rung and Muang Tam Temple), huge water reservoirs, human habitat mounds...etc.



**Figure 1- 2:** Laterite building of (left) Prasat Kuti Rushi (hospital) and (right) Prasat Ban Bu (rest-house) (photo in 2009)

Obviously, there is evidence that the people of the Angkor period had the comprehensive and systematic understanding necessary to set up residential space needed for living by clearly delineated land parcels, boundaries, water courses, and the locations of sanctuaries, as can be seen in the settlement structure engraved on the sandstone doorframe inscription of the North Khleang temple (Figure 1-3) during the Khmer empire from the ninth to the fifteenth centuries A.D. (Coedès 1951:217-228).

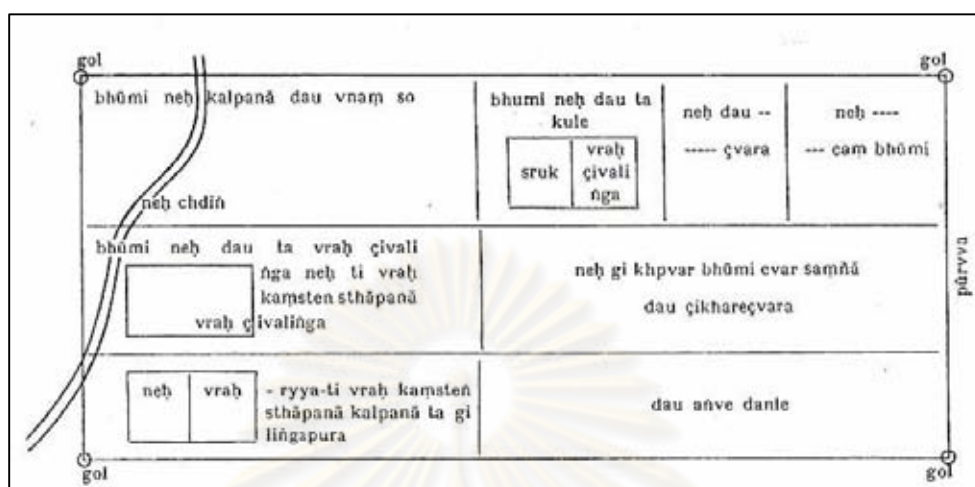


Figure 1- 3: The plan of ancient structure on stone doorframe of Prasat Kleang: K.542 (Coedès 1951:223.)

Therefore, from this evidence and the studies of LARP and Preeyanuch, it can be assumed that the Angkor Empire court had influence on the pattern of ancient settlement features of Kol and Phnom Rung during the 9<sup>th</sup> to 13<sup>th</sup> centuries as evident by the similarities of temples, their characteristics and stylistics, water reservoirs or irrigation systems, *Kok* or elevated area/mound, and residential space and other man-made structures.

In order to provide a clearer idea of the ancient settlements in the aforementioned areas, this research applied a multi-disciplinary approach: (1) Geographic Information System (GIS) and Remote Sensing (RS) and (2) an archaeological study. For the GIS and RS approach, GIS and RS techniques were carried out, together with applying a series of old aerial photographs and satellite images, of old topographic maps and of archaeological maps, to identify and draw the archaeological settlement structures in order to understand local settlement relationships and developments of the Kol and Phnom Rung areas. As for the archaeological study, architectural features of sacred worship temples were studied, both the architectural plans and artistic lintel styles. Finally, the development of the ancient settlement and a comparison of these settlements, both Kol and Phnom Rung, as far as possible, were examined and will be explained in this study.

## 1.2 Research Questions

In order to response to the thesis topic, two questions are designed as follows:

- To what extent did the Angkor civilization have an impact on Kol and Phnom Rung during the Angkor period from the 9<sup>th</sup> to 13<sup>th</sup> centuries A.D.?
- What are the similarities and differences of the man-made structural patterns of the ancient settlements around the vicinity of Kol and Phnom Rung?

## 1.3 Research Objectives

The main objectives of this study are:

- To study the development of the ancient settlements at Kol in Siem Reap, Cambodia and Phnom Rung in Buriram, Thailand during the Angkor period from 9<sup>th</sup> to 13<sup>th</sup> century;
- To examine the similarities and differences of man-made structures around the vicinity of Kol and Phnom Rung.

## 1.4 Hypothesis

During the Angkorian period, Angkorian territory, which had its capital city at the northern part of Tonle Sap Great Lake, covered nearly the entire area of the present day mainland Southeast Asian. Kol, situated around 50 km to the northwest of the Angkor capital city and along the Angkor-Phimai route, has been identified as an ancient agglomerate area due to the density of archaeological remains around this area. For example, a laterite hospital chapel (*Arogyasala*) and a rest-house chapel (*Dharmasala*) that were erected by King Jayavarman VII and a large pink stone worshipping temple indicate that this area played a vital role in providing public services to the people living around this area during that time. Meanwhile, Phnom Rung, positioned about 162 km further northwest of the Angkor center in the Northeast of present-day Thailand, also indicates an ancient agglomerate area due to the presence of large worship temples

(Phnom Rung and Muang Tam) and the same type of laterite hospital and rest-house chapels of King Jayavarman VII.

Given the similar characteristics in terms of the hospital temples and rest-houses of the aforementioned areas, it is hypothesized that during the Angkor period from the 9<sup>th</sup> to 13<sup>th</sup> A.D. century, the Kol and Phnom Rung areas were influenced by similar public work policies from the same court of Angkor, even though one was near the Angkor center and other one was much farther away. This means that the Kol and Phnom Rung areas shared more similarities than differences in terms of development characteristics and settlement patterns during the Angkor period.

### **1.5 Significance/Usefulness of research**

- This study will provide a better understanding of the development of ancient settlements during the Angkor period;
- This study will be useful for the protection and preservation planning of ancient communities without opposing the recent development projects.
- This study will be a reference for further studies of other ancient agglomerate areas in the Angkor period.

### **1.6 Research Methodology**

#### **1.6.1 Data Collection**

Data collection was conducted over two week periods in each area. Kol is located at Kol commune, Angkor Chum district, Siem Reap province, Cambodia, about 50 km from the Siem Reap town and the Angkor center. Data collection of this area was implemented in the field in the first phase from 23<sup>rd</sup> to 30<sup>th</sup> November 2009 and the second phase from 25<sup>th</sup> to 31<sup>st</sup> January 2010. Phnom Rung is located at Chorakhé Mak sub-district, Prakhon Chai district, Buriram province, Thailand, about 162 km from the Angkor center. Data collection of this area was conducted in the field at the first phase from 10<sup>th</sup> to 19<sup>th</sup> December 2009 and at the second phase from 22<sup>nd</sup> to 25<sup>th</sup>, February 2010. In the field, the semi-structured qualitative research method and the Geographic

Information System (GIS) and Remote Sensing (RS) techniques, together with survey equipment, including Global Positioning System (GPS), millimeter paper, military compass, 360 degree ruler and database survey forms, were applied in order to identify and pinpoint all archaeological sites and other old settlement features in the study area. Moreover, the ornamental lintel style and other architectural features were also studied to every sacred worship temples from both areas.

In order to gather additional information, books, articles, reports, and published and unpublished thesis were studied. The researcher also utilized a series of aerial photographs taken in 1945, 1954, 1957, 1967, 1976 and 2004, topographical maps generated in 1954, 1960, and 2003, archaeological maps drawn in 1901 and satellite images, such as Lansat ETM in 2002, Spot 5 in 2007 (?) from Google Earth, AirSAR, and Shuttle Radar Topography Mission (SRTM), to understand the elevation.

### ***1.6.2 Data Analysis***

The researcher utilized GIS and Remote Sensing applications, including ArcGIS Desktop 9.3, Envi 6, Erdas Imagine 9.1 and Garmin Mapsource 6.9, to interpret and analyze the patterns of ancient settlement structures through GIS and RS data, such as aerial photographs, satellite images, topographic maps, old archaeological maps and GPS data, in order to reveal the actual archaeological sites on the maps. Moreover, stone inscription sources and artistic lintel styles of sacred temples and its sculptures were analyzed to interpret the development of ancient settlements of these two areas.

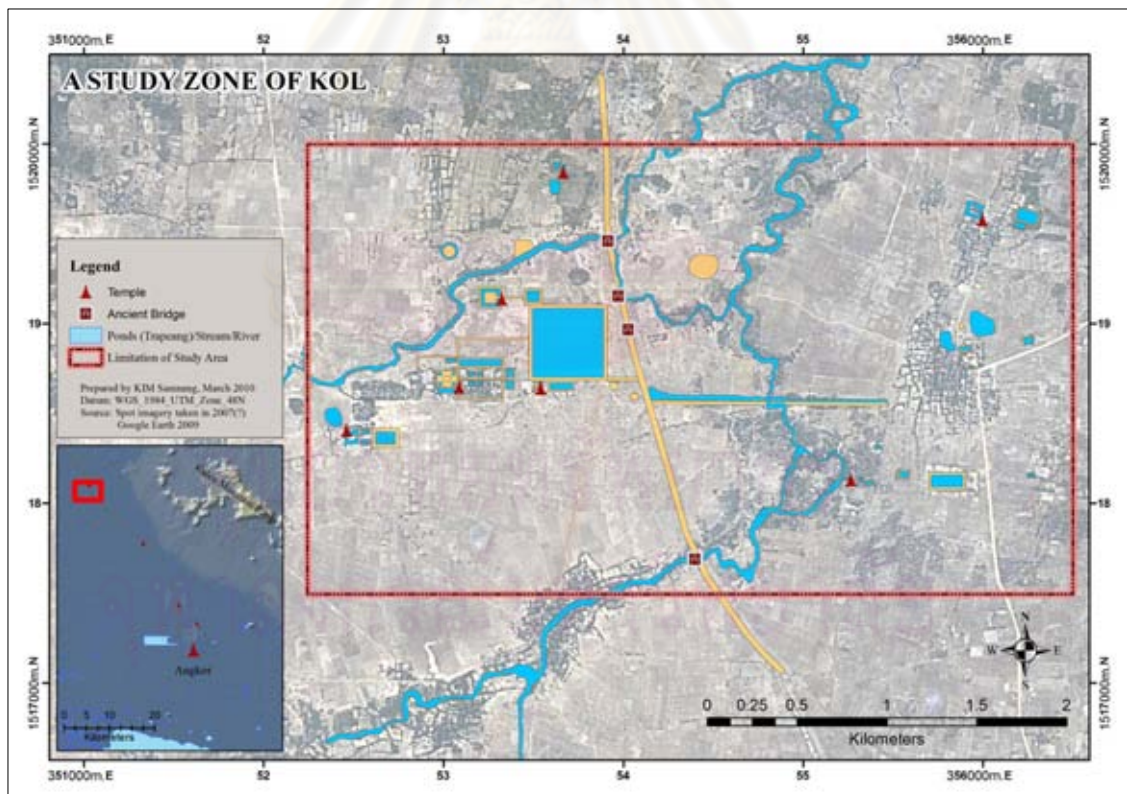
### **1.7 Scope of Research Study**

The scope of these studies is as follows:

- Kol: the researcher followed the LARP's study area covering the distance of two kilometers around Kol temple in Kol village and extending to the eastern area of Bat village. However, the researcher looked through further additional studies of significant sites situated in the surrounding study buffer, including Kvaio village and Kok Knang village. At the

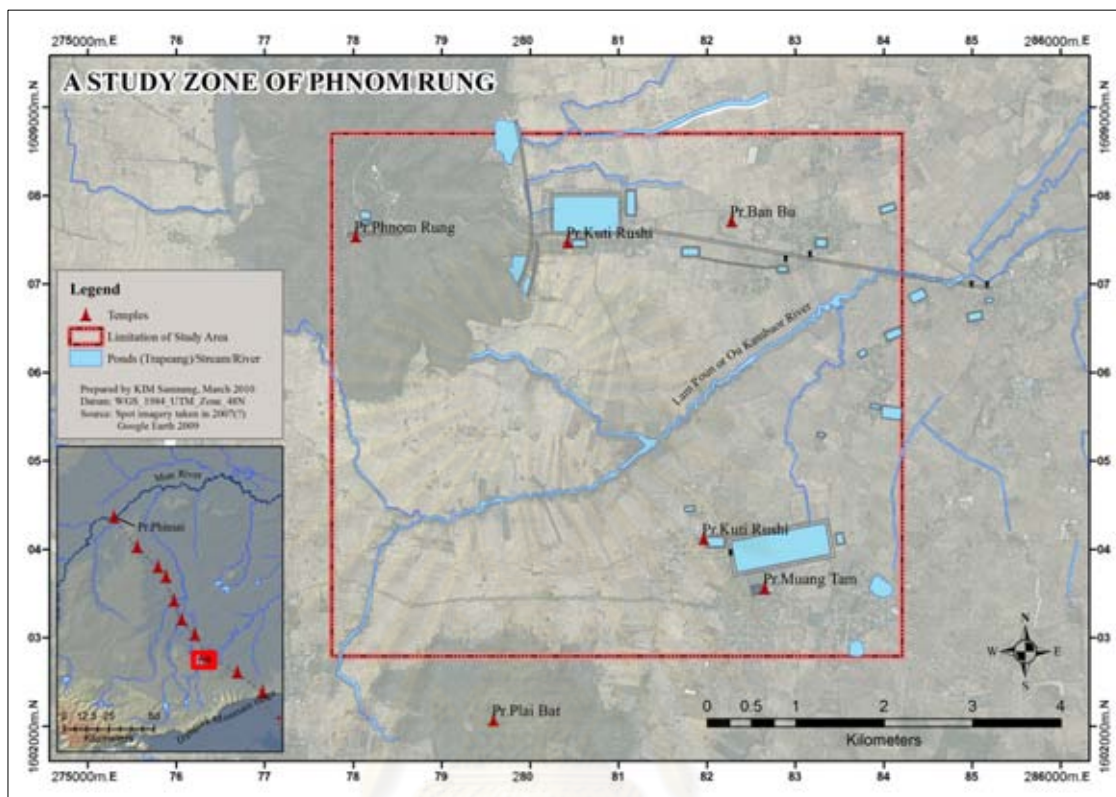
present day, Kol is situated in Kol commune, Angkor Chum district, Siem Reap province, Cambodia (Map 1-2).

- Phnom Rung: Nong Bua Lai village, Ban Bu village and Kok Muang village were defined as the study area to be Phnom Rung. Today, Phnom Rung is located in Chorakhé Mak sub-district, Prakhon Chai district, Buriram province, Thailand. While the term “Phnom Rung” generally refers to the original name of the main sacred worship temple known as “Prasat Phnom Rung”, located on top of the mountain, and the areas surrounding this temple, in this research, the term “Phnom Rung” refers to the area also encompassing the southeastern part of Phnom Rung temple and the villages mentioned earlier (Map 1-2).



**Map 1-1:** A study zone of Kol, Siem Reap, Cambodia. (map in 2010)





Map 1-2: A study zone of Phnom Rung, Buriram, Thailand. (map in 2010)

## 1.8 Literature Reviews

Apart from the works of French scholars, such as Lajonquière and Aymonier, which appeared a century ago and have been mentioned above, recent studies on the Phnom Rung and Kol areas include:

1. Living Angkor Road Project Report (2007) and Living Angkor Road Project Report Phase II (2008) [Rai-ngan kan wichai krongkan konha lae patthana sarasonthet khong rachamakkha samai phrachao chaiworaman ti 7 lae Rai-ngan kan wichai krongkan konha lae patthana sarasonthet khong rachamakkha samai phrachao chaiworaman ti 7 raya ti 2], edited by Surat Lertlum and Panjai Tantasanawong, Bangkok: Thailand Research Fund, 2007 and 2008. These two studies revealed knowledge about the ancient route from Angkor to Phimai and the surrounding areas in terms of physical evidence, geographic property and archaeological information. The

most important items found from these studies were two missing *Dharmasalas* (rest-house chapels), laterite bridges along the ancient road on the Cambodia side, ancient industry sites and ancient areas along the road on both the Cambodia and Thailand sides. In a series of detailed archaeological site maps produced by the LARP team, traces of the route and its associated structures in the four kilometer buffer zone of the study from Angkor to Phimai were also illustrated, and ancient structures in both the Kol and Phnom Rung areas were included. This study shows that there were high potential archaeological sites spreading over these two areas, including temples, rest-house chapels, hospital chapels (Arogyasalas) and other archaeological remains.

2. The Cultural Development of Ancient Communities Settled Down at Phnom Rung, Buriram Province (From 10<sup>th</sup> – 13<sup>th</sup> Century A.D. [Kansiksa patthanakan khong chunchon boran nai watthanatham khamen boriwen rop khao panomrung changwat buriram (rawang putthasatawat ti 15-18)], an unpublished M.A. thesis of Preeyanuch Jumprom, Silpakorn University, 2005. This thesis focused on the relationship between the ancient areas at Phnom Rung and the Phnom Rung Temple with its study area covering the distance of 10 kilometers around Phnom Rung. It was found that the settlement of 46 ancient communities around Phnom Rung started from the 7<sup>th</sup> – 9<sup>th</sup> century A.D. and was developed much larger during the 10<sup>th</sup> Century A.D. when Khmer culture spread into the area. Major evidence of the relationship between the Phnom Rung temple and its surrounding areas were boundary stones and ceramics found in every area. This thesis also revealed that after the Angkor Empire weakened in the 13<sup>th</sup> century, the role of Phnom Rung, as a center of religious activities and areas, gradually declined and finally vanished.

## **CHAPTER II**

### **ANCIENT SETTLEMENTS AT KOL IN SIEM REAP, CAMBODIA**

#### **2.1 Historical Background**

A thousand years before the emergence of Angkor, a region located on a sloping terrain running from the northeast to the southwest between the northern part of Tonle Sap Great Lake and Kulen hill ('mountain of lychee'), a region in the northwestern part of present day Cambodia, was discovered to be the site of ancient settlements of humans evidenced by a number of the pre-historic archaeological sites in this region. According to studies by Elizabeth Moore and Richard A Engelhardt using the UNESCO-ZEMP database, at least 60 to 69 pre-historic habitation mound sites in the Angkor plain have been identified, with some of the sites possibly dating to the Neolithic period (Moore 1993, 1998; Engelhardt 1996). In the urban complex of the Angkor capital, these sites are Prasat Ak Yum, Prasat Baksei Chamkrong, Prasat Chau Say Tevoda and Prasat Trapeang Phong, as noted by Bernard Philippe Groslier (Ang, Prenowitz & Thompson 1998: 26-30, Engelhardt 1996: 154, Stark 2004: 93-95). In addition to circular moated sites, at least three very well-known pre-historic sites have been found to the northwest of the Western Baray, known as Phum Reul and Phum Lovea (Ang, Prenowitz & Thompson 1998: 26-30, Moore and Freeman in 1998, Engelhardt 1996, Stark 2004) and Phum Snay, a looted site, situated a bit further from Angkor (O'Reilly, Domett & Pheng 2006).

After the emergence of the Angkor civilization, some of these pre-historic sites were occupied by pre-Angkorian and Angkorian settlements. In the Siem Reap region, at least two main groups of pre-Angkorian sites can be found around the Western Baray in the vicinity of the first capital of Angkor, Hariharālaya (Ang, Prenowitz & Thompson 1998). In the first group, there have been at least seven or eight pre-Angkorian sites

found: one significant pre-Angkorian city known as “Banteay Choeu” or “Wooden Fortress”; Prasat Ak Yum (8<sup>th</sup> Cen.); Prasat Prei Kmeng (7<sup>th</sup> Cen.); Prasat Khnat; Prasat Phnom Rung; Prasat Kok Po (8<sup>th</sup> Cen.); Prasat Roluh; and Phum Prasat (Ang, Prenowitz & Thompson 1998: 31-32).<sup>3</sup> It is noteworthy that at Prasat Kok Po and its complex and Prasat Prei Khmeng, a ninth-century Angkorian king, Jayavarman III, paid attention to maintaining these sites as a worship places and celebrated ritual ceremonies well into the Angkor period.

In the second group of pre-Angkorian settlements, remains can be found of a few pre-Angkorian temples erected in the vicinity of the Roluos region: Prasat Trapeang Phong; Prasat Svay Pream; Prasat Prei; Prasat He Phka; and Prasat Olok. Unlike the Western Baray region, the eleventh-century Angkorian kings maintained important cults at the pre-historic and pre-Angkorian site known as Prasat Trapeang Phong (Ang, Prenowitz & Thompson 1998:32-34, Stark 2004).

After the ninth century, the foundations of Angkorian civilization were progressively consolidated and the famous King Jayavarman II announced independence from the Java kingdom on top of Phnom Kulen (Ang, Prenowitz & Thompson 1998). In the following years, the Angkorian kings intentionally conquered territory, especially in the northwestern part of present-day Cambodia where existing settlements had been located since pre-historic and pre-Angkorian times. Through the explorations of Lajonquière from 1901 to 1911, hundreds of Khmer temples and other ancient settlements were depicted on his archaeological maps (Lajonquière 1902-1911). In addition, Aymonier was also interested in studying the Khmer temples and inscriptions that had mushroomed widely to the northwestern of Angkor, as well as the whole region of the present-day Northwestern Cambodia and the territory in Thailand, especially in the region in Northeast Thailand known as *Isan* (Aymonier 1999a, Aymonier 1999b).

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<sup>3</sup> The word “*Prasat*” in this context refers to a sacred worship temple.

In the study area of Kol, some pre-historic sites have been discovered, some of which were occupied by pre-Angkorian and Angkorian settlements (Im et al. 2007).<sup>4</sup> For example, the round moated site of *Kok Preach Chang Er* and *Kok Anglong Thom* were clearly occupied in pre-historic periods (probably during the stone age) evidenced by the presence of stone tools and pre-historic ceramic fragments, and the physical characteristics of the sites (Im et al. 2007: 334-336). Additionally, the discovery of stone tool at an un-dated temple (likely from either the pre-Angkorian or Angkorian period) indicate that this is a pre-historic site, now known as *Kok Prasat Prei Kou* (Im et al. 2007: 334-336). Interestingly, the re-use of a pre-Angkorian lintel at *Prasat Ta Kam*, a hospital chapel (*Arogyasala*), indicates significant development of this area with temples built over existing sites during the reign of Jayavarman VII. In addition, the inclusion of the name *Lokeśvara*, known as “*Jagadīçvara*”, which indicates the first emergence of Mahayana Buddhism in the 8<sup>th</sup> century, was also found at this temple (Finot 1925b, Coedès 1951: 89).

In light of the fact that the Kol area had been occupied since pre-historic times and later was continuously developed during the pre-Angkorian and Angkorian period, this area unquestionably played a crucial role as an agglomerate city/area during that time. In this respect, urban developments, in terms of road networks and other public infrastructure, were established following and respecting the existing settlements. For example, the royal road from Angkor to Phimai turned in order to pass this area and intersected two cross roads connecting to the central villages/communities. This appears to be a unique characteristic of the royal road, as it can rarely be seen in other areas or along the other royal roads built during the Angkor period (per. comm. with Dr. Surat Lertlum 2010). Furthermore, even though this is a relatively small area, significant public infrastructure was constructed around this area, such as a main sacred worship temple, a hospital chapel, a rest-house chapel and a number of water reservoirs.

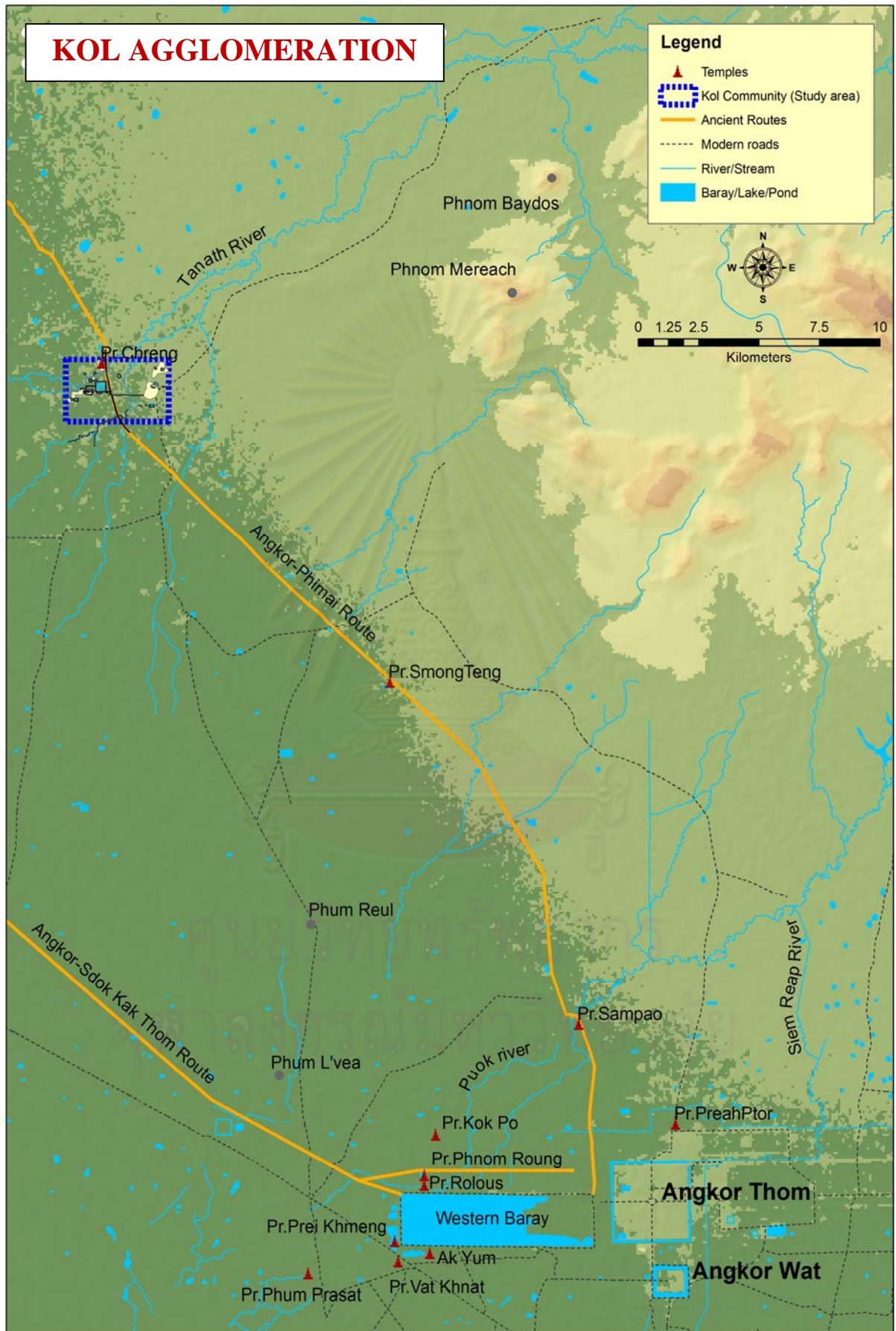
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<sup>4</sup> It should be noted that, according to the research time frame of this study, which is defined to be from the 9<sup>th</sup> to 13<sup>th</sup> centuries during the Angkor period only, the pre-historic and pre-Angkorian sites are not focused on to study in detail and have been excluded in making the comparisons in this study.

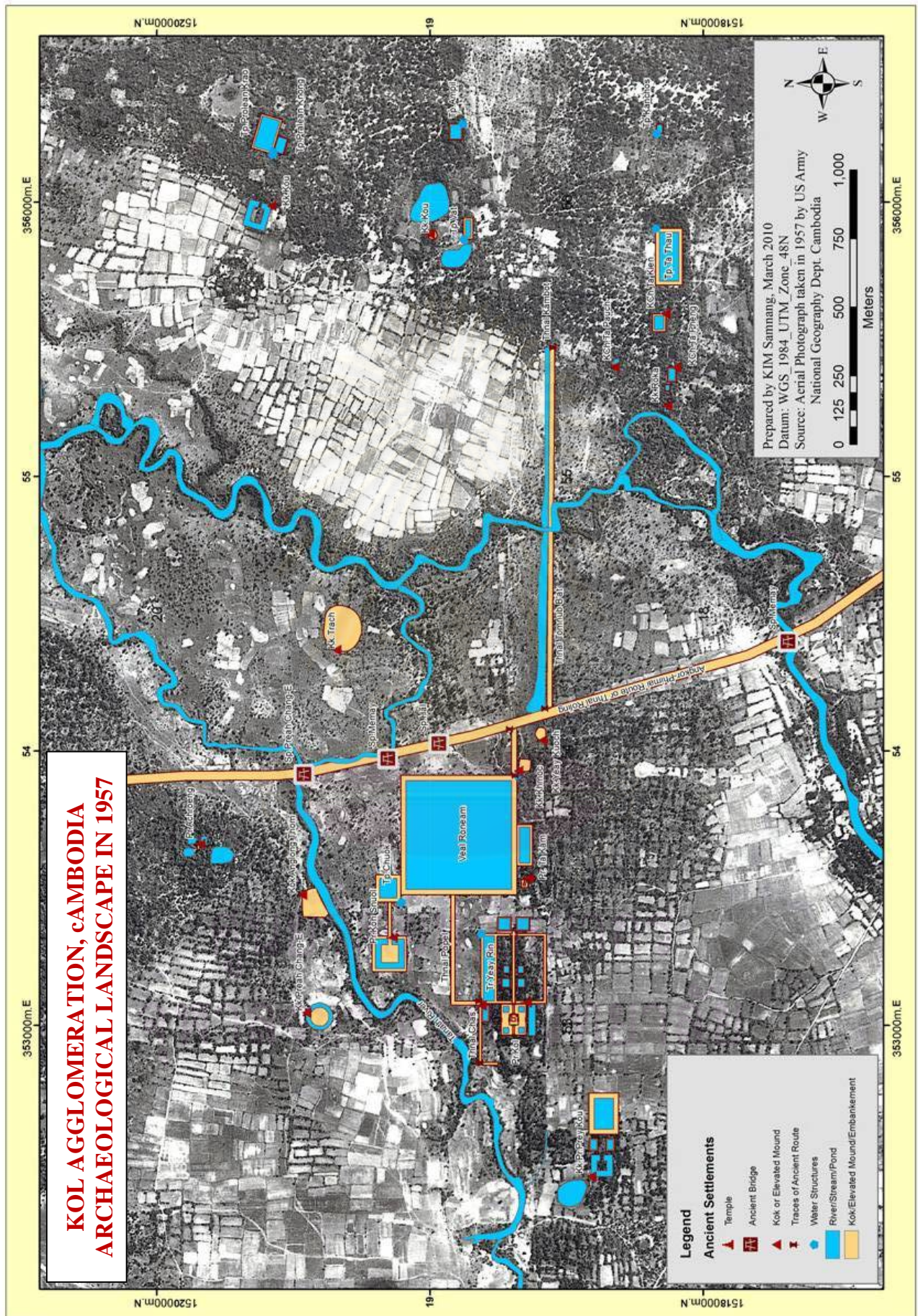
Presently, Kol is located to the northwest of Angkor, approximately 50 km from the Angkor capital, along the principal royal route from Angkor to Phimai and is surrounded by ancient settlements. Today, Kol extends in an east-west direction over two villages, Kol village and Bat village in Kol commune, Angkor Chum district, Siem Reap province, Cambodia. Given the geographical and natural terrain, this area slopes down from the northeast to the southwest, similar to the Angkor plain, and catches the twined Tanath Rivers that flow from the mountainous region, about 300 meters elevation, known as Phnom Mereach and Phnom Baydos, to the northeast (Map 1-1). The twined Tanath Rivers are the main water source supplying this area, both now and in the past. Viewed from satellite images and aerial photographs, it is evident that this area had numerous man-made structural settlements that possibly were established long ago. These man-made settlements are primarily water reservoirs (ponds or *Trapeang*), traces of local road networks, traces of dikes or canals, traces of Khmer monuments and probable human habitation mounds. At the present, people continue to live in this area.



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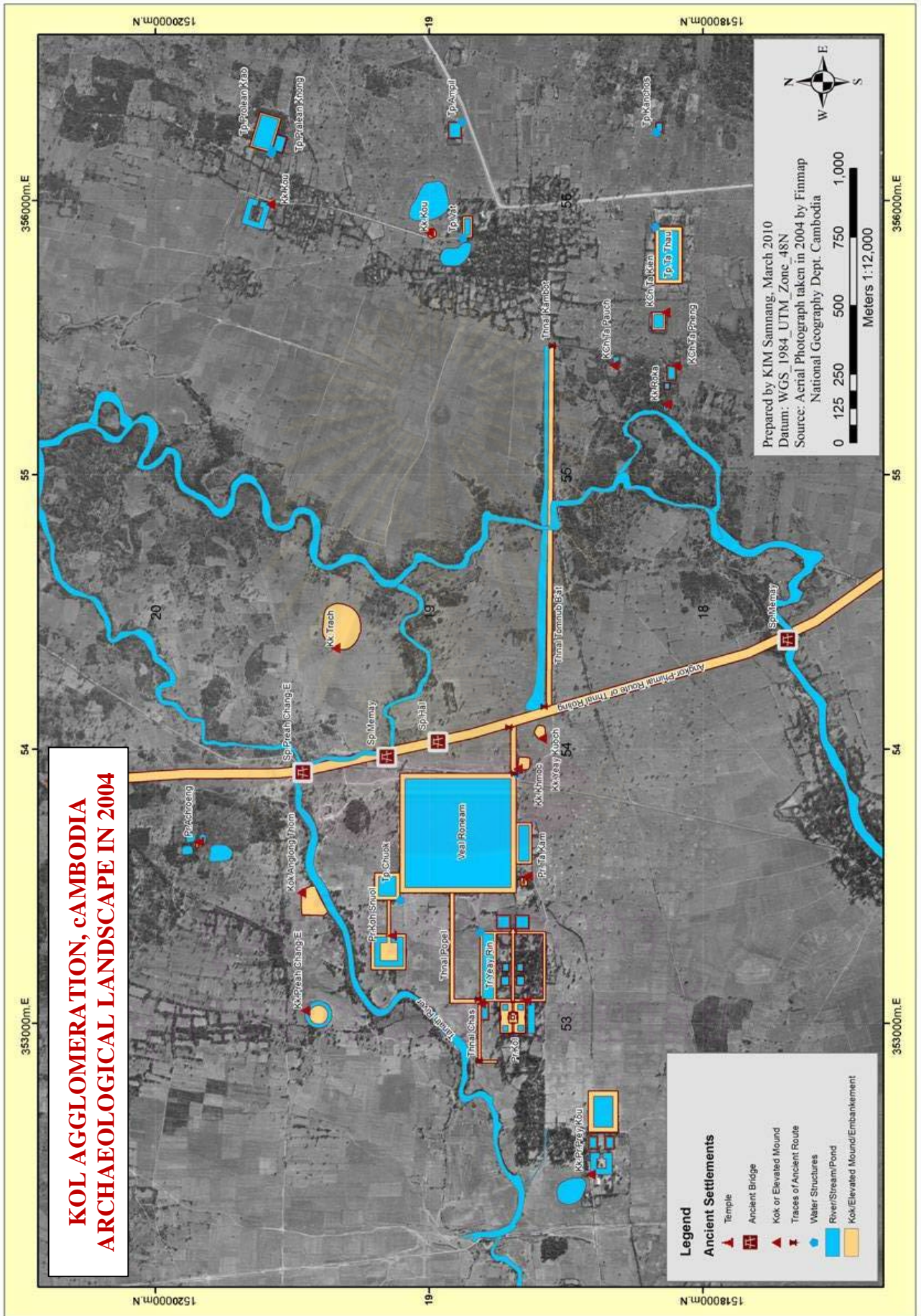


**Map 2- 1:** General geographical landscape of the study area of Kol area. (Map in 2010)

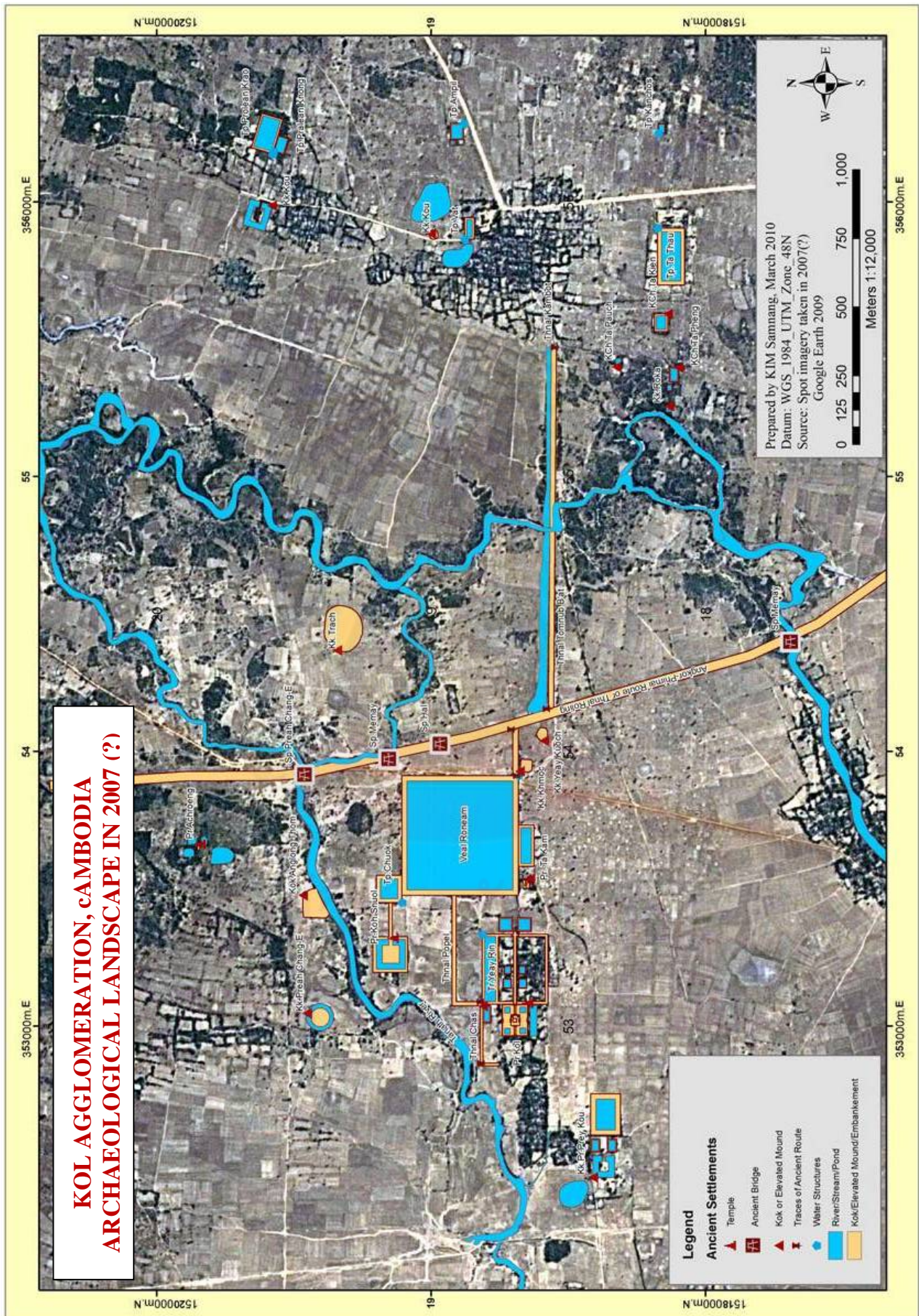


Map 2- 2: General geographical landscape of Kol area in 1957. (Map in 2010)





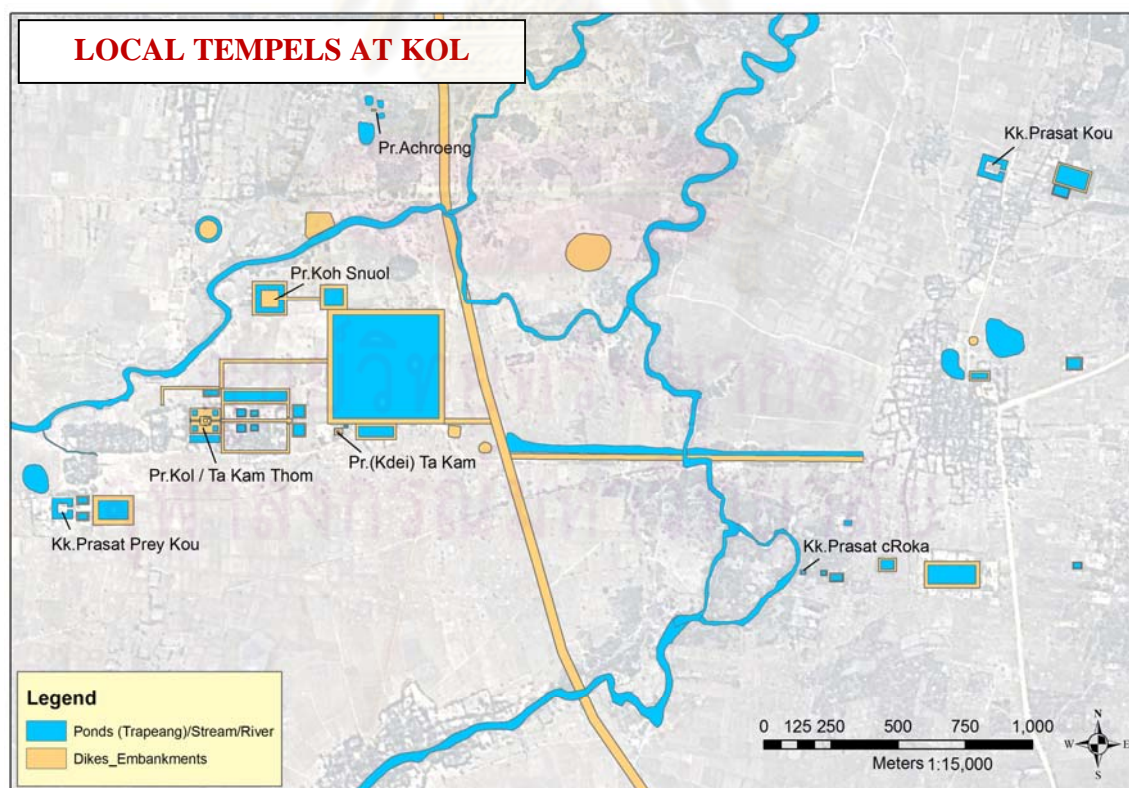
Map 2- 3: General geographical landscape of Kol area in 2004. (Map in 2010)



Map 2- 4: General geographical landscape of Kol area in 2007(?). (Map in 2010)

## 2.2 Temples and Its Inscriptions/ Characteristics/ Stylistics

In the vicinity of Kol, there are seven temples that were built or rebuilt during various reigns and in different periods, most of which were likely developed in the Angkor period (9<sup>th</sup> to 13<sup>th</sup> centuries A.D.) (Map 2-5, Table 2-01). Some of the temples still have inscriptions remaining, providing significant historical sources telling us of the past. Unfortunately, most of these inscriptions have decayed or been destroyed by both nature and, more significantly, by human intervention. At the present, only three temples are still standing in this area, with the rest having only the structural patterns of basements and building materials on the ground. This section will describe the previous studies and current status of the following temples, along with their inscriptions, characteristics, and stylistics:



Map 2- 5: Map of local temples at Kol area. (Map in 2010)

Site_id	Name En	Name Kh	UTM_X	UTM_Y	Length (m)	Width (m)	Moat's width (m)	Materials
1	Pr.Kol / Ta Kam Thom	ប្រា.គោល (ប្រា.តាកាំធំ)	353077	1518648	114	94	20	Pink Sandstone
2	Pr.(Kdei) Ta Kam	ប្រា.(ក្តី) តាកាំ	353531	1518641	30	25		Laterite Sandstone
3	Pr.Achroeng	ប្រា.អាជ្រឹង	353656	1519843	15	6		Laterite Sandstone
4	Kok Prasat Prey Kou	គ.ប្រាសាទព្រៃកូ	352449	1518409	77	77	20	Unknown
5	Pr.Koh Snuol	គ.ប្រាសាទកោះស្នួល	353314	1519139	105	105	20	Unknown
6	Kok Prasat Kou	គ.ប្រាសាទកូ	355988	1519580	96	80	20	Brick (?)
7	Kok Prasat Roka	គ.ប្រាសាទរកា	355258	1518132	20	15	5	Brick (?)

**Table 2- 1:** Inventory list of Local temples at Kol area.

### 2.2.1 Prasat Kol or Ta Kam Thom

In the early 20<sup>th</sup> century, Aymonier and Lajonquière started to explore and register the Khmer archaeological sites in mainland Southeast Asia. As a result, the widespread archaeological settlement sites to the northwest of Angkor center were depicted on Lajonquière's map in 1911 and Aymonier's map in 1901. Prasat Kol appeared on their maps, along with a description of the temple's characteristics and a drawing of the temple's plan. According to the general description they provided of the temple, it is evident that the complex was in good condition at that time, allowing them to draw and describe all the characteristics of the temple. For example, Aymonier recorded *"...the regularity of its plan and even more for the beauty of its materials: sometimes blue sandstone, but more often red sandstone with a fine grain which rarely crumbles and of which the beautiful colour enhances the effect of the rich mouldings..."* (Aymonier 1999b [1901]: 179). Later, with interest in tracing the Angkor-Phimai route, as mentioned in the Prasat Preah Khan's inscription, the LARP team included this temple and its general layout in their maps and reports (LARP report 2007, 2008; Im et al. 2007).

Regarding the name of the temple, Aymonier (1999b [1901]: 179) recorded the temple as "Banteay Ta Keam" = "Pandāy Tā Gām" or "the fortress of ancestor Keam".

However, Lajonquière (1911: 328) called it Prasat Ta Kam Thom, probably comparing it to Prasat Kdei Ta Kam, which is smaller than this temple in size. Later, Coedès, who fully translated the inscriptions of this temple, called it Prasat Ta Kam Thom following Lajonquière. Recently, the LARP project designated this temple as Prasat Kol, being the name used by the local people. In this context, the name “Prasat Kol” will be used to refer this temple.

***a. Current Condition and Structural Characteristic***

Today, Prasat Kol, is situated on an elevated mound in the Kol village, Kol commune, Angkor Chum district, Siem Reap province and has a geographical coordinate location of X: 353077 and Y: 1518648. In the approximate radius of 500 meters around this temple, there are three significant sacred worship monuments, namely Prasat Ta Kam (hospital) to the east, Kok Prasat Koh Snoul to the northeast, and Kok Prasat Prei Kou to the southwest. To the northern part of this temple, there is the Tanath River, called *Stung Tanath* in Khmer, which is an important water resource serving this area. Prasat Kol faces to the east and is surrounded by a double external wall enclosure and four ponds<sup>5</sup> in the middle of this double wall. The first external wall measures 114 meters to the east-west and 94 meters to the north-south; the second wall is about 40 meters to the east-west and 32 meters to the north-south. To the center of the second wall, there is a main central sanctuary which is presently totally collapsed, and two ruined library edifices facing the main sanctuary (Figure 2-1). Generally speaking, this temple is in almost total ruin having fallen to the ground, thus it is difficult to determine the real structural building and its sculptures, completely different from the condition a century ago as described by Aymonier and Lajonquière. However, the fragments of sandstone and laterite blocks and bricks scattered over the ground provide evidence that the building materials were mostly pink sandstone with a fine grain and of good quality, similar to the building materials of

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<sup>5</sup> In the plan of Aymonier and Lajonquière, at the middle of this double enclosure, they pointed out four L-shaped ponds or moats separated by causeways which linked the first wall gates to the second wall gates (Aymonier 1999b [1901]:179, Lajonquière 1911: 331).

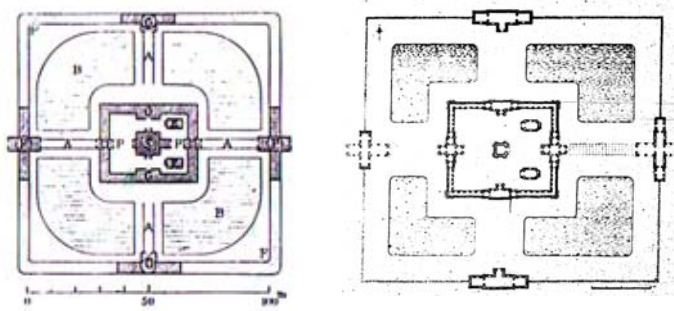
the famous and beautiful temple of Prasat Banteay Srei and is in conformity with what was noted by Aymonier and Lajonquière.

There are some associated structures of Prasat Kol which were not mentioned by Aymonier and Lajonquière, but were noted in a part of the LARP report which was issued in the Journal of Khmer Studies (UDAYA) number 8 (Im et al. 2007). These associated structures are: a long causeway flanked by stone pillars ending in a laterite cruciform platform and steps; a rectangular earthen embankment wall; some ponds along the causeway; a large water tank, called *Trapeang Yeay Rin*, to the north of the causeway inside the earthen embankment wall; and rectangular ponds to the south and north of the temple. The causeway measures 10 meters in width by 250 meters in length, lined on both sides by standing stone poles and four ponds, ending with a laterite cruciform platform (*Kompong* in Khmer) (Figure 2-3). The stone causeway lies down the center of an earthen embankment wall and connects the first *gopura* of the east face of the outer wall to the rectangular water tank embankment of *Veal Roneam* and further on to the Angkor-Phimai royal route, but is also attached to a large rectangular earthen wall. The rectangular earthen embankment wall is 255 meters to the east-west and 240 meters to the north-south, and 10 meters in width.

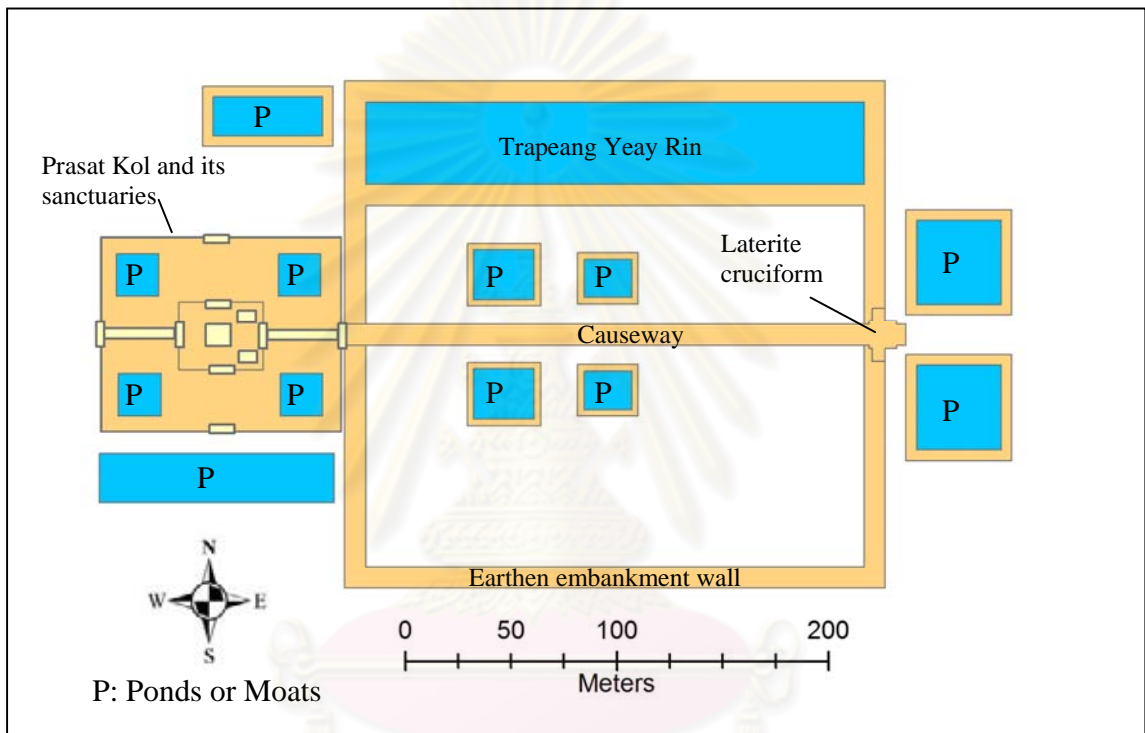
It can be discerned that in terms of the general architectural layout plan of Khmer monuments, Prasat Kol would be considered to be on an “axial plane”<sup>6</sup> lay-out because of the access causeway leading to the central shrine or temple.

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<sup>6</sup> Various scholars have divided the architectural plan lay-out of Khmer temples into two types: “axial plane” lay-out and “centered plane” lay-out. The axial plane lay-out is composed of an access causeway connecting the main shine or temple. For example, Prasat Preah Vihear, Prasat Banteay Srei, Prasat Thom at Koh Ker, Prasat Phnom Rung, Prasat Wat Phu, Prasat Phnom Chiso. The centered plane layout, most of them are original plane, is composed of a flat plane without attaching to a causeway. For instance, Prasat Preah Ko, Prasat Ta Prhom, Prasat Muang Tam, Prasat Ta Kam. (see Boisselier 19966: 33-34, 53-56; Jacques 2008: 4-5).



**Plan 2- 1:** Plans of Prasat Kol or Ta Kam Thom in 1901 by Aymonier (Left) and in 1911 by Lajonquière (right).



**Plan 2- 2:** General lay-out plan of Prasat Kol or Ta Kam Thom and its association structures.(Plan in 2010)



**Figure 2- 1:** Viewing of the Eastern gopura of second enclosure wall of Prasat Kol. (photo in 2009)



**Figure 2-2:** Viewing from the disappeared central sanctuary to library edifices at the East (left) and the Eastern gopura (right). (photo in 2009)



**Figure 2- 3:** Connected Causeway, piece of lotus sandstone pole lined up along the causeway, and laterite blocks of cruciform. (photo in 2009)



### *b- Inscriptions*

to Aymonier (1901: 180-181) and Coedès (1951: 94-96), three inscriptions were found at Prasat Kol, one of which (K.246) is partly still *in-situ* on the door jamb of the Eastern *Gopura* of the second enclosure wall (Figure 2-8) and the others are only fragment stones, the other parts of which have not been found. Coedès fully translated and inventoried the inscriptions as K.246, K.247 and K.248 (Coedès 1951). A date was included in these inscriptions and they mention the king's name and the donation of gifts of lands to his people. In the fragment inscription of K.246, the only lines of which remaining are in the Khmer language, mention the date of 986 Saka or 1064 A.D.,<sup>7</sup> and K.247, of which only four lines in Khmer language appear, includes a date of 982 Saka or 1060 A.D.<sup>8</sup> The last and longest inscription, K.248, with 20 lines in Khmer language, talks about gifts of lands together with a demarcation border of pillars at the four and eight points of the compass donated by King Jayavarman II<sup>9</sup> to their relatives or ancestors of persons who maintained this temple and engraved this inscription. Coedès observed that this inscription could have probably been written by the same person as the Prasat Ta Kam inscription due to the similarity of the physical letters in both stones, as well as being inscribed with the same dates of 982 Saka and 986 Saka (1060 A.D. and 1064 A.D.) that are included in the two fragment inscriptions of Prasat Kol (Aymonier 1999b [1901], Coedès 1951).



**Figure 2- 4:** Inscription K.246 engraved on the doorframe of the eastern gopura of Prasat Kol (right) (photo in 2009), and Coedès's rubbing inscription K.246 ( left) in 1951.

<sup>7</sup> Aymonier (1901: 180) and Coedès (1951: 94) translated in the same meaning: “//986 çaka mvay...”.

<sup>8</sup> Aymonier (1901: 180) read the date “982 s’aka and the word Khloñ (chief)” and Coedès (1951: 94) read the date: “(1) 982 ç[ka] .....[ādi], (2) dityavāra nu khlo[ñ].....”.

<sup>9</sup> In the 9<sup>th</sup> of lines of K.248, it is recorded that “...(9) kāla rāja vraḥ pāda parameçvara gi pi añ oy samnañ gol...” (Coedès 1951: 95). The word “parameçvara” is the posthumous name of king Jayavarman II.

### *c- Lintel Ornamentation Style`*

*“One knows the whole importance of the decorative lintel in the evolution of Khmer art; the richness and precision of its ornamentation provide a whole array of information, that our predecessors have used to establish the suite of styles in this art and which enable us to draw comparisons with Indian art, demonstrate new phases (appearance, transition, etc.) in the transformation of early Khmer art, and propose certain iconographic identifications, etc.”* (Bénisti, 1974: 132, quoted and translated in Polkinghorne 2007: 118).

As previously mentioned, Aymonier and Lajonquière did not take into account the lintel decoration styles of this temple, as they concentrated mainly on the general architectural characteristics and the inscriptions. In a similar way, the LARP project was not concern with the sculptures or lintel ornamentations as well. Thus, in order to provide more information in relation to the development of this temple, this section will attempt to study the decorative lintels.

Unfortunately, there are only a few lintels and other fragments that have been found at this temple. In total, there are three complete carved lintels with decorations still present at the east *gopura*, two of them attach to the face of the tower and the other one appearing on the back of the upper part of the door frame (Figure 2-4, 5, 6). In addition to these in tact lintels, there are some fragments of ornament lintels, made of pink or red sandstone, remaining in temple’s vicinity (Figure 2-7).

The complete lintel on the east face (top) of the *gopura* tower (Figure 2-4) is totally decorated with vegetal designs and terminates in a vegetal rinceaux or *vong hien* shape<sup>10</sup> on pink sandstone. At the central of the lintel is a fleuron emblem that forms the style’s focus. Therefore, according to the classification of lintel style by Phillippe Stern

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<sup>10</sup> Definition and labeling of *vong hien* shape after Chan Vitharin and Preap Chanmara (2005). The word “*vong*” means circle or round and “*hieng*” refers to the name of a kind of snail or shell which has a physical appearance similar to the sculpture decoration on the lintels.

(1934), this lintel's attribute should be categorized in the Kompong Preah style of lintels, from about the end of the 7<sup>th</sup> to the early 8<sup>th</sup> century.<sup>11</sup>

Another lintel, situated on the upper-main door frame of the same *gopura*, is carved with great garlands clasped with bands and elaborate fleuron motifs with *vong hien* shapes at the extremities (Figure 2-5). The central motif of this lintel was probably a *Kala or Rahu*<sup>12</sup> with some god appearing above the garland motifs. It is plausible that this lintel style may belong to the Khleang style, from the last years of the 10<sup>th</sup> century and the first part of the 11<sup>th</sup> century (Stern 1934, Polkinghorne 2007). With similar characteristics in terms of stylistics to the previous lintels, the extremely deteriorated lintel of the *gopura*'s tower, facing the main central sanctuary, as well as the other fragments of lintels, also illustrate the same Khleang style (Figure 2-6, 7).

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<sup>11</sup> Kompong Preah style lintel is one of many styles of lintel of Khmer arts which were categorized by Phillipe Stern and Coral-Rémusat. The following is a brief list the various significant lintel styles: Sambor Prei Kuk (600-650 A.D.), Prei Khmeng (635-700 A.D.), Kompong Preah (706-800 A.D.), Kulen (825-875 A.D.), Preah Ko (875-893A.D.), Bakheng (893-925 A.D.), Koh Ker (921-945 A.D.), Banteay Srei (967-1000 A.D.), Khleang (965-1010 A.D.), Baphuon (1010-1080 A.D.), Angkor Wat (1100-1175 A.D.) and Bayon (1177-1230 A.D.). (see Stern 1934, Coral-Rémusat 1951, Polkinghorne 2007).

<sup>12</sup> *Kala* or *Rahu* has been summarized throughout various aspects from various scholars by Polkinghorne (2007: 127). In here I quote only general aspects of the term "*Kala* or *Rahu*" in the following: "The *kala* is known by the name of *Rahu* by local Khmer (Marchal, 1951: 32, and Ang, 2004: 85 – 98). *Rahu* is not only associated with funerary and cremation rites, but possesses a 'bivalent' nature as the first step towards new life. In this aspect *Rahu* is regarded as the demon of the eclipse, causing the darkness to make new light reappear (Ang, 2004: 85 – 98)". (Polkinghorne 2007: 127)



**Figure 2-5:** Lintel of the first top of the East Gopura of Prasat Kol. (photo in 2009)



**Figure 2- 6:** Lintel on the main door of the East Gopura of Prasat Kol. (photo in 2009)



**Figure 2- 7:** Lintel on the main door (face to the main sanctuary) of the East Gopura. (photo in 2009)



**Figure 2- 8:** Fragments of Lintel spreading inside the enclosure wall. (photo in 2009)

Therefore, it can be concluded that the pink sandstone monument of Prasat Kol was found around the first half of the 11<sup>th</sup> century A.D. (1060 and 1064 A.D.) during the reign of Udayadityavarman II (r.1049-1066 A.D.). Moreover, during that period, there appears to have been the donations of pieces of land and the installation of pillars to define the land borders. Meanwhile, even though this monument was erected at the outskirts of the capital, this monument still received great artisans to manage and ornament the general architectural features, likely being from the same workshops or professional artisans working on the monument groups in the capital city (see Polkinghorne 2007b:219-241).

### **2.2.2 Prasat Ta Kam or Kdei Ta Kam (Arogyasala or Hospital)**

In the same study of Khmer monumental sites by Aymonier and Lajonquière, Prasat Ta Kam or Kdei Ta Kam was reported in their works. They described both the physical architectural buildings and also provided a translation of the inscriptions found at this temple (Aymonier 1999b [1901]:176-179, Lajonquière 1911: 330-332). However, at that time, Aymonier and Lajonquière concentrated only on the main temple building, without recording the associated structures of this temple. The condition of the towers and edifices of this temple was in good condition, which allowed Aymonier and Lajonquière to record data regarding all the characteristic features, including the buildings and sculptures or statues. For example, Aymonier said about the single entrance of the *gopura*'s northern pediment that: “...a standing god in a completely stiff posture is coming out of a stone, almost intact. Five other figures are worshipping below the god.” (Aymonier 1999 [1901]: 177). Moreover, Aymonier added a description of the lintel of the ante-room connecting to the main sanctuary that:

“...a beautiful and original piece of sculpture, shows a god, the hairdo tied, standing on the two horses the mouths of which launch bundles three clappers and below that four worshippers. In the west there are six praying figures, four in the lower part and two on the top; all are

*massive in shape and decorated with heavy ornaments curved backwards into points at the ears...*” (Aymonier 1999 [1901]: 177)

Almost one and half decades later, Louis Finot studied the influences of Mahayana Buddhism in Cambodia, as well as in the whole of Indochina. The inscriptions of this temple were considered as perhaps the first inscriptions that mentioned the name of *Lokeśvara*.<sup>13</sup> Finally, he pointed out that Mahayana Buddhism would be firstly present at the region of Angkor since 791 A.D. (K.244), evidenced by the depiction of *Lakeśvara* at the fronton of the main sanctuary of this temple (Finot 1925b). Coedès also translated the two inscriptions found at this temple (Coedès 1951:89-93). Recently, the LARP teams pointed out that this temple was one of five hospital chapels, out of a total of 102 of King Jayavarman VII’s hospitals, along the Angkor-Phimai route (Finot 1925b, the LARP report 2007, 2008).

As for the naming of this temple, Aymonier called it “Prasat Kedei Ta Keam” = “Prāsād Kuti Tā Gām”, which referred to the towers and cells of the ancestor Gām. Later, Lajonquière called it only “Prasat Ta Kam”. Recently, the LARP teams recorded this temple in their reports as “Prasat Ta Kam”, which is the name as it is called by the villagers.

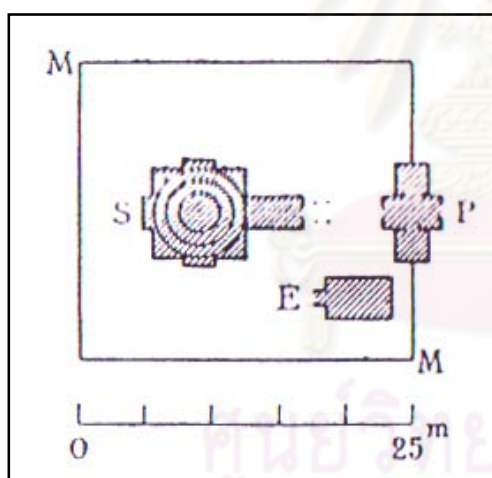
#### ***a. Current Condition and Structural Characteristic***

Prasat Ta Kam (Figure 2-9) is located about 450 meters to the east of Prasat Kol and about 900 meters, with a direction of 204 degrees north, from the Spean Preah Chang Er, in Kol village. This temple is comprised of a laterite enclosure wall which measures 30 meters to the east-west and 25 meters to the north-south (Figure 2-10-c), together with

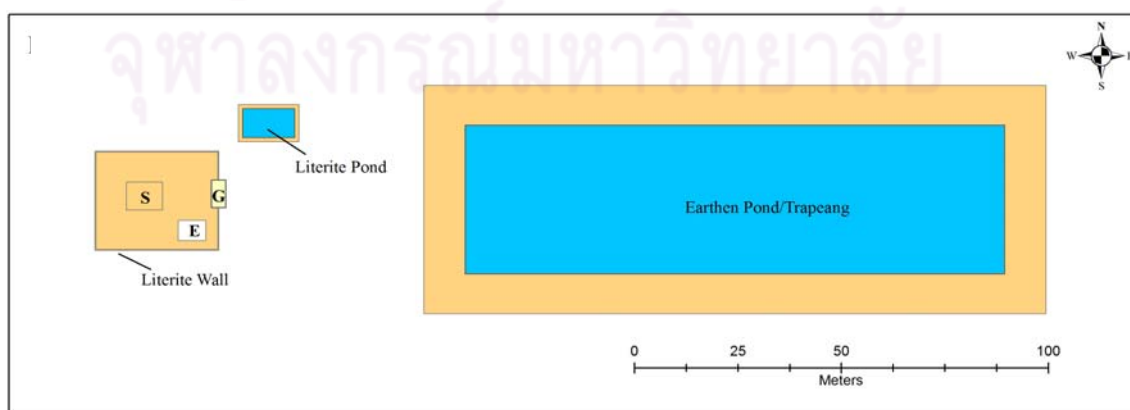
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<sup>13</sup> **Lokeśvara** or **Avalokiteśvara** (Sanskrit: अवलोकितेश्वर) is a bodhisattva who embodies the compassion of all Buddhas. He is one of the more widely revered bodhisattvas in mainstream Mahayana Buddhism. (Source: Retrieved in March, 14 2010 from <http://en.wikipedia.org/wiki/Avalokite%C5%9Bvara>)

a *gopura* (G) to the east; a ruined-central sanctuary (S) (Figure 2-10-a); a library edifice to the south-east of the central sanctuary (E) (Figure 2-10-c); a rectangular laterite pond to the northeast of the laterite enclosure wall; and a large rectangular earthen pond or *Trapeang*, currently known as *Trapeang Ta Kam*, to the east, having a length of 150 meters to the east-west and a width of 50 meters to the north-south and a height of about 2 meters. A part of the central sanctuary, which used pink sandstone and laterite blocks as the main materials, has collapsed and is covered by trees. The library edifice (E) and *gopura* (G) were also made of laterite and sandstone blocks, which have partly fallen and are covered by trees. Fortunately, a portion of two praying figures in the lower part of the west fronton of the main sanctuary and a complete lintel supporting this fronton can still be seen (Figure 2-10-d). As is evident, the current condition is, therefore, totally different from a century ago.



**Plan 2- 3:** Plans of Prasat Ta Kam in 1901 by Aymonier.



**Plan 2- 4:** General lay-out space of Prasat Ta Kam together with its associated structures (Plan in 2010)



**Figure 2-9:** Prasat Ta Kam looking from the laterite pond at the northeast. (Photo in 2009)



**Figure 2- 10:** (a) Main central sanctuary; (b) laterite edifice of library; (c) Laterite enclosure wall and (d) Fronton at the west of main sanctuary. (Photo in 2009)



**b. Inscriptions**

As mentioned above, two inscriptions were found at this temple, one at the main sanctuary and the other at the small edifice, and have been inventoried by Coedès in his published book in 1951, entitled “*Inscription du Cambodge*”, numbered K.244 and K.245. Inscription K.244 was written in the Sanskrit language and includes only two lines. It was firstly interpreted by Bergaigne in 1884, later mentioned again in 1901 by Aymonier and finally fully translated by Coedes in 1951. Interestingly, it specifically mentions the date of 713 Saka or 791 A.D. and includes the name of *Lokeśvara* called *Jagadīśvara* (Coedès 1951: 89). Here is the original transliteration text of K.244 translated by Coedès:

- (1) samagunaçaçinagaçāke  
prathito yas supratīṣṭhito bhagavān  
(2) **jagadīçvara** iti nāmnā  
sa jayti lokeçvarapratimaḥ //

“Victorieuse est la célèbre image de *Lokeśvara*, nommée *Jagadīśvara*, bien érigée en (l’année) saka (marquée par) les (7) montagnes, la lune (=1) et le (3) qualités.”<sup>14</sup> (Coedès 1951: 89)

According to the presence of *Lokeśvara* and the date of 791 A.D., Finot (1925b) suggested that this was a primary inscription which mentioned the practice of the cult of Mahayana Buddhism in Angkor, even though the Angkor court was, at that time, strongly and principally upholding the cult of Hinduism.

Another inscription, K.245, was engraved with a total of 35 lines in Khmer language during the reign of Suryavarman I (r.1002-1049 A.D.).<sup>15</sup> At the beginning of

<sup>14</sup> English translation: “Victorious is the famous image of *Lokeśvara* named *Jagadīśvara*, although built in (year) saka (marked by) (7) mountains, the moon (= 1) and (3) qualifications”.

<sup>15</sup> In the beginning of the seventeenth line of the inscription, it is stated “paramavīraloka ° añ sveñ thmo çivaliṅga I...” ( Coedès 1951: 91). The word “paramavīraloka” is the posthumous name of Suryavarman I.

the fifth line of this inscription, the date of 884 saka or 962 A.D.<sup>16</sup> is stated. This means that the inscription referred to almost a century previous, describing the current events at that time, mentioning two significant matters, one talking about officials who were sent to look after this temple from Angkor, and the other stating the request of the right to maintain the temple for the king to his three children during the reign of Suryavarman I (Aymonier 1901: 177-179, Coedès 1951: 90-93).

### *c. Lintel Ornamentation Style*

The complete lintel on the upper part of the main doorframe to the west of the main sanctuary is entirely decorated with vegetal and floral tassels or garlands clasped with bands. The center of the lintel is an unclear fleuron emblem that forms the style's focus. In this sense, this lintel should belong to the Kompong Preah style (late 7<sup>th</sup> and early 8<sup>th</sup> century) similar to one of the lintels of Prasat Takam Thom. The other lintel fragments of this temple are similar to the two complete lintels and fragments of Prasat Takam Thom. Thus, they can be classified in the same group of Khleang style (late 10<sup>th</sup> and early 11<sup>th</sup> century) (Figure 2-11-12).



**Figure 2-11:** Ornamented lintel at the western central sanctuary. (photo in 2009)

<sup>16</sup> In the beginning of fifth line of inscription K.245 it is written in transliteration text by Coedès (1951: 91) recorded that “(5) 884 çaka vyar ket vaiçakha nu mratāñ çrī...”.



**Figure 2-12:** Fragments of ornamented lintels. (photo in 2009)

As mentioned above, Prasat Ta Kam is one of the hospital chapels (*Arogyasala*), among five hospitals chapels, along the Angkor-Phimai route, re-built and transformed by King Jayavarman VII in the 12<sup>th</sup> - 13<sup>th</sup> century on the existing temple that was initially built in 791 A.D. (K.244) and re-built in the first half of 11<sup>th</sup> century by King Suryavarman I (K.245). This is confirmed by the ornamentations of the lintels, one of them belonged to the Kompong Preah style (late 7<sup>th</sup> and early 8<sup>th</sup> century) and others grouped in the Khleang style (late 10<sup>th</sup> and early 11<sup>th</sup> century). Interestingly, it appears that the cult of Mahayana Buddhism came to Cambodia since the 8<sup>th</sup> century due to the presence of Lokeśvara's name in inscription K.244. Being a hospital chapel of Jayavarman VII, the common architectural structures were built almost with the same features and plan as the main central sanctuary, small edifice of library to the southeast, encircled by a laterite wall, one laterite pond to the northeast and one large earthen pond to the east.

### 2.2.3 Prasat Achroeng or Ach Chroeng (*Rest-house or Dharmasala*)

Similar to the two temples mentioned above, Prasat Achroeng was studied by Aymonier (1901a), Lajonquière (1911), Finot (1925a) and LARP (2007-08). Aymonier reported very briefly about this temple: “*the tower of the end of the bridge of the sacred horse-box. This small, isolated temple was a gallery with limonite pillars and sandstone*

walls” (Aymonier 1901a: 176). Later, Lajonquière registered this temple in his inventory list as code number 700 (Lajonquière 1911: 337). Moreover, Lajonquière compared the similar characteristic of this temple to Prasat Teap Chei located along the eastern Angkorian royal route. Because this is a small temple, those scholars did not pay much special attention to see the overall associated structures besides providing only a short description.

Regarding the naming of this temple, Aymonier called it Prasat Chong Spean Preach Changér (Aymonier 1901a:176) and Lajonquière recorded this temple as Prasat O Chru’ng (Lajonquière 1911: 337); the LARP team called it Prasat Ach Chroeng or Achroeng, the same names as it is presently called by the local people at this area (LARP report 2008:249). Finot (1925a) and the LARP team (2007-2008) pointed out that Prasat A’chroeng was one of the 17 rest-houses (*Dharmasalas*)<sup>17</sup> along the Angkor-Phimai road (see Finot 1925a, LARP reports 2007, 2008, Hendrickson 2007, Im 2004, Im et al. 2007).

#### ***a. Current Condition and Structural Characteristic***

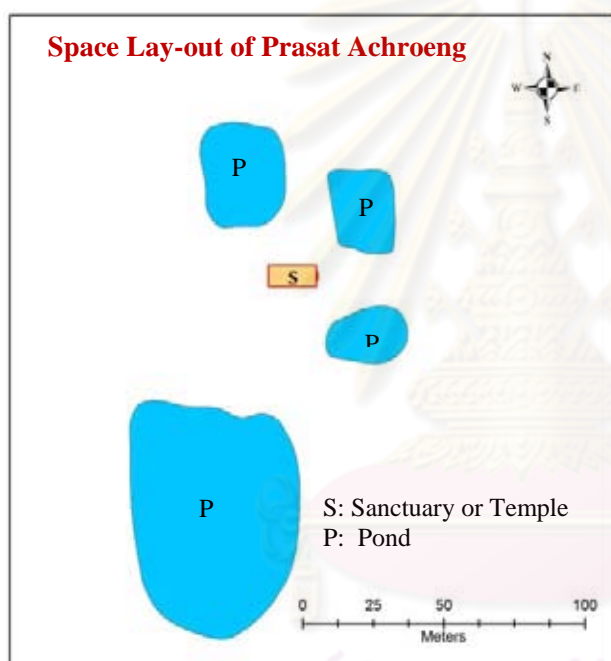
Being a rest-house chapel along the royal route from Angkor to Phimai, Prasat Achroeng is not located far from that route, around 250 meters to the west of the trace of the royal road. Its location is situated in the same village as Prasat Ta Kam, at the coordinate point X:353657 and Y:1519846, about 460 meters, with a direction of 325 degrees to the north and 145 degrees to the east as compared with the Spean Preach Chang Er. Presently, Prasat Achroeng is covered by bamboo forest. Most parts of the sanctuary were made of laterite stone, except for the doorframes and windows being made with sandstone. Today, there is only the entrance with the doorframe opening to the east and the windows facing to the south standing. The temple measures six meters to the north-south and fifteen meters to the east-west and is surrounded by ponds (*Trapeangs*) (Plan 2-5).

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<sup>17</sup> “*Dhamasala*” used by Louis Finot refers to a temple where people used to make worships and take rests during a long journey to other cities along the road. (see Finot 1925a).

Unfortunately, the artistic features have been lost or have disappeared from this temple. Only a fragment of a pediment remains showing a part of a standing foot of the god Lokeśvara and two praying deities (Figure 2-14), along with the top part of a lotus which perhaps covered the top of the tower (Figure 2-13).

According to the unique form of Jayavarman VII's rest-houses, it can be assumed that Prasat Achroeng was built around the 13<sup>th</sup> century during the reign of the King Jayavarman VII.



**Plan 2- 5:** General space lay-out of Prasat Achroeng and its associated structure. (Plan in 2010)



**Figure 2-13:** the southern windows of Prasat Achroeng and the piece of crown lotus cover of the tower. (photo in 2009)



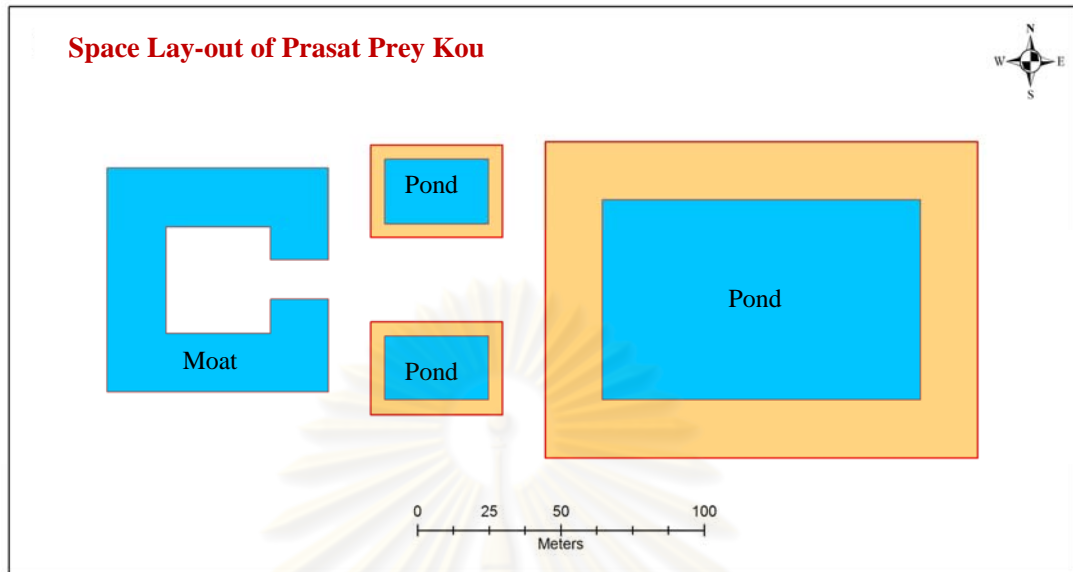
**Figure 2-14:** the piece of fronton sandstone of Prasat Achroeng (a) (photo in 2009); the fronton of the standing of Iokeśvara and praying figures on the rest-houses's building of Prasat Ta Prohm (b) and Prasat Preach Khan (c) (Finot 1925a).

#### 2.2.4 (Kok) Prasat Prey Kou

Only the LARP teams studied and reported on this temple in 2007-08 (LARP 2007, 2008; Im et al. 2007). The LARP report only briefly pointed out the dimensions of the moat without providing any description of the general current condition and the associated structures. The local people currently call this temple Kok Prasat Vat Prey Kou, the same as the LARP team (Im et al. 2007:322).

##### *a. Current Condition and Structural Characteristic*

Prasat Prey Kou is positioned at the coordinate of X: 352449 and Y: 1518409, about 650 meters, with a direction 240 degrees north as compared with Prasat Kol, and is located inside the vicinity of the present Buddhist pagoda of Kol village. Regrettably, this temple was destroyed and replaced by a modern pagoda. Nonetheless, the presence of a moat which measures 77 meters E-W by 77 meters N-S, two ponds/*Trapeangs* to the east and a rectangular earthwork pond to the east, measuring 150 meter E-W by 110 meters N-S, indicate that there was an important sacred worship temple at this spot (Plan 2-6). According to an interview and some remaining fragments of bricks, laterite stones and sandstones, and other objects around this area, this temple was possibly built of brick and composed of three towers. However, there is not enough supporting evidence to date the age of this temple (Figure 2-15, 16).



**Plan 2- 6:** General space lay-out of Prasat Kok Prey Kou and its associated structures.



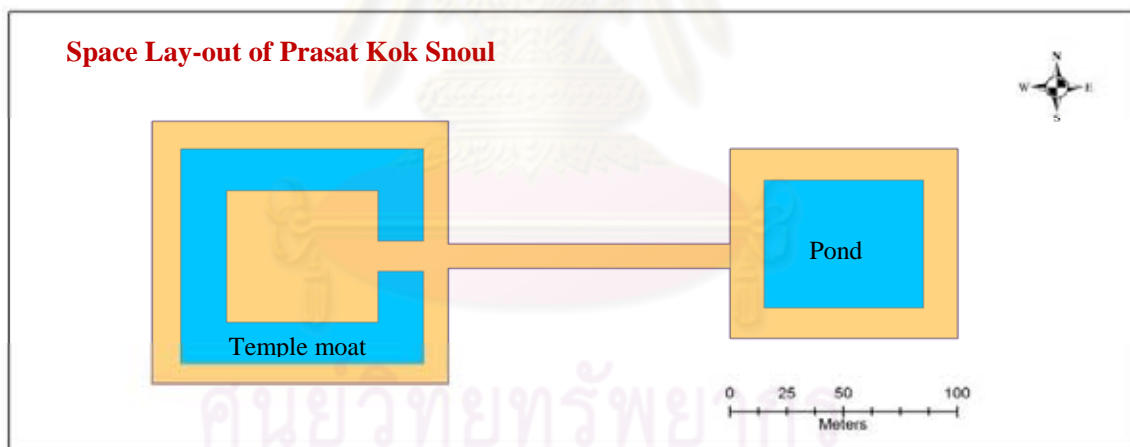
**Figure 2-15:** Moat and un-finished modern pagoda built on the existed temple (photo in 2009).



**Figure 2-16:** Pedestal sandstone, a small tiling brick group and a piled brick. (photo in 2009)

### 2.2.5 (Kok) Prasat Koh Snoul

Similar to Kok Prasat Prey Kou, this temple was discovered and reported by the LARP team (LARP 2007, 2008; Im et al. 2007). The geographical location of Kok Prasat Koh Snoul is at the coordinate point X: 353314 and Y: 1519139, about 550 meters, with a direction 335 degrees north by using Prasat Ta Kam as a benchmark. It is located in the same village as Prasat Ta Kam. Kok Prasat Koh Snoul is referred to as a disappeared-building temple which is situated on an elevated mound, surrounded by a moat, measuring 105 meters E-W by 105 meters N-S and 20 meters in width, with a rectangular pond, 100 meters E-W by 92 meters N-S, to the east (Plan 2-7). At present, only pieces of a sandstone doorframe and a pink sandstone block with some engraved graffiti on the top part have been found (Figure 2-18).



**Plan 2- 7:** General space lay-out of Kok Prasat Koh Snoul and its associated structures. (Plan in 2010)





**Figure 2-17:** General view of Kok Prasat Koh Snoul from the Northeast of dry out moat to the elevated mound of temple. (photo in 2009)

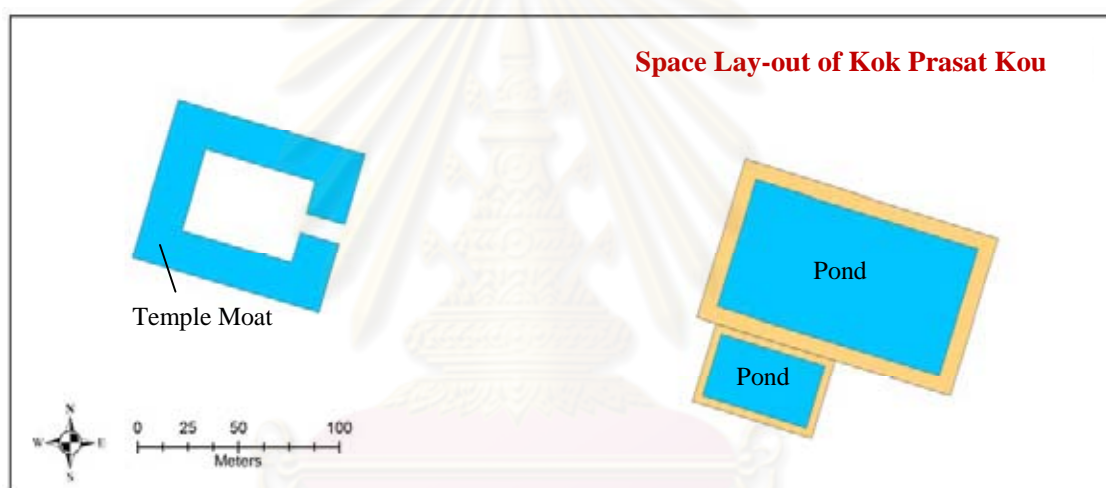


**Figure 2-18:** A sandstone doorframe (left) and a pink sandstone with graffiti (right) of Kok Prasat Koh Snoul. (photo in 2010)

### 2.2.6 *(Kok) Prasat Kou*

Similar to Kok Prasat Prey Kou, this temple was also discovered and reported by the LARP team (LARP 2007, 2008; Im et al. 2007). Kok Prasat Kou is situated at the northern part of Bat village, Kol commune, Angkor Chum district, Siem Reap province

(Figure 20). Geographically, this temple is at the coordinate point X: 355999 and Y: 1519590, about 700 meters to the north of Central Bat Village. Today, the temple sanctuary is totally invisible with only the basement surrounded by a moat, 96 meters E-W by 80 meters N-S, evident (Plan 2-8). However, a few pieces of building material have been found: a sandstone pedestal transformed into *Neak Ta* (Local spirit) today, laterite blocks, and some ceramic fragments (Figure 2-19-20). It is noticeable that this temple is parallel in direction to the two ponds at the front, even though its direction, dissimilar to the other temples in this area, is not to the east, but 105 degrees north.



**Plan 2- 8:** General lay-out space of Kok Prasat Kou. (plan in 2010)



**Figure 2-19:** General view of Kok Prasat Kou from the Northeast corner of dry-out moat. (photo in 2009)



**Figure 2-20:** Pedestal sandstone and fragments of ceramics (left to right). (photo in 2009)

### 2.2.7 *(Kok) Prasat Roka*

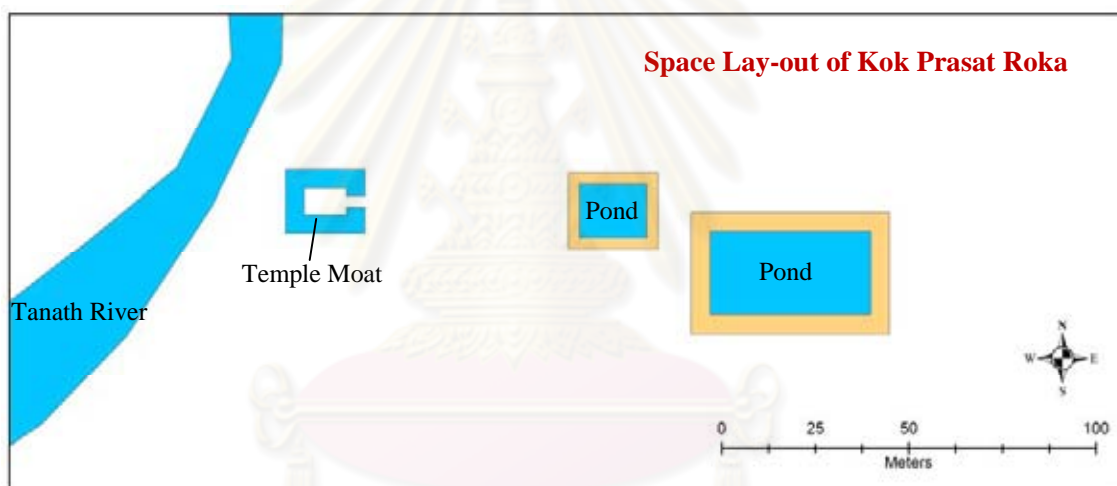
As with Kok Prasat Prey Kou, this temple was discovered and reported by the LARP team (LARP 2007, 2008; Im et al. 2007). Today, Kok Prasat Roka is situated to the south-west of Bat village, at the coordinate point X: 355258 and Y: 1518132, about 650 meters, 270 degrees north as compared with Trapeang Ta Thay, near the modern road (Figure 22-a). As seen today, Kok Prasat Roka is comprised of a surrounding moat measuring 20 meters E-W by 15 meters N-S and two rectangular earthen ponds to the east (Plan 2-9). This temple was probably erected with bricks, similar to Prasat Prey Kou at Kol village because many fragments of bricks were found in the vicinity, along with some pieces of sandstone, one pedestal sandstone and other sandstone blocks (Figure 2-21, 22).



**Figure 2-21:** Kok Prasat Kok Roka viewing from the northeast part. (photo in 2009)



**Figure 2-22:** A piece of pedestal sandstone and the fragments of bricks at Kok Prasat Kok Roka. (photo in 2009)



**Plan 2-8:** General space lay-out of Kok Prasat Roka and its associated structures.(plan in 2010)

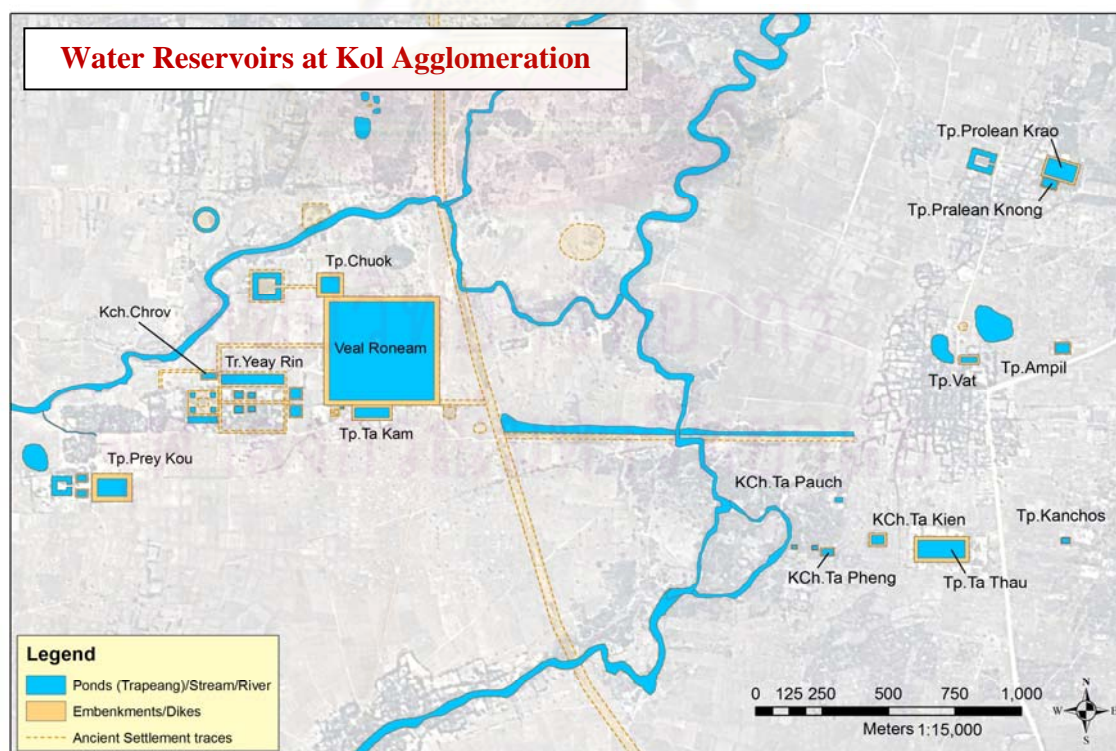
### 2.3 Water reservoirs (ponds or *Trapeang*, lakes, and *Baray*)

At Kol area , there are 16 artificial water reservoirs which are divided into different categories in accordance with what the local people call them, namely *Veal*, *Trapeang*, and *Kanchorn*<sup>18</sup> (see LARP 2007, 2008; Im 2004: 72). Some water reservoirs were associated with temples and others were publicly dug to serve for the community's

<sup>18</sup> *Veal*, *Trapeang* and *Kanchorn* are Khmer words referring to water tanks or reservoirs, just different in size. *Veal* is bigger than *Trapeang* and *Kanchorn*, and *Trapeang* is bigger than *Kachorn*.

consumption and agricultural plantations. Even though in the vicinity of this area two significant rivers naturally and geographically are present, flowing in the direction from the northeast to the southwest, large water reservoirs were still considered necessary to retain water for the dry season or perhaps to follow the old tradition or influence from the public policy of the Angkor court, even though being located away from the capital.

Regarding the structural characteristic of the water reservoirs, it can be concluded that they were primarily established in rectangular shape obeying an east-west direction, some surrounded by embankments. The largest water structure is Veal Roneam, which is presently dried out, situated between the complex of Prasat Kol and the royal route from Angkor to Phimai. It measures 450 meters E-W by 450 meters N-S, the embankment 20 meters in width covering about 2 hectares of surface area. The smallest water reservoir is a *Trapeang*, comprising 28 meters long (E-W) by 17 meters (N-S) in width, covering 476 square meters without the surrounded bank (Table 2-2 & Map 2-6).



**Map 2- 6:** General view of artificial water structures at Kol area. (map in 2010)

Site_id	Name En	Nam Kh	UTM_X	UTM_Y	Length (m)	Width (m)	Bank's width (m)	Surface (m <sup>2</sup> )
1	KCh.Ta Pheng	កច.តាផេង	355398	1518098	52	32	5	1664
2	KCh.Ta Pauch	កច.តាប៉ូច	355400	1518324	28	17	0	476
3	KCh.Ta Kien	កច.តាកៀន	355593	1518137	65	50	8	3250
4	Tp.Vat Bat	ត្រ.វត្តបត់	355865	1518878	77	35	8	2695
5	Tp.Ta Thau	ត្រ.តាថាវ	355905	1518174	207	98	15	20286
6	Tp.Prolean Krao	ត្រ.ព្រលានក្រៅ	356175	1519578	130	80	10	10400
7	Tp.Pralean Knong	ត្រ.ព្រលានក្នុង	356184	1519574	60	40	5	2400
8	Tp.Ampil	ត្រ.អំពិល	356287	1518881	60	47	5	2820
9	Kch.Chrov	កច.ជ្រៅ	353073	1518811	60	28	5	1680
10	Tr.Yeay Rin	ត្រ.យាយរិន	353334	1518813	255	60	10	15300
11	Veal Roneam	វាលរន្ទឹម	353911	1518682	450	450	20	202500
12	Tp.Kanchos	ត្រ.កក្កុស	356251	1518171	35	25	10	875
13	Tp.Chuok	ត្រ.ឈូក	353449	1519106	100	92	15	9200
14	Tp.Prey Kou	ត្រ.ព្រៃគូ	352602	1518418	150	108	20	16200
15	Tp.Kol	ត្រ.គោល	353074	1518614	110	23	0	2530
16	Tp.Ta Kam	ត្រ.តាកាំ	353581	1518682	150	57	10	8550

**Table 2- 2:** List of artificial water structures at Kol area.

## 2.4 *Kok(s) or Elevated Areas/Mounds*

Koks, or mounds, refer to elevated place or elevated mounds, with an elevation normally higher than the natural ground. Most of them were used as residential places, burial places, and sacred worship monumental sites in the past. Some of them have continued to remain as living places until today, while others have been abandoned and covered by forest and agricultural plantation fields. In the vicinity of Kol area, there are six koks and six general elevated spaces (Map 2-7).

Kok Preah Chang Er, Kok Anlong Thom and the Kol elevated space, referring to the mounds in Kol village extending from Kok Prasat Prey Kou to Prasat Kol, were identified as pre-historic sites due to archaeological evidence, such as physical characteristics, stone tools and fragments of ceramics that were found in these areas (Im et al. 2007). Kok Preah Chang Er is a circular mound surrounding by a moat. It measures 70 meters in diameter, covering almost 4,000 square meters. Only one stone tool and some pre-historic and historic ceramics were found by the LARP project (Figure 2-23) (Im et al. 2007: 335-336). As for Kok Anlong Thom, which is not far to the east of Kok Preah Chang Er, some pre-historic and historic ceramics and one stone tool were discovered, similar to the previous kok. This kok covers an area of almost 8,000 square meters (Figure 2-24) (Im et al. 2007: 335). In addition, at the Kol elevated space, two stone tools were discovered, one found around Kok Prasat Prey Kou by the LARP project and the other found at Prasat Kol by the researcher (Figure 2-25) (Im et al. 2007: 334-335).

With respect to the other koks, one is currently a burial mound of Kol village and others are abandoned mounds, some of which were probably residential places or sacred sites. At Kok Yeay Kuoch, Kok Trach and the other elevated spaces (Kok Prasat Achroeng, Prasat Ta Kam, Kok Prasat Koh Snoul and Kok Prasat Kou), only various kinds of ceramics on the surface have been found, although some laterite and sandstone blocks were found at Kok Kou in Bat village. Therefore, it can be seen that at Kol some koks or elevated mounds had been occupied since pre-historic times and have been continuously used through the Angkorian times until today.



**Figure 2-23:** A stone tool (face and back), Fragments of ceramics collecting from the surface of Kok Preach Chang Er (left-right). (photo in 2009)

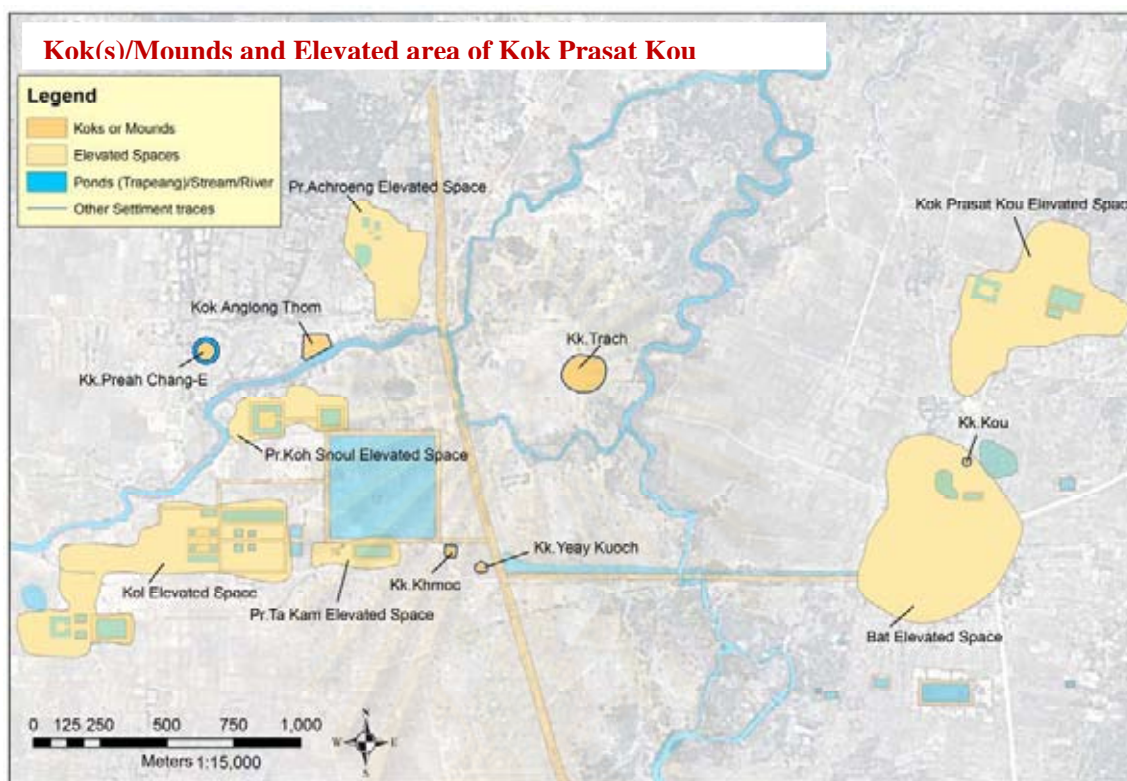


**Figure 2-24:** Stone tool (face and back) and fragments of ceramics collecting from the surface of Kok Angkor Thom (left-right). (photo in 2009)



**Figure 2-25:** Stone tools (face and back) on left found at Kok Prasat Prey Kou and on the right found at near Prasat Kol. (photo in 2009)





**Map 2- 7:** Koks or mounds and elevated spaces at Kol area. (Map in 2010)

Site_id	Name En	Name Kh	UTM_X	UTM_Y	Diameter (m)	Perimeter (m)	Area (m)
1	Kk.Preah Chang-Er	គ.ព្រះចង្កែវ	353046	1519451	70	220	3841
2	Kk.Yeay Kuoch	គ.យាយខ្លូច	354039	1518588	40	140	1514
3	Kk.Kou	គ.កូ	355885	1518999	31	105	858
4	Kk.Khmoc	គ.ខ្មោច	353927	1518676	44 X 42	164	1847
5	Kk.Trach	គ.ត្រាច	354369	1519342	140	490	18650
6	Kk. Anglong Thom	គ.អង្គឌំ	353477	1519467	102 X 75	350	7657

**Table 2- 3:** List of Koks or mounds at Kol area.

## 2.5 Other Man-made Structures

Because Kol is situated on terrain sloping in a northeast to a southwest direction and is geographically occupied by complicated rivers, there are three important ancient laterite bridges along the royal road passing through this area, namely, Spean Preah Chang Er, Spean Memay and Spean Hal.<sup>19</sup> All the laterite bridges were discovered and inventoried in the EFEO published books of Aymonier and Lajonquière in the first decade of the 20<sup>th</sup> century (Aymonier 1999b [1901]: 176, Lajonquière 1911: 332-333). Again, in 2007, the LARP team studied and excavated one of the three bridges in detail, Spean Hal (Im et al. 2007: 332-333). In addition, some other man-made structures of infrastructural communication systems and irrigation systems were examined by the LARP project in order to understand the local relationships inside this area as well as the connections with other areas (Im et al. 2007: 321). Those still present today are Thnal Roling, Thnal Popel, Thnal Tumnuh Bat, Thnal Kambot and Thnal Chas.<sup>20</sup>

### 2.5.1 Ancient Stone bridges

#### a. Preah Chang Er bridge

Local people call one bridge Spean Preah Change Er ('large flat basket bridge') or Spean Thma ('stone bridge'), similar to the name Aymonier and Lajonquière recorded in their report, and as set forth in the LARP project reports (Aymonier 1999a [1901]: 176, Lajonquière 1911: 333, Im et al. 2007:332). This bridge is located along the Thnal Roling, which is the Angkor-Phimai royal route, about 800 meters, 360 degrees north from the big tree at the inter-junction road to Prasat Ta Kam, and at the coordinate point X: 353915 and Y: 1519462, crossing the Tanath river (Table 04, Map 05). The bridge measures 37 meters long by 10 meters wide with 12 arches, and is made of laterite blocks

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<sup>19</sup> *Spean* is the Khmer word for bridge.

<sup>20</sup> The term *Thnal*, used by the local people, refers to the local roads or embankments or dikes which are connected from place to place inside or outside the community.

(Figure 2-26). Its inventory number 687 was registered by Lajonquière in 1911. The bridge is still used by the local people.



**Figure 2-26:** Spean Preach Chang Er viewing the south-east and its basement of laterite ornament balustrades on the bridge's back. (photo in 2009)

***b. Memay bridge***

Lajonquière registered this bridge in his inventory of 1911 as number 686 and called it Spean Thmat due to it passing the O'Thmat (Lajonquière 1911: 333). Presently, local people call it Spean Memay. The bridge's location is on the same route as Spean Preach Chang Er, at the coordinate point X: 353972 and Y: 1519155, approximately 350 meters in direction, 175 degrees north of Spean Preach Chang Er (Table 04, Map 05). It measures 33 meters long by 7 meters wide with invisible arches, constructed of laterite blocks. Today, a part of this bridge has collapsed and is covered by the bamboo forest (Figure 2-27).



**Figure 2-27:** Spean Memay viewing the modern road at the west and its laterite arch covered by bamboo forest at the north. (photo in 2009)

*c. Hal bridge*

Spean Hal is the name as called by the local people and later recorded as the same name by the LARP team, although it was called Spean Prasat Ta Kam and listed as number 685 by Lajonquière (Lajonquière 1911: 332). In 2007, this bridge was taken into account to study in detail the characteristics and its architectural structure by the LARP project (Im et al. 2007: 332-333). The LARP report explained that Spean Hal was possibly built during the 9<sup>th</sup> to 10<sup>th</sup> century and was continuously used until the 15<sup>th</sup> century. Moreover, the supporting resistance of this bridge could support a weight up to 40 tons and was used as the waterway to direct water into the Veal Roneam (Im et al. 2007: 340).

Today, Spean Hal is positioned at coordinate point X:354027 and Y:1518968, and is on the royal route similar to the two previous bridges, about 500 meters in a direction 175 degrees north from Spean Preach Chang Er. It was constructed totally using laterite blocks, and measures 7.3 meters long by 6 meters wide, with 3 arches (Figure 2-28).



**Figure 2-28:** Spean Hal viewing the modern road at the west and its body back connecting to the route.

(photo in 2009)

### **2.5.2 Traces of local roads/embankments/dikes/canals**

Even though Kol is located at the outskirts of the Angkor capital, well-development infrastructural communication networks were organized and established. For instance, road networks were connected to each other allowing travel from place to

place in the vicinity of this area, as well as being connected to the principal royal road from Angkor to Phimai. Presently, there is trace evidence of road networks, some already discovered by the LARP team and some not yet reported on. Through interviewing with local people and conducting ground truthing surveys in the field, six traces of road networks emerged and are described below.

***a. Thnal Roling***

Thnal Roling refers to the royal route passing across Kol connecting Angkor city to Prasat Phimai in present-day Northeast Thailand (see LARP report 2007, 2008). It runs in a direction 345 degrees north and is around 5,000 meters in length and 30 meters in width going across the Kol village (Table 2-4, Map 2-7) (see Im et al. 2007). Today, traces of Thnal Roling are clearly visible, while other parts have been invaded to be rice fields by the local people at Kol village. However, people have abandoned this road and have been using the modern road instead. According to the results of an excavation across sections of this route and Spean Hal, the LARP team revealed that this route was built around the 9<sup>th</sup> or 10<sup>th</sup> century A.D. and was continuously used until the 15<sup>th</sup> century A.D. due to the findings of ceramic fragments in the ground (see Im et al. 2007: 340).

***b. Thnal Popel***

Thnal Popel is located at the northern part of Prasat Kol, measuring 900 meters long and 15 meters wide, connecting the west embankment (Thnal) of Veal Roneam to the earthen wall of Prasat Kol at the northwest corner and Thnal Chas Kol village forward to the Kol existed mound (Table 2-4, Map 2-7). At present, many parts of this road are destroyed and have disappeared.

***c. Thnal Chas Kol village***

Thnal Chas Kol village is laid down at the northern part of Prasat Kol, comprising 520 meters long by 10 meters wide and linking Thnal Popel to the Kol existed mound, Kol village today (Table 2-4, Map 2-7). Some sections of this road have become rice fields and mango plantations, although some parts are still used as a cart track by the people.

***d. Thnal Chas Kok Kmoch***

Thnal Chas Kok Kmoch refers to the old local road which connects Thnal Roling (Angkor-Phimai route) to Prasat Ta Kam, Prasat Kol and further on to the residential space of Kol village by running partly over the southern embankment of Veal Roneam (Table 2-4, Map 2-7). This road measures 175 meters long by 20 meters wide, with a direction 90 degrees north. Today, people still use this old road as a pathway or cart track.

***e. Thnal Tumnub Bat***

Thnal Tumnub Bat ('the road which lost the dike') connects Thnal Roling at the east going straightforward in a direction 90 degrees north to the river. It measures 645 meters long by 25 meters wide and has the waterline on the north of the road. It seems to serve as a dike to retain the water or direct the water to other areas. Interestingly, this road is perhaps important for connecting to the other side of the river running straightforward through Thnal Kambot to the residential space of Bat village (Table 2-4, Map 2-7). People still use this road today.

***f. Thnal Kambot***

Thnal Kambot ('the road which lost the direction') runs continuously straight in an E-W direction from Thnal Tumnub Bat to the living space of Bat village. It measures 650 meters long by 25 meters wide and plays a similar role as Thnal Tumnub Bat, accompanying the waterline on the northern part of the road (Table 2-4, Map 2-7). Today, people still use this road for transporting their goods by motorbike or oxcarts from Bat village to Kol village.

## **2.6 Conclusion**

Regarding the findings set forth above, it can be concluded that Kol has been occupied since the pre-historic period, thousands of years before even the presence of Angkorian settlements. Given a favorable geographical terrain, pre-Angkorian and Angkorian settlements started to colonize and extend over some of the pre-historic sites

or mounds in the vicinity of this area.<sup>21</sup> Furthermore, it is apparent and noteworthy that this area was developed and significant attention paid by the kings at Angkor during the Angkorian period (9<sup>th</sup> to 13<sup>th</sup> century A.D.), evidenced by the presence of a large worship temple built in pink sandstone with great ornamentation architectural art styles and inscriptions, a hospital chapel (*Arogyasala*) re-used the lintel of the pre-Angkor period and/or re-erected over the pre-Angkorian sites, a rest-house chapel (*Dharmasala*) and many other collapsed temples.

In addition, many small and large rectangular water reservoirs, some associated with temples and some separate or possibly established for general purposes, are scattered throughout the territory of Kol. Having the royal road pass this area, it became not only easy for this area to make communication or trade with Angkor city itself, but also linked the area to other areas nearby or perhaps at longer distances. Meanwhile, in order to establish a communication system, a complex local road network establishing links with each other in the vicinity of Kol was created.

Therefore, as mentioned earlier, Kol area, even though located at the outskirts of Angkor, approximately 50 km in distance, received significant influence from the civilization of Angkor under the power of the Angkor court. Moreover, this area served as a crucial ancient agglomerate area along the royal road from Angkor to Phimai, especially during the reign of King Jayavarman VII.

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

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<sup>21</sup> The ancient settlements which had been settled down since the pre-history period and the pre-Angkor period are excluded to study in detail this thesis.

# CHAPTER III

## ANCIENT SETTLEMENTS AT PHNOM RUNG IN BURIRAM, THAILAND

### 3.1 Historical Background

Until the present-day, the Northeast region of Thailand has remained the scene of a complex situation. New significant historical features of the past in this region with regard to archaeological evidence from excavations and other inscription sources have been newly discovered. With the presence of the *Chi* and *Mun* Rivers, it can be assumed that there were at least 250 to 300 ancient prehistoric sites situated along their valleys, both non-moated and moated sites (Williams Hunt 1954, Supajanya and Vallibhotama 1972, Moore 1988). Later, according to Higham and Thosarat (2004), the settlements in this region can be dated to at least some thousand years ago through the evidence from their excavations from 1992 to 2001 under the umbrella of a long term research program entitled “The origins of the civilization of Angkor”. As a result, there were four important prehistoric sites discovered, both non-moated and moated in shape. These sites are the Ban Lum Khao site, falling in the late Neolithic and Bronze period, Non Muang Kao dated to the Iron period, Noen U-Loke dated to the Bronze and Iron periods, and Ban Non Wat dated in the early Neolithic period, all of them located along the lower and upper *Mun* Rivers (Higham and Thosarat 2004).

Dealing with the occupation of numerous ancient settlements around this area, Angkorian kings showed interest in expanding their power and territory in this region during the 6<sup>th</sup> – 7<sup>th</sup> century. Furthermore, as a result of a systematic survey of the Khmer sites in Northeast Thailand by B.P. Groslier in 1977, there were about 250 ancient Khmer



sites covering over existing prehistoric and Dvaravati (Mon) sites;<sup>22</sup> some of which have collapsed and only the basements remaining. Some of these sites were erected together with inscriptions during the reign of King Bhavarman and Citrasena (Mahendravarman) in the 6<sup>th</sup> – 7<sup>th</sup> centuries. Interestingly, several inscriptions refer to Citrasena's military victories beyond the Dangrek Mountain range; for example, inscription K.1106 found at Prasat Phimai (Groslier 1977, Vickery 1998: 75).

After King Jayavarman II proclaimed himself as King of Kings or universal monarch (*Chakravartin*) on the top of Mahendrapura (Kulen Mount today) in 802 A.D., Angkor power started to centralize and expand until it became a great empire covering the mainland of Southeast Asia (Ang, Prenowitz and Thompson 1998). Significant construction of Khmer monuments, together with the engraving of inscriptions, started to grow continuously covering the pre-Angkorian sites or probably over prehistoric sites elsewhere in Northeast Thailand from the various Angkorian kings. For example, Prasat Phimai, Prasat Phnom Wan, Prasat Phnom Rung, and Prasat Muang Tam are large significant worship monuments in Northeast Thailand built between the 9<sup>th</sup> to 13<sup>th</sup> centuries during the Angkor period (see Briggs 1999 [1954], Talbot & Janthed 2001, Jacques & Latfond 2007). In addition, it is apparent that the mega infrastructures and other giant public construction projects during the reign of King Jayavarman VII were continuously developed and expanded throughout the kingdom. For instance, the hospital chapels (*Arogyasalas*) and rest-houses (*Dharmasalas*) that were associated with the royal route were constructed in order to facilitate communication between the Northeast Thailand region and Angkor center (Ishizawa and Tamura 1999; LARP 2007, 2008).

Along the royal road from Angkor to Phimai, Phnom Rung and its surrounding areas is one of the ancient agglomerate cities/areas that had been occupied since the pre-history period and was continuously developed during the pre-Angkor and Angkor periods, as evidenced by the density of ancient settlements. In a radius of 10 km from

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<sup>22</sup> Dvaravati is the name of a Mon civilization established in the lower Chao Phraya River valley in present-day Thailand which flourished from the 6<sup>th</sup> to the 13<sup>th</sup> century.

(Source: retrieved in March 01, 2010 <http://www.britannica.com/EBchecked/topic/174783/Dvaravati>)

Prasat Phnom Rung, there are many ancient sites from pre-historic times (Preeyanuch 2005, LARP 2007, 2008). For example, Ban Ta Ko village site, Ban Bu village site, Ban Talong Kao village site have been classified as pre-historic sites as made evident by the remains of stone tools and the physical characteristics of the sites (both moated and unmoated) (Preeyanuch 2005: 110-113, 258; Per-comm. with Dr. Surat Lertlum 2010). The Ban Bu village site, one of these pre-historic sites, is located within the study zone of this thesis, indicating that the “Phnom Rung” study zone area was occupied since the pre-history period. In addition, some settlements from pre-Angkorian times have also been discovered inside the study zone, with the ruined brick basement of Prasat Phnom Rung and the dates of the 7<sup>th</sup> and 8<sup>th</sup> centuries found in inscription K.384 being significant evidence of this fact (Preeyanuch 2005, H.R.H. Sirindhorn 2004:7).<sup>23</sup> Also, in the vicinity of the Phnom Rung area, two hospital chapels (*Arogyasalas*) and one rest-house chapel (*Dharmasala*) were established during the reign of King Jayavarman VII, with the distance of both hospital chapels, Prasat Kuti Rushi Muang Tam and Prasat Kuti Rushi Nong Baray (Map 3-1), not far from each other. The close proximity of these two hospital chapels appears to be a special case which rarely occurred elsewhere in the territory of the Angkor Empire (Per. comm. with Dr. Surat Lertlum 2010). Moreover, the presence of large water reservoirs, commonly known as “*Baray*”, is also considered significant in establishing this area as an ancient agglomerate cities/areas and indicates a level of social development similar to the urban complex at the Angkor capital.

Today, Phnom Rung is located in Prakorn Chai district, Buriram province, Northeast Thailand, approximately 162 kilometers from Angkor center and 100 kilometers from Phimai (the ancient capital of *Vimayapura*) in Korat (Nakorn Ratchasima). This area is surrounded by numerous ancient settlements. The area boundary chosen for this case study extends from the south to the north direction over the area of Prasat Muang Tam, Prasat(s) Kuti Rushi, Prasat Ban Bu and Prasat Phnom Rung. Observed from a geographical and natural perspective, this area was laid down on the

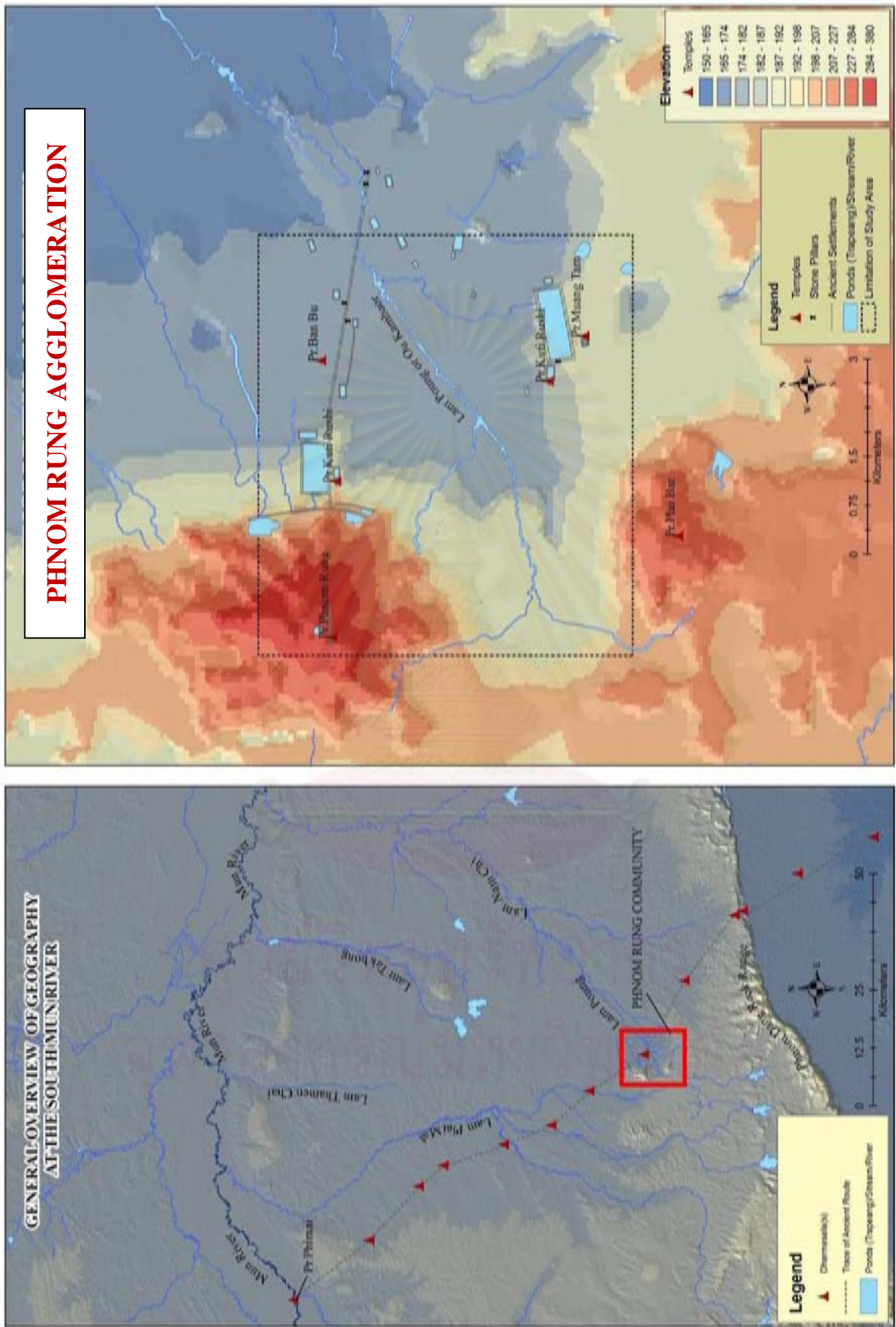
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<sup>23</sup> As with the Kol area, the pre-historic and pre-Angkorian sites scattering over this area have been excluded from detail study.

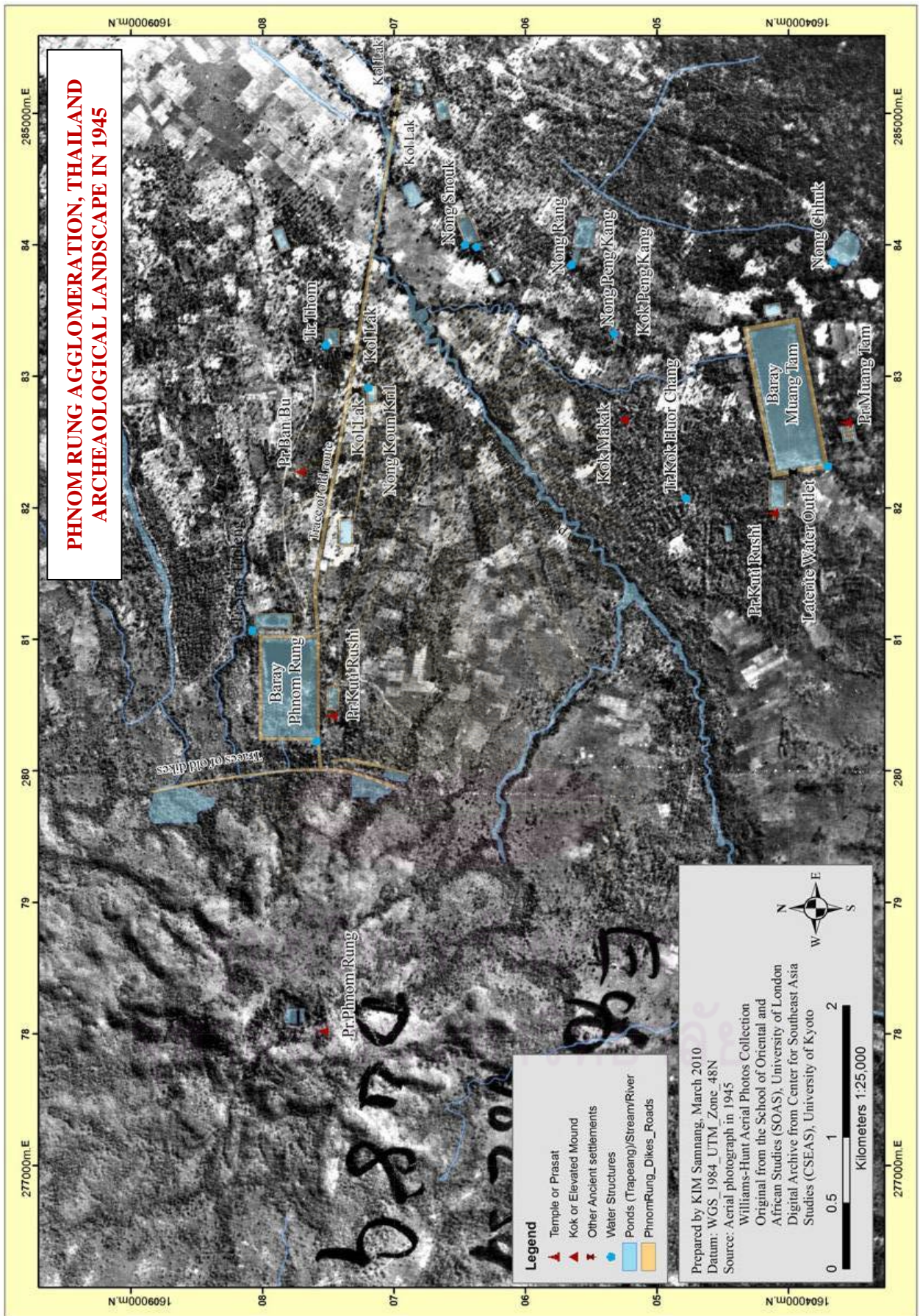
plain in an average 180 to 190 meters elevation; sloping down from the southwest to the northeast direction and receiving its main water source from the two large mountains to the west and the southwest known as Phnom Rung Mount (380 meters high) and Plai Bat Mount (280 meters high). In the center plain of this area, there is a small stream called Klong Pong or Ou Kambaor in Khmer, flowing from the southwest to the northeast connecting to the *Mun* River through the Lam Nam Chi stream. Through satellite imagery, this area provides a clear picture of some ancient settlements surrounding this area; for example, the two huge water reservoirs known as Baray Phnom Rung and Baray Muang Tam. The presence of these baray is, therefore, an indication that this area received some influence from the Angkor center and may have served as a crucial ancient agglomerate area during the Angkorian time (Map 3-1,2,3,4,5,6).



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จุฬาลงกรณ์มหาวิทยาลัย

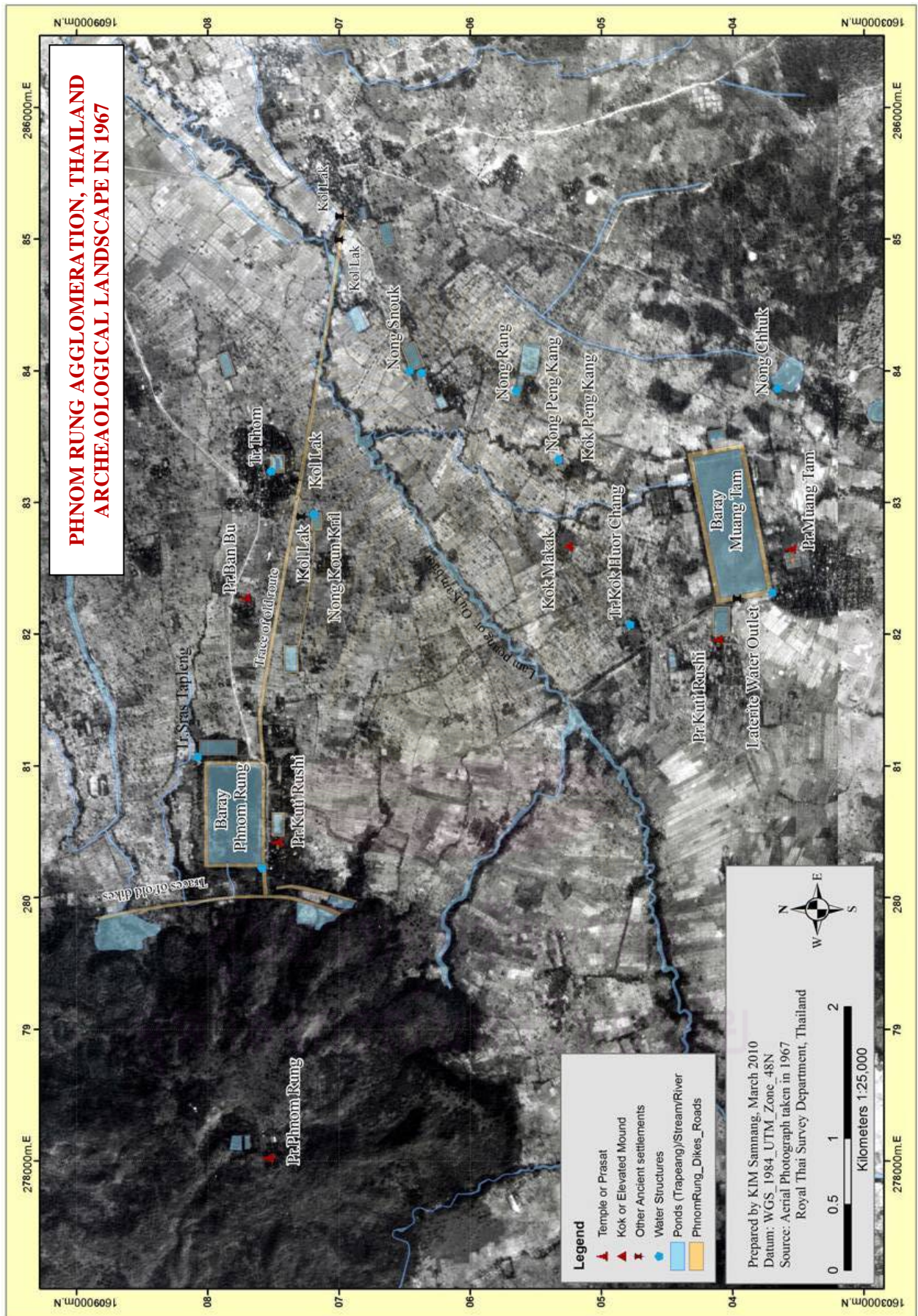


**Map 3- 1: General overview of southern Mun River and Geography of Phnom Rung area**

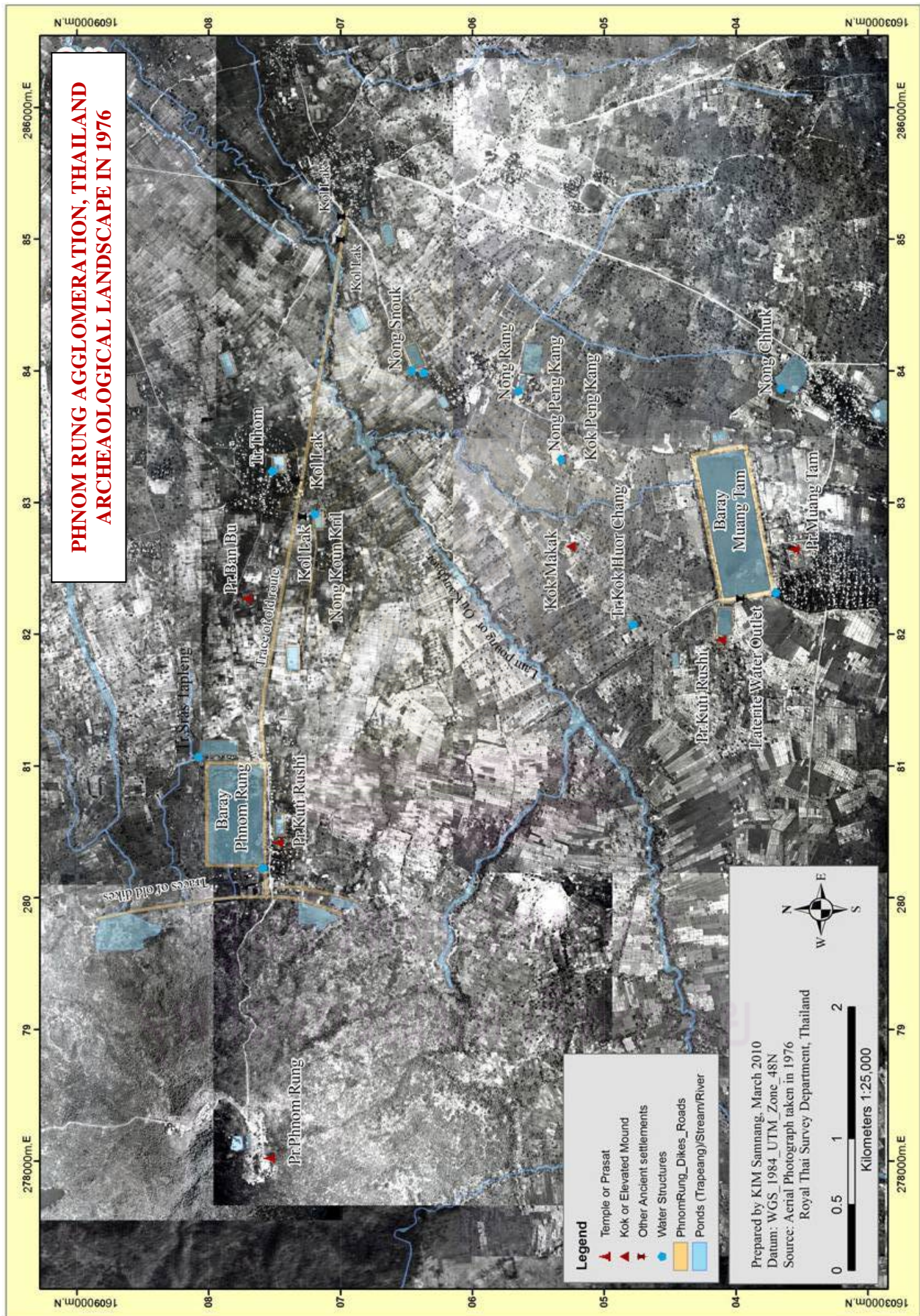


Map 3- 2: General geographical landscape of Phnom Rung area in 1945. (Map in 2010)





Map 3- 4: General geographical landscape of Phnom Rung area in 1967. (Map in 2010)



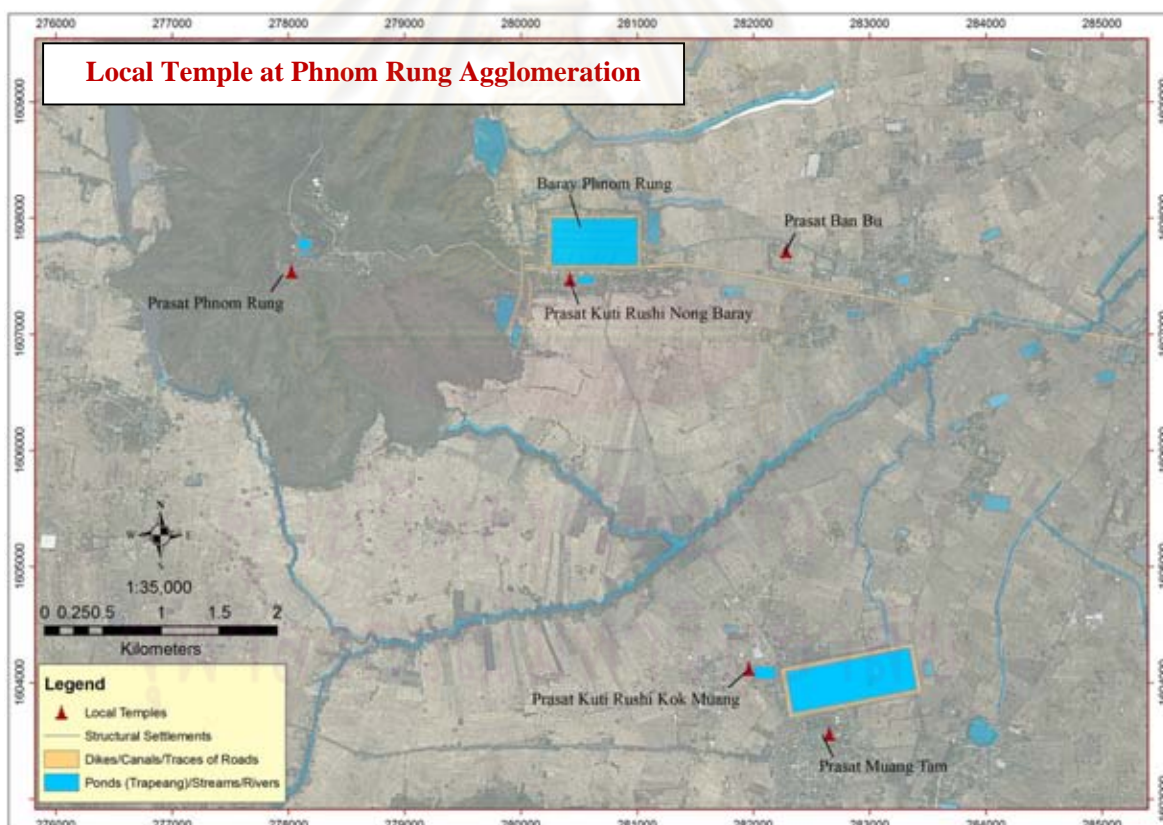
Map 3- 5: General geographical landscape of Phnom Rung area in 1976. (Map in 2010)





### 3.2 Temples and Its Inscriptions, Characteristics, and Stylistics

Similar to Kol in Cambodia, another prosperous community along the royal road from Angkor to Phimai, Phnom Rung's worship monuments, such as the hospital and rest-house chapels and other settlements, were left by the Angkorian kings. In terms of worship places, hospitals and rest-houses, at least five significant temples have been discovered around this vicinity (Map 3-7, Table 3-1). To provide further detail, therefore, the features of these temples, namely the general current condition, structural characteristic, stylistics and related inscriptions, will be described in this section:



Map 3- 7: Local temples at Phnom Rung area, Buriram Province. (Map in 2010)

Site_id	Name En	Name Th	UTM_X	UTM_Y	Length (m)	Width (m)
1	Pr.Pnom Rung	ปราสาทพนมรุ้ง	278009	1607543	60	60
2	Pr.Muang Tam	ปราสาทเมืองต่ำ	282635	1603563	140	115
3	Pr.Kuti Rushi Muang Tam	ปราสาทฤๅษีเมืองต่ำ	281946	1604122	40	26
4	Pr.Kuti Rushi Nong Baray	ปราสาทฤๅษีหนองบาราย	280406	1607476	40	22.5
5	Pr.Ban Bu	ปราสาทบ้านบุ	282262	1607718	17	7.5

**Table 3- 1:** List of local temples in the vicinity of Phnom Rung area.

### 3.2.1 *Prasat Phnom Rung*

A significant sanctuary, among the important Khmer monuments in Northeast Thailand, Prasat Phnom Rung, as seen today, was fully noted in the systematic and descriptive reports of Aymonier and Lajonquière during the early 20<sup>th</sup> century (Aymonier 1999 [1901]: 158-161, Lajonquière 1907:203-214). At that time, Aymonier and Lajonquière seriously studied not only the physical architectural features and art styles, but also the translation of the inscriptions found in and around this temple. Given the light translating by Aymonier, this inscription was later interpreted again in detail and scientifically numbered as N<sup>o</sup> K.384 by Coedès in 1953. Likewise, Lajonquière systematically registered Prasat Phnom Rung as n<sup>o</sup> 401 in his inventory (Lajonquière 1907:203). Of course, without being maintained for hundred of years after the decline of Angkor, the condition of Phnom Rung temple became worse. For example, some parts of the temple collapsed for two main reasons: nature and human. According to Aymonier's study, it was recorded that this temple's "...tower, which today is totally ruined, must have occupied the center of this small edifice..." (Aymonier 1999b [1901]: 151).

Since then, Prasat Phnom Rung has become an interesting subject for research scholars, particularly from Thailand's Fine Arts Department (FAD). By 1971, the restoration of this temple was carefully carried out by the FAD and French expert, Pierre Pichard (Pichard 1974, Hammond 1988). In similar aspects, in order to confirm the data

related to this temple after the restoration, the history of the temple and its surrounding area has been illustrated by many research scholars, such as H.R.H Princess Maha Chakri Sirindhorn in 1978, Sarah Hammond in 1987 and Suriyavuth Sukhasvasti in 1988. More interestingly, the inscriptions found at and around Prasat Phnom Rung were fully translated by H.R.H Princess Sirindhorn in 1978 (H.R.H. Sirindhorn 2004).

Concerning the name, the name Prasat Phnom Rung was derived from the inscriptions found at both this temple and inscriptions found at the temples situated inside and near the Angkor capital. The term “Phnom Rung”, meaning the “great or large mountain” and derived from the Khmer words “*Vnam Ruñ*” and the Sanskrit word “*Prthuśaila*”, can be found in inscriptions: K.134, K.254, K.485, K.1067, K.1068, K.1090, K.384, and Phnom Rung inscription No. 8 (Coedès 1951, 1953, 1954; H.R.H Sirindhorn 2004:7).

#### *a. Current Condition and Structural Characteristic*

For almost all the ancient monuments, both small and large sites in Thailand, the FAD has taken strong efforts to implement a project for safeguarding by preservation and restoration of the heritage sites since 1971. The heritage of Prasat Phnom Rung can be seen today as an example of this preservation and restoration project. Prasat Phnom Rung is located at the top of Phnom Rung hill in Chlaleram Phra Kiat District, Buriram Province, in the Northeastern part of Thailand, about 400 km from Bangkok and some 30 km in the northern part of Phnom Dangrek. From a geographical perspective, Phnom Rung is a mountain temple because it was built atop Phnom Rung hill, a 383 meter high extinct volcano mountain. Its location coordinate is at point X: 278000 and Y: 1607543, about six kilometers to the northeast of Prasat Muang Tam. Today, every sanctuary and small edifice, both inside the interior enclosure wall and outside along the causeway and the rest of the significant associated structures of Prasat Phnom Rung, have been totally restored by the FAD.

In terms of general structural characteristics, Prasat Phnom Rung comprises a laterite and sandstone enclosure wall, accompanying four galleries and measuring, almost

a square, some 60 meters each side, with many brick, laterite and sandstone buildings inside this compound. Inside the temple enclosure, there are several buildings, such as a principal sandstone sanctuary at the center, two small laterite libraries on both sides when entering the main tower, a basement of a brick tower to the northeast, and a small stone sanctuary called, in Thai, “Prang Noi” to the southwest. The main central sanctuary was classified in the Baphuon (1010-1080 cen.) and Angkor Wat (1100-1175 cen.) styles; the small tower or Prang Noi belongs to the Kleang and Baphuon (early 11<sup>th</sup> century) styles; the two edifice libraries seemed to be grouped into the Bayon style of the reign of Jayavarman VII and his successors; and a brick tower, which would have been firstly constructed, can be grouped to the Bakheng period (Jacques & Lafond 2007, Hammond 1988, Suriyavuth 1988). Connecting from the temple enclosure and extending in a long distance to the east, there are two Naga bridges linking to a steep stairway and long causeway flanked by two rows of stone pillars before reaching another cruciform platform that has a small sandstone and laterite building situated at the northern part of this platform, called Kuti Rusi by Lajonquière (1907:213) and today known as the hall of the white elephant (Jacques & Lafond 2007: 216). Moreover, a large water reservoir, a baray, was erected at the foothill of Phnom Rung at the eastern side of Prasat Phnom Rung, measuring 800 meters E-W by 450 meters N-S (Plan 3-1, 2). It is called Nong Baray Phnom Rung by the local people.

A small ruin is surrounded by a rectangular laterite wall measuring 40 meters E-W by 20 meters N-S and a gallery inside. This building was built between 965 and 1010 A.D. and modified during the Bayon period (Jacques & Lafond 2007, Hammond 1988, Suriyavuth 1988).

## ***b. Inscriptions***

### ***b.1. Inscriptions at and around Prasat Phnom Rung***

Until the present-day, 11 inscriptions have been discovered at and around Prasat Phnom Rung and were completely translated by H.R.H. Princess Maha Chakri Sirindhorn

in 1978. Only one of these inscriptions was discovered before the temple was restored by Aymonier in 1901. Later, this inscription was numbered K.384 and fully translated by Coedès (Coedès 1953:207-305). It was only the upper half of the inscription and was composed in the Sanskrit language. Later, during the reconstruction, the lower part of the same inscription was found, together with two other Sanskrit inscriptions. Noticeably, the Angkorian king, Suryavarman II (r.1113-1145 A.D.) and the family names of this King, including two important persons, Narendraditya and his son, Hiranya, were described in inscription K.384 (Coedès 1953, H.R.H. Sirindhorn 2004:1). The remainder of the inscriptions that were more recently discovered were studied and translated by H.R.H. Sirindhorn. Their register numbers are K.1066, K.1067, K.1068, K.1071, K.1072, K.1090, K.1091, K.1120, Phnom Rung inscription No. 8 and No. 11<sup>24</sup> (H.R.H. Sirindhorn 2004). According to H.R.H. Sirindhorn's study and translation, the result of the dating of the temple and its environment can be summarized as follows:

***Khmer Inscriptions:***

- K.1067 was inscribed in AD 968.
- K.1066, K.1071, K.1072, K.1090 dated to about the 10<sup>th</sup>-11<sup>th</sup> centuries.
- K.1068 and K.1091 dated to around the 11<sup>th</sup> -12<sup>th</sup> centuries.

***Sanskrit and Khmer Inscriptions:***

- K.1120, face 1 mentions the name of King Rajendravarman who ascended the throne in AD 944. However, face 2 mentions the name of King Jayavarman who must have been King Jayavarman V (AD 968-1001). Therefore, the inscription must have been engraved in either the reign of King Rajendravarman and perhaps also in the reign of King Jayavarman V, if each face of the inscription was inscribed at different times.

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<sup>24</sup> Phnom Rung 8 and 11 is the inventory number of the Fine Arts Department of Thailand.

- Phnom Rung inscription No. 11 dated to AD 977. The date corresponds to the reign of King Jayavarman V (AD 968-1001).

***Sanskrit Inscriptions:***

- K.384 dated to AD 1150. K.1069 dated to around the 7<sup>th</sup> -8<sup>th</sup> centuries. It is a small fragment and may have been brought from elsewhere for use as construction material. (H.R.H. Sirindhorn 2004:7)

Besides the dating above, the names of Angkorian Kings were described in these inscriptions. These kings names are Rajendravarman (r. 944-968 A.D.) and Jayavarman V (r. 968-1001 A.D.) found in K.1120; Jayavarman VI (r. 1080-1107 A.D.); and Dharanindravarman I (r. 1107-1112 A.D.) and Suryavarman II (1113-1150 A.D.) appearing in K.384 (H.R.H. Sirindhorn 2004: 7-12).

Moreover, the original name of “Phnom Rung” (great and large mountain) was also found in these inscriptions. For instance, the words “*bnam run*”, the Khmer words “*bnam*”, meaning mountain or hill, and “*run*”, meaning great or massive, were found in Khmer inscriptions K.1067, K.1068, and K.1090. At the same time, the Sanskrit name “*sthladri, sthlasaila*” can be seen in Sanskrit inscription K.384 and “*prthvadri*” in Phnom Rung Khmer and Sanskrit inscription No. 8, meaning also the same, a great or massive mountain (H.R.H. Sirindhorn 2004:7).

***b.2. Related inscriptions talking about Prasat Phnom Rung***

Even though Prasat Phnom Rung is located a long distance from the Angkor capital, the Angkorian kings who ruled at the Angkor court, apparently regarded this temple as a significant sacred worshipping place, comparable to Prasat Phimai. That is why we see some inscriptions found in Cambodia that mention the name Prasat Phnom Rung and some donations of land parcels, servants and other significant things from the Angkorian kings to the temple. For example, in Lovek’s bilingual inscription K.136, of

which the Khmer part was translated by Coedès and the Sanskrit part translated by Auguste Barth, mention is made that there were gifts of land parcels and servants from the high ranking officials of King Suryavarman I (r.1002-1050) and Udayadityavarman II (r.1050-1066) during the 11<sup>th</sup> century to Prasat Phnom Rung by writing the original name of Phnom Rung in Khmer words as “*Vnam Rūn*” and Sanskrit as “*Pṛthuśāila*”, that is, “large or massive mountain” (Coedès 1954: 284-286). Likewise, the bilingual inscription K.254 of Trapeang Don Ong, also translated by Aymonier and Coedès, mentioned the donations of high ranking official of King Udayadityavarman II and Suryavarman II (r.1113-1150 A.D.) to Prasat Phnom Rung and other temples. The word “Phnom Rung” was found in the inscription similar to inscription K.136 (Aymonier 1999[1901]:187-189, Coedès 1951:180-192). More interestingly, the inscription of Prasat Phimeanakas K.485, a famous inscription giving a lot of information related to King Jayavarman VII, indicated that there were donations of big Buddha images to both Prasat Phimai (*Vimayapura*) and to Prasat Phnom Rung (Coedès 1942:161-181).

As mentioned above, it can, therefore, be clearly concluded that Prasat Phnom Rung was considered a significant worshipping monument during the 9<sup>th</sup> to 13<sup>th</sup> centuries of the Angkor period.

### *c. Lintel Ornamentation Style*

Many research projects have been undertaken to illustrate the whole of Prasat Phnom Rung’s artistic and architectural styles. These projects focused on lintel styles and the other architectural ornamentation features. According to Hammond and Suriyavuth, the central principal sanctuary exhibits the Baphuon (1010-1080 A.D.) and Angkor Wat (1100-1175 A.D.) styles. All of the artistic decorative lintel indicate a artistic style similar to the style of the central building architectural features. For example, the famous lintel, which was allegedly stolen and brought to the United States in the 1960s and brought back to the original place some decades later, has been classified to the 11<sup>th</sup> and 12<sup>th</sup>



century. This lintel depicts the reclining Vishnu on *Makara*<sup>25</sup> at the east *gopura* entrance (Figure 3-7).

At the same time, there are many lintels depicting episodes of the Ramayana epic in many places on the main tower. These lintels have been categorized in the type IV of Lajonquière (Lajonquière 1907: 205) and in the Angkor Wat style (Stern 1934). For example, a lintel in the corridor to the west of the main sanctuary shows the shooting of *Rāma*<sup>26</sup> and *Lakṣmaṇa*<sup>27</sup> by *Indrajit*<sup>28</sup>, with the same episode being found at Prasat Phimai (Figure 3-8) (Siyonn 2005:131). Thus, it is supposed that this lintel is in the Angkor Wat style of the 12<sup>th</sup> century. Similar to the engraved artistic lintel of Prasat Thipdei and Prasat Phnom Chisor, which was grouped in the Baphuon style (11<sup>th</sup> century), the lintel on the north side of the eastern gallery of Prasat Phnom Rung is also curved using the same characteristics: the god *Indra*<sup>29</sup> seating on a throne and *Kāla* coalescing to two mythical animals that regurgitate garlands to both sides (Figure 3-9) (Polkinghorne 2007: 140).

In addition, the lintels, which were attached to the face and false back entrances of the minor sanctuary at Prasat Noi, can be grouped in the transition between Kleang and Baphuon styles (early 11<sup>th</sup> century), clearly evident through the attributes of the decorative sculptures or bas-reliefs carving on these lintels (Figure 3-10, 11).

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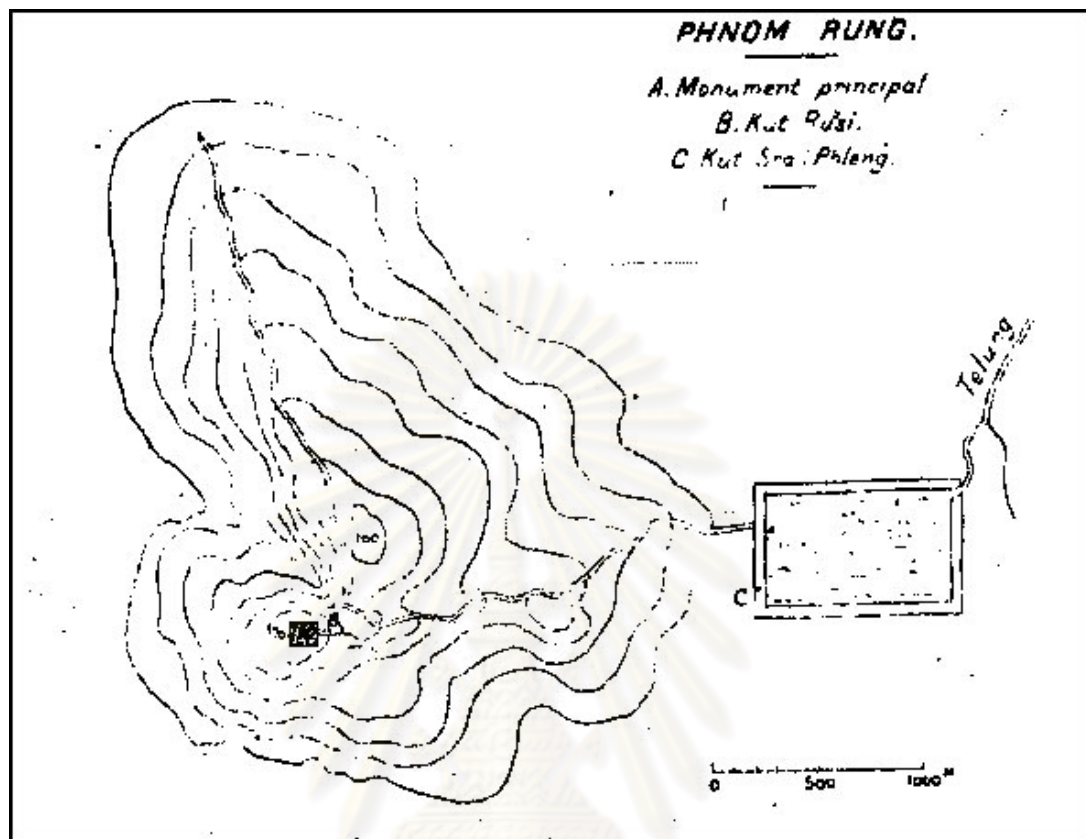
<sup>25</sup> A makara is a mythical animal associated with water. It is depicted as a composite animal, part crocodile, part elephant, and part lion (see Polkinghorne 2007).

<sup>26</sup> Rama is an epic hero and well known for his personal integrity in keeping his father's promise in the Ramayana story (Reamker in Khmer and Ramakien in Thai) (San 2007).

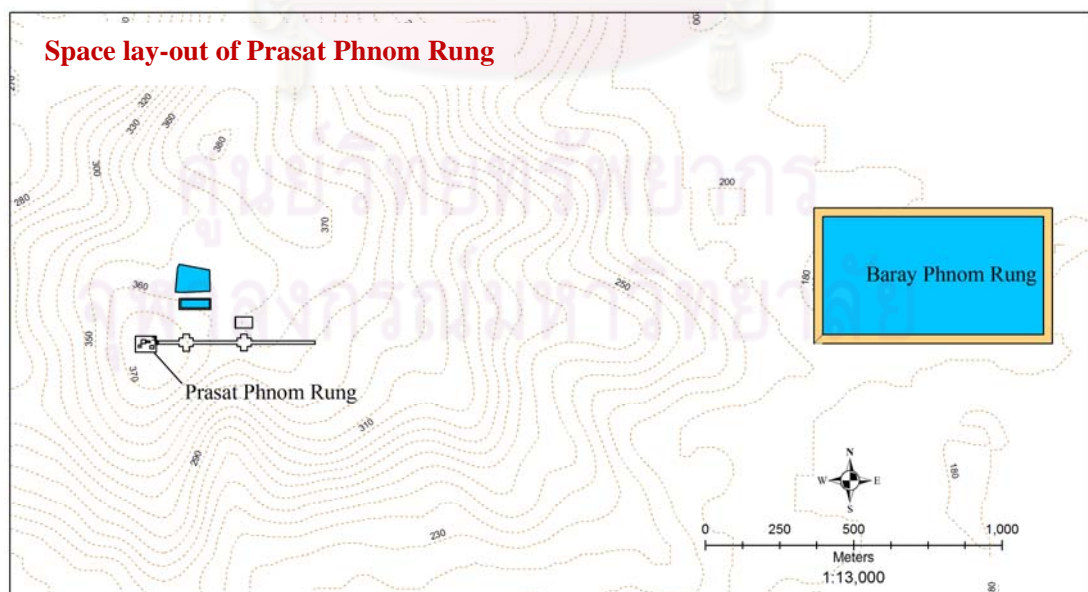
<sup>27</sup> Lakṣmaṇa is the younger brother of Rama, but from a different mother. Lakṣmaṇa is a symbol of self-sacrifice and loyalty (San 2007.).

<sup>28</sup> Indrajit is the beloved son of Ravana and his Queen and is a model of a warrior who has strength and power (San 2007).

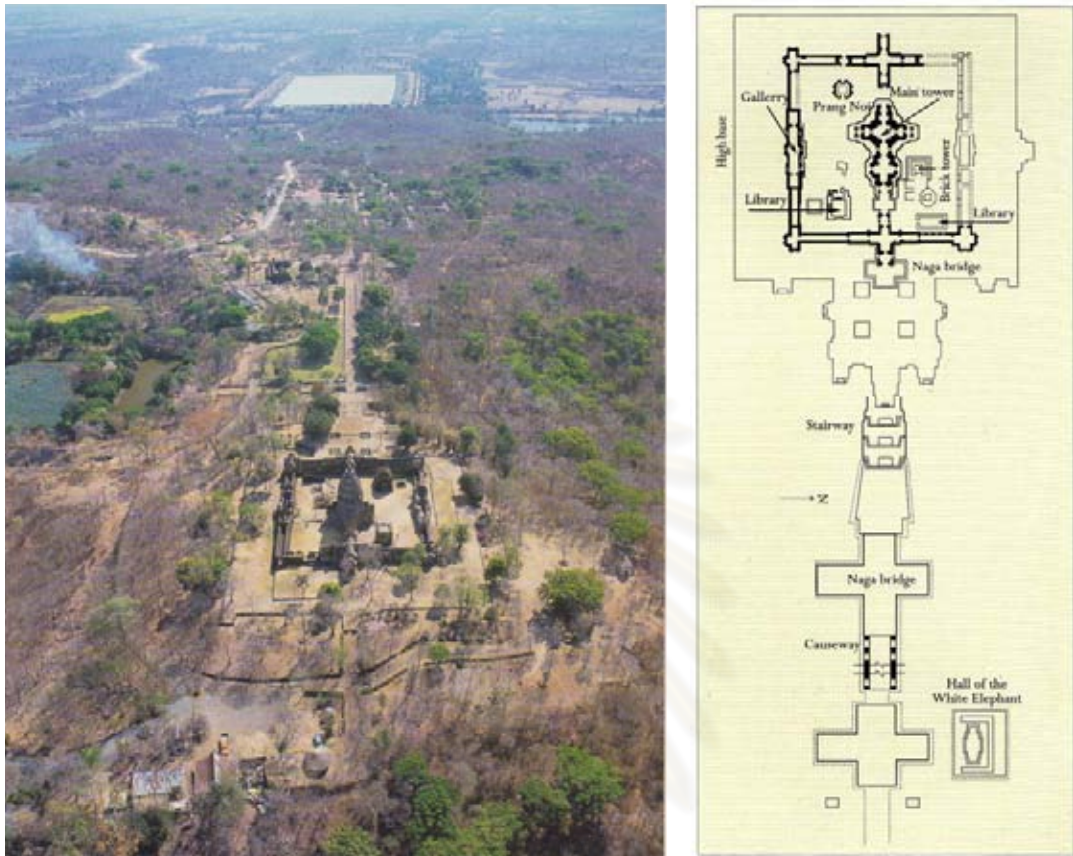
<sup>29</sup> Indra (Devanagari: इंद्र ) is the King of the gods or Devas and Lord of Heaven or Svargaloka in Hindu mythology, and also he is the God of War, Storms, and Rainfall. (Source: retrieved in March 01, 2010 from <http://www.answers.com/topic/indra>)



**Plan 3-1:** General space lay-out of Prasat Phnom Rung and its associated structures in 1907 by Lajonquiere (1907: 204).



**Plan 3-2:** General space lay-out of Prasat Phnom Rung and its associated structures. (plan in 2010)



**Figure 3- 1:** Aerial-view of Prasat Phnom Rung (Piyaphon Kanchana 1999) and its general plan (Jacques & Lafond 2007).



**Figure 3- 2:** Prasat Phnom Rung viewing from the East. (photo in 2009)



**Figure 3- 3:** Ruined brick building, northeast of main sanctuary. (photo in 2009)



**Figure 3- 4:** Small temple or Prasat Noi, southwest of main sanctuary. (photo in 2009)



**Figure 3- 4:** Laterite library edifices, one at the northeast and other at the southeast of main sanctuary. (photo in 2009)



**Figure 3- 5:** Causeway flanked by sandstone pillars and its lining stone pillars. (photo in 2009)



**Figure 3- 6:** Reclining Vishnu lintel (11<sup>th</sup> and 12<sup>th</sup> century). (photo in 2009)



**Figure 3- 7:** Shooting of Rāma and Lakṣmaṇa by Indrajit lintel (11<sup>th</sup> and 12<sup>th</sup> century). (photo in 2009)



**Figure 3- 8:** Indra seating on throne and Kala lintle (11<sup>th</sup> and 12<sup>th</sup> century). (photo in 2009)



**Figure 3- 9:** Mythical Lion in combat lintel (11<sup>th</sup> and 12<sup>th</sup> century). (photo in 2009)



**Figure 3- 10:** Indra seating on throne and Kala lintel (11<sup>th</sup> and 12<sup>th</sup> century) (photo in 2009)

### 3.2.2 *Prasat Muang Tam*

In the early 20<sup>th</sup> century, Aymonier and Lajonquière studied the structural and artistic features, together with the current condition at that time, of Prasat Muang Tam and its water reservoir to the north (Aymonier 1999a [1901]: 156-157, Lajonquière 1907: 215-218). This temple was numbered as No. 403 in the inventory and descriptive book of Lajonquière. In 1993, a report of the FAD revealed the results of the excavation and restoration of the entire building and basement of this temple as seen today (Report of the FAD, 1993). Jacques and Lafond classified this temple into the Baphuon style and supposed it to be dated to the 11<sup>th</sup> century (Jacques and Lafond 2007: 164-167). Later, Preeyanuch wrote a M.A. thesis for Silpakorn University describing the general architectural plan and artistic styles of the temple (Preeyanuch 2005: 40).

Regarding the name Muang Tam, it is not the original name due to the fact that no inscription has been found at or around this temple. Aymonier called this temple Prasat Muang Tam, the same as the local people did. Moreover, Aymonier gave a short expression to the term of “Muang Tam” that: “...*This name of Moeuong Tam is Siamese (Thai), which exceptional to the Khmer expression “Nokor Teap”, “the low city”, or “Banteai Teap, “the low fortress”. Perhaps this place was commonly given this name as the opposed to another inhabited group which could have been the “high city”, close to Phnom Rung?”* (Aymonier 1999b [1901]: 156). Today the name Muang Tam is still used by the local people.

#### **a. *Current Condition and Structural Characteristic***

Prasat Muang Tam is located some four kilometers, 160 degrees north from the northeast corner of Baray Phnom Rung and on the laterite platform in the elevated plain of Kok Muang village, Charake Mak sub-district, Prakorn Chai district, Buriram province. It has coordinate point X: 282635 and Y: 1603563. This temple is composed of enclosure walls, many small towers and ponds inside this fortress, and an associated large water reservoir to the north. The outer enclosure wall is erected from laterite blocks measuring 140 meters E-W by 115 meters N-S interrupting by a *gopura* on each side.

Within this laterite enclosure wall, there are five brick towers facing to the east; two library edifices circled by an inner enclosure; and four water-moats decorated with seven headed Nagas resting on stones bordering the banks of the moat. A large water reservoir, called Tonle Muang Tam by the local people, measures 1100 meters E-W by 450 meters N-S piled up with laterite blocks at the inner dike wall in order to retain the water at a better level and for service to the area. Without being straightforward in a east-west direction, the whole building structures and its water reservoir (Tonle Muang Tam) obey the direction at 80 degrees E-W and 170 degrees N-S (Plan 3-3, 4, 5; Figure 3-12; 15).

From the results of reconstruction and preservation work released by the FAD in 1993, this temple stands in exhibition to the public in better condition, and in some parts perhaps similar to the past in the Angkorian time. However, inscription sources related to the temple history and its original name have yet to be discovered.

#### ***b. Lintel Ornamentation Style***

Fortunately, the remains of artistic decorative lintels and other sculptural objects are the primer key to judge the date of this temple. As a result, various research studies and projects have revealed the artistic characteristic of the lintels of this temple. The FAD and Jacques & Lafond indicated the style to the Kleang and Baphuon groups (late 10<sup>th</sup> century and 11<sup>th</sup> century) (FAD 1993, Jacques & Lafond 2007: 164). In this research study, seven decorative lintels were examined to modify and prove the previous studies. Three of the seven lintels have been assigned to the Kleang group style. They are decorated by *Kala* in the center spewing out garlands in horizontal arcs to both sides; one is attached to a fleuron motif on the upper part of the *Kala* (Figure 3-16) and the other is attached to a seating god *Indra* (perhaps) on a throne atop the *Kala* (Figure 3-17; 18). These lintels are similar to the lintel found at the southeast doorway, eastern face at Prasat Kleang and the central *gopura* lintel, internal western face at Royal Palace at Angkor.



Likewise, the rest of the lintels are all grouped to the Baphuon style because of the appearance of narrative scenes : the scene of *Krishna*<sup>30</sup> subduing the six-headed *Naga Kaliya*<sup>31</sup> (Figure 3-19); *Siva*<sup>32</sup> and *Uma*<sup>33</sup> on *Nandi*<sup>34</sup> above a *Kala* (Figure 3-20); the scene of *Krishna* lifting the mountain to shelter his subjects (Figure 3-21); and lastly the god *Varuna*<sup>35</sup> borne on the three mythical *hamsas*<sup>36</sup> atop a *Kala* (Figure 3-22).

Moreover, during the FAD excavations there were many statues discovered at and around Prasat Muang Tam that indicated the Baphuon style. For example, the FAD found two significant statues, one of a standing woman and the other of a standing man. The artistic decoration features of these two statues were easily identified as being in the Baphuon style (Figure 3-23) (Report FAD 1993:17-19).

As mentioned above, it can be summed up that Prasat Muang Tam probably was erected during the 11<sup>th</sup> century during the reign of King Suryavarman I, Udayadityavarman II or Hashavarman III, after Prasat Phnom Rung was built. As for the general lay-out of this temple comprising a large water reservoir at the northern part and surrounded by an elevated mound, this area was likely inhabit by a large area in the past.

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<sup>30</sup> Krishna is an incarnation of the god Vishnu (Higham 2001: 169)

<sup>31</sup> Naga Kaliya (IAST:Kāliyā, Devanagari: कालिया), in Hindu mythology, is the name of a poisonous Nāga living in the Yamuna River, in Vrindavan (Source: retrieved on March 01, 2010 from <http://en.wikipedia.org/wiki/K%81liy%81>).

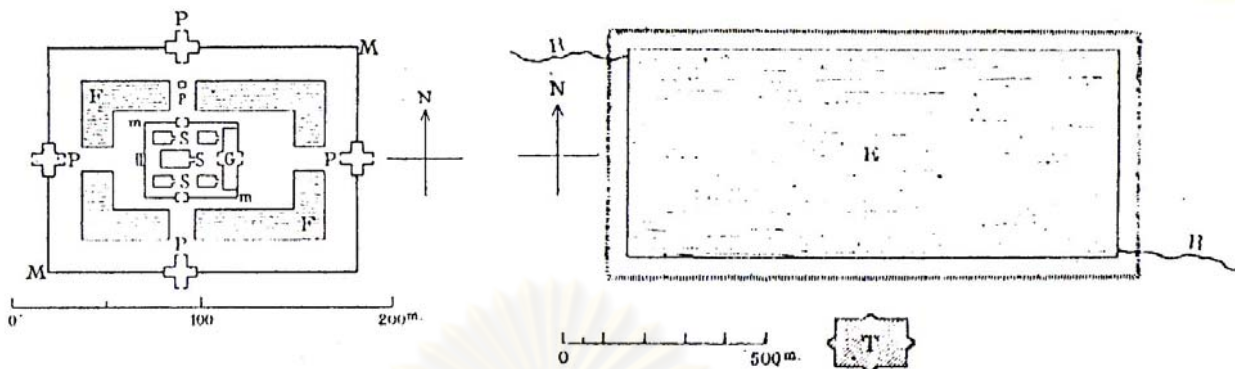
<sup>32</sup> Siva or Shiva is the auspicious, god of ascetics, and of cosmic destruction and creation (Roveda 2001(?): 273).

<sup>33</sup> Uma is the daughter of the Himalayas, Siva's wife (Roveda 2001(?): 274).

<sup>34</sup> Nandi is the sacred bull of Siva (Roveda 2001(?): 273).

<sup>35</sup> Varuna is the sovereign of the waters (Roveda 2001(?): 274)

<sup>36</sup> Hamsa is goose (or swan), vehicle of Brahma (Roveda 2001(?): 275).



Plan 3-3: Plan of Prasat Muang Tam and its Baray or Tonle in 1901. (Aymonier 1999a [1901]: 156-

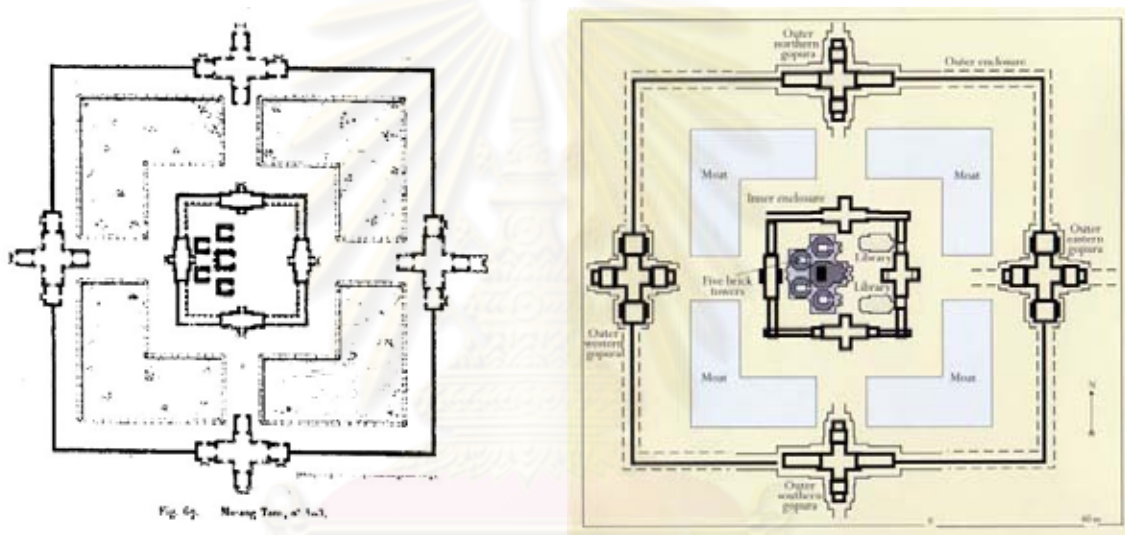
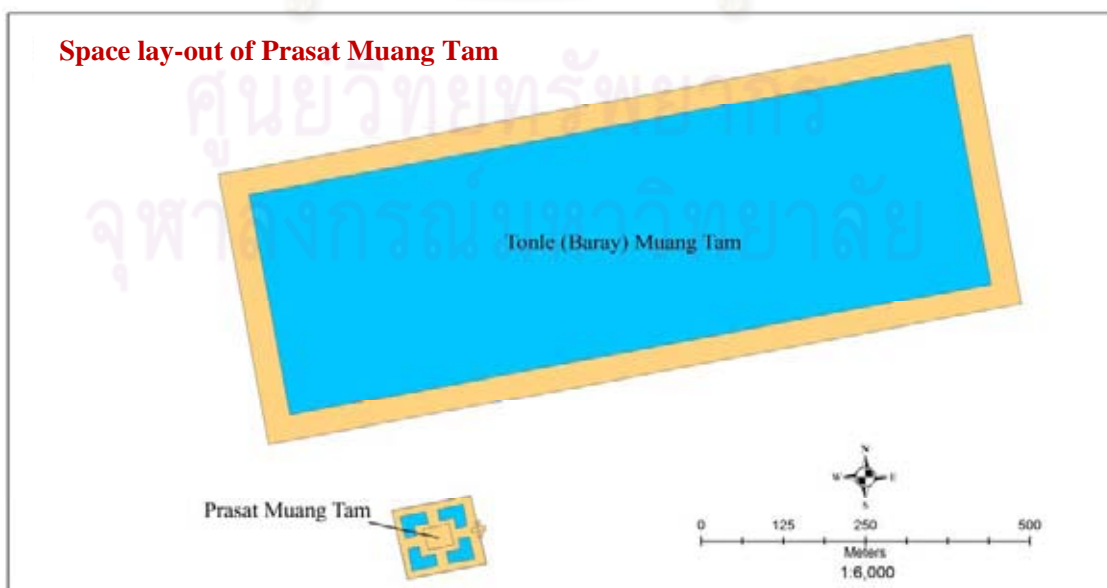


Fig. 65. Muang Tam, n° 1-3.

Plan 3- 4: Plan of Prasat Muang Tam in 1907 (Lajongiere 1907: 216) and in 2007 (Jacques & Lafond 2007: 216).



Plan 3-5: General space lay-out of Prasat Muang Tam and its associated structures. (plan in 2010)



**Figure 3-12:** Aerial view of Prasat Muang Tam (Piyaphon Kanchana 1999)



**Figure 3- 13:** Eastern main gopura of Prasat Muang Tam. (photo in 2009)



**Figure 3-14:** Five-brick towers in the center of Prasat Muang Tam. (photo in 2009)



**Figure 3- 15:** Tonle (Baray) Muang Tam and its laterite block inside bank. (photo in 2009)



**Figure 3- 16:** A motif fleuron above Kala vomiting the garlands. (photo in 2009)



**Figure 3-17:** Seating Indra (?) atop of Kala and garland decoration. (photo in 2009)



**Figure 3-18:** Seating Indra (?) atop of Kala and garland decoration. (photo in 2009)



**Figure 3-19:** Krisna combating with six-heads of Naga Kaliya. (photo in 2009)



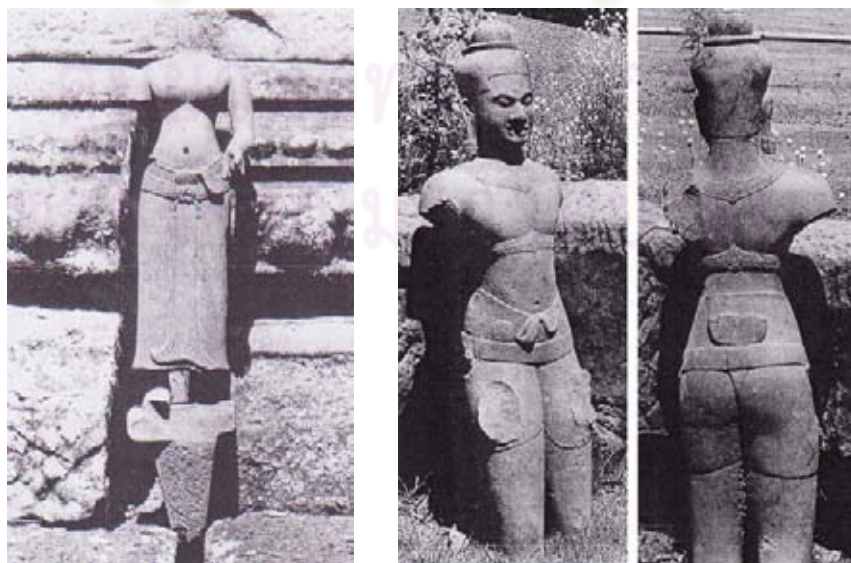
**Figure 3-20:** Siva and Uma on Nandi above a Kala. (photo in 2009)



**Figure 3- 21:** Krishna lifting the mountain for sheltering his lover, atop of Kala. (photo in 2009)



**Figure 3-22:** god Varuna seating on the three hamsas, atop of a Kala. (photo in 2009)



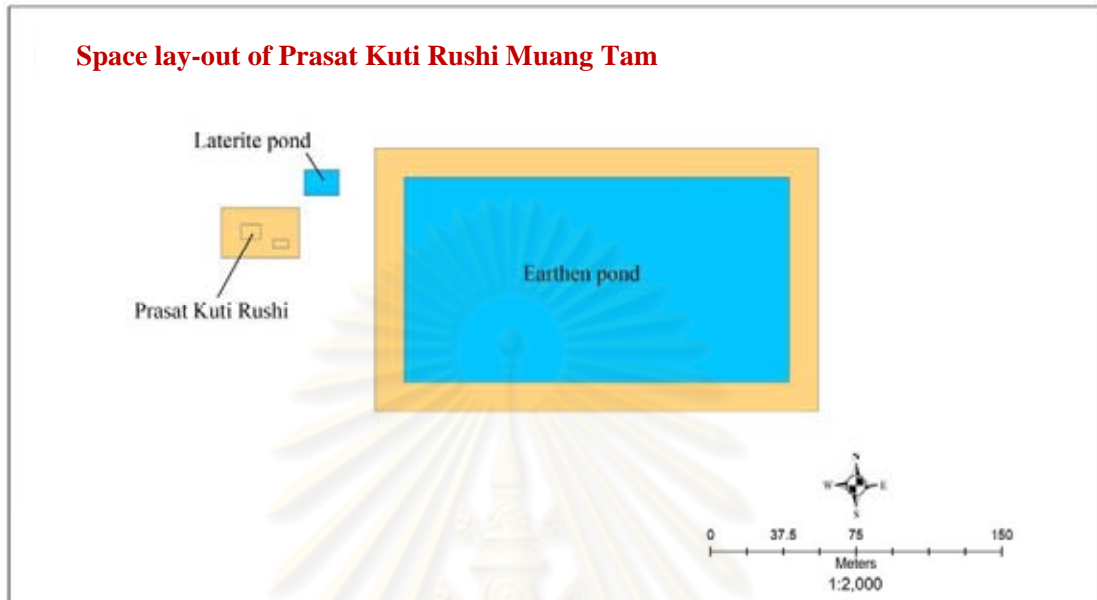
**Figure 3-23:** Lady and man statues, Baphuon Style (FAD 1993).

### **3.2.3 *Prasat Kuti Rushi Muang Tam (Hospital or Arogyasala)***

Similar to the previous temples, Prasat Kuti Rushi was discovered by Lajonquière in the early 20<sup>th</sup> century and later by the FAD in the 1990s. Lajonquière registered this temple as No. 404 in his inventory list, published by the EFEO in 1907 (Lajonquière 1907: 218-219). A few decades later, the FAD started to conduct excavations at and around this temple and its elevated mound (Kok) in order to reconstruct the whole temple (FAD Report 1993: 33-36). In 2005, Preeyanuch briefly described the general characteristics of this temple in her M.A. thesis (Preeyanuch 2005: 41).

Regarding the name, Lajonquière called it Prasat Kuk Ru'si of Muang Tam, probably meaning that mound of Prasat Ru'si, while the FAD team called it Prasat Kuti Rushi, shrine or house of a hermit. Today, the local people at Kok Moug village called it (Kok) Prasat Touch, small temple or shrine, or Prasat Kuti Rushi.

Prasat Kuti Rushi is located on an elevated mound about 650 meters, 315 degrees north from the southwest corner of Tonle Muang Tam in Kok Muang village, Charake Mak sub-district, Prakorn Chai district, Buriram province. This temple is totally built of laterite blocks and has been currently standing in a good condition since the reconstruction was completed by the FAD team in the 1990s. The general structural characteristics and lay-out space of this temple are not different from those of Prasat Ta Kam at Kol (Figure 3-24; 25). It is surrounded by a laterite enclosure wall measuring 40 meters E-W by 26 meters N-S and interrupted by a gopura entrance facing to the east. Inside the enclosure wall there is a main central sanctuary, in laterite block, facing to the east and a small laterite library edifice to the southeast of the main tower. A few meters from the enclosure wall, there is a small laterite pond to the northeast (18 x 13 meters) and a big earthen pond to the east (230 x 135 meters) (Plan 3-6). According to the FAD report of the general plan and lay-out space, this temple is a hospital chapel or Arogyasala of King Jayavarman VII from the 13<sup>th</sup> century.



**Plan 3-6:** General space lay-out of Prasat Kuti Rushi and its associated structures. (plan in 2010)



**Figure 3-24:** Prasat Kuti Rushi viewing from the laterite pond at the Northeast. (photo in 2009)





**Figure 3-25:** Prasat Kuti Rushi viewing from the East and its central tower (left to right).



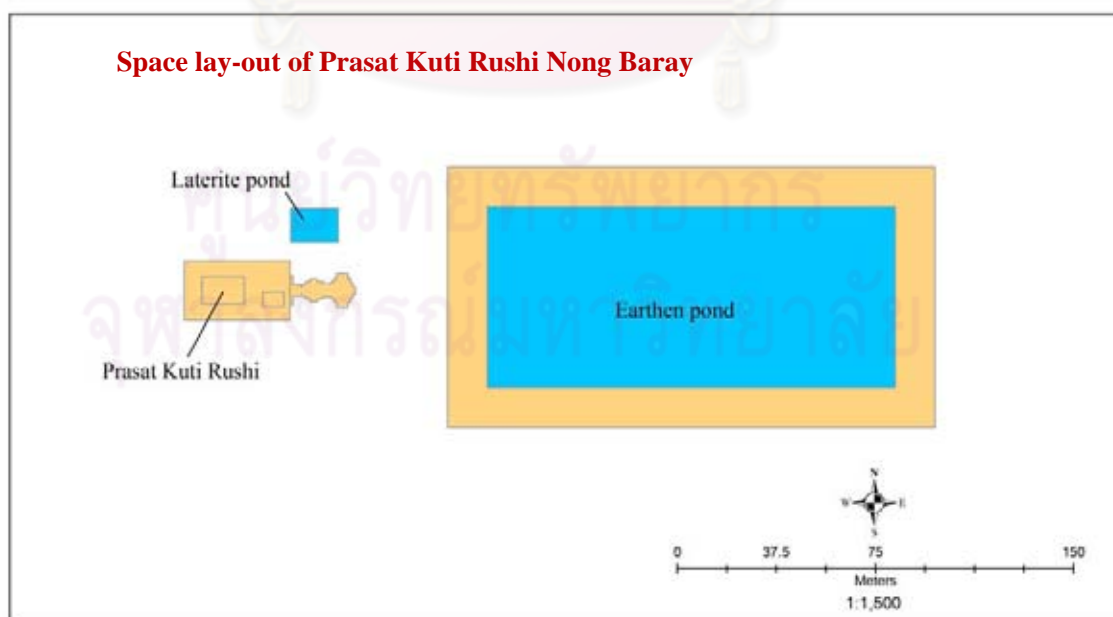
**Figure 3-26:** Laterite library at the northeast and earthen pond at the east (left to right).

#### 3.2.4 *Kuti Rushi-Nong Baray (Hospital or Arogyasala)*

According to the previous studies by Lajonquière in 1907 and later briefly described by Preeyanuch in her thesis, Prasat Kuti Rushi was numbered No. 402 by Lajonquière (Lajonquière 1907: 214-215). At that time, Lajonquière did not call this temple Prasat Kuti Rushi, but he called it Kut Sras Phleng. However, today the local people call this temple “Kuti Rushi”.

Prasat Kuti Rushi is situated at the southern part of Baray Prasat Phnom Rung, some 650 meters, 260 degrees north from the southeast corner of Baray Phnom Rung in Nong Bua Lai village, Charake Mak sub-district, Prakorn Chai district, Buriram province. Its coordinate is X: 280406 and Y: 1607476. Given the excellent restoration and preservation from the FAD, this temple is one of the many temples in Northeast Thailand which has survived in good condition (Figure 3-27; 28). This temple is completely composed of laterite blocks and surrounded by a broken enclosure wall interrupting with a gopura facing to the east. The enclosure wall measures 40 meters E-W by 22.5 meters N-S and connects forward to the east with a laterite platform. Within this wall, there is a main sanctuary in the center and a small, now disappeared, library edifice to the southwest of the main tower. Moreover, there are two rectangular ponds to be found; a small one (18 x 13 meters) near the temple built of laterite blocks to the northeast and another large one (185 x 98 meters), albeit broken, built of earth to the east (Plan 3-7).

Therefore, given the same lay-out design as that of Prasat Kuti Rushi-Kok Muang and Prasat Ta Kam, this indicates that this construction was one of the hospital chapels or Arogyasala built in the 12<sup>th</sup> -13<sup>th</sup> century by King Jayavarman VII.



**Plan 3-7:** General space lay-out of Prasat Kuti Rushi-Nong Baray. (plan in 2010)



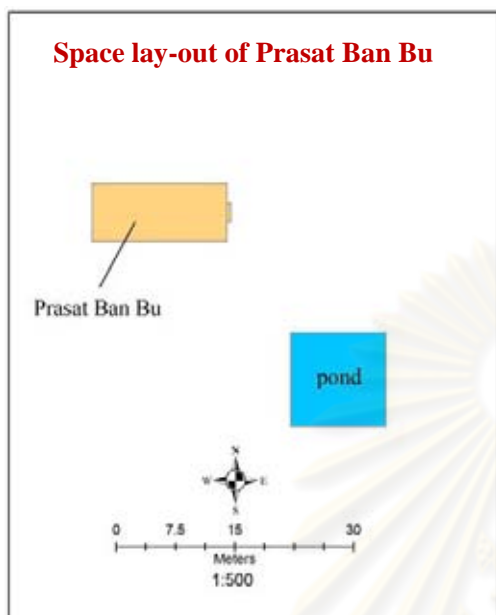
**Figure 3-27:** PrasatKuti Rushi viewing from the eastern laterite pond. (photo in 2009)



**Figure 3-28:** The Eastern gopura connecting the laterite platform and the main sanctuary and its basement of library edifice (left to right). (photo in 2009)

### 3.2.5 *Prasat Ban Bu (Rest-house or Dharmasala)*

Prasat Ban Bu was briefly described in the M.A. Thesis of Preeyanuch (2005: 41) and restored in good condition by the FAD. This temple is a laterite temple located inside



**Plan 3- 8:** General space lay-out of Prasat Ba Bu. (plan in 2010)

the territory of Ban Bu School about 1200 meters, 80 degrees north from the southeast corner of Baray Phnom Rung in Bu village, Charake Mak sub-district, Prakorn Chai district, Buriram province. Its coordinate is X: 282262 and Y: 1607718. Standing without a roof, this temple is comprised of only one sanctuary on a laterite platform measuring 17 meters E-W by 7.5 meters N-S, facing to the east, with four windows facing to the south. To the southwest of the sanctuary, there is a small rectangular pond, but Preeyanuch noted another three ponds placed to the northern part of this sanctuary (Plan 3-8; Figure 3-29)

(Preeyanuch 2005: 41).

As mentioned above, this temple's arts and architectural characteristics and general lay-out space means it has been categorized as a rest-house, fire-house or *Dharmasala* of Jayavarman VII in the 13<sup>th</sup> century (see Finot 1925a, Im 2004: 68-71). Interestingly, this temple is one of the 17 rest-house temples along the royal route from Angkor to Phimai, similar to the one which can be found at Kol, Prasat Achroeng.



**Figure 3-29:** Prasat Ban Bu viewing from the southwest and its small pond at the southeast.(photo in 2009)

### 3.3 Water reservoirs (ponds or *Trapeang*, lakes, and *Baray*)

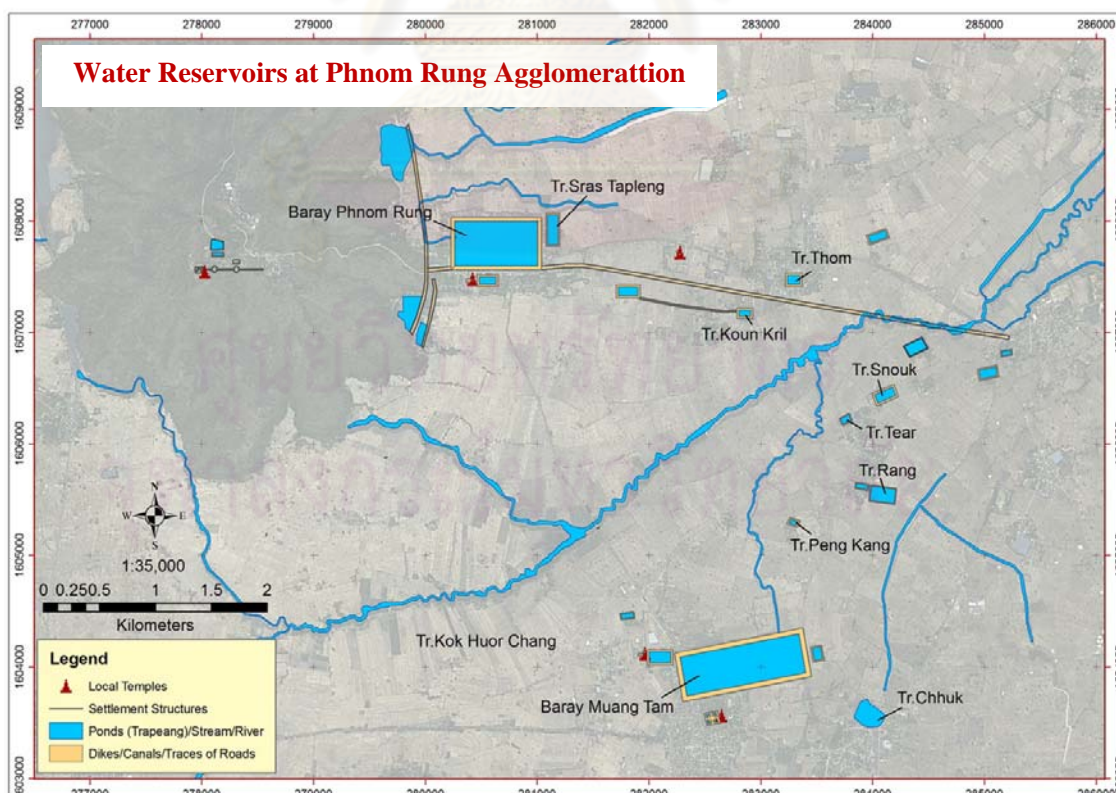
In the vicinity of Phnom Rung, there are nine significant water structures, both man-made and natural, scattered over this area (Table 3-2, Map 3-8). Two huge water reservoirs associating with sacred worship monuments, the well-known Baray Phnom Rung and the Baray Muang Tam, were erected to retain the water flowing down from the mountains nearby in the rainy season in order to serve the local people for agricultural plantations or other usage in their area during the dry season. Baray Phnom Rung was precisely named *Srisurya* in Phnom Rung Inscription No. 8; the short royal name as *Srisurya* probably referred to the full name of *Srisuryavarman* in the 12<sup>th</sup> century (H.R.H. Sirindhorn 2004).

With adaptation and adoption of the Angkor urban planning, many water reservoirs dug in a rectangular shape and surrounded by a high and wide dike or bank made of laterite blocks and compact soil were widespread over this area. Generally observing, the dikes or banks of the reservoirs play a dual role: retaining the water and providing connecting roads from place to place in the area. For instance, the dikes of Tonle Muang Tam, Baray Phnom Rung, Nong (pond) Kuti Rushi Muang Tam, Trapeang Snouk and Nong Trapeang Thom have remained in use as road networks connecting to each other and retaining water the whole year. Unlike, and as opposed to those in the geographic environs of the Angkor plain, some of the water reservoirs were dug or constructed according to the natural geography rather than following an east – west or north – south direction.

However, in order to have a better life, the people were required either to set up their settlements near the big or small water reservoirs (swamps and ponds) where there was sufficient water, or to cooperate in digging reservoirs, on a small or large scale, for their communal consumptions, as seen in Phnom Rung.

Site_id	Name En	Name Th	UTM_X	UTM_Y	Length (m)	Width (m)	Bank's width	Surface (m2)
1	Baray Phnom Rung	บารายพนมรุง	280228	1607592	800	450	30	303236
2	Baray Muang Tam	บารายเมืองต่ำ	282319	1603702	1100	450	30	390614
3	Nong Chhuk	หนองชุก	283868	1603662	250	180	0	44392
4	Nong Koun Kril	หนองโกนกรียล	282914	1607198	110	56	15	6173
5	Nong Peng Kang	หนองเปงกอง	283330	1605327	70	40	10	2800
6	Nong Rang	หนองเรียง	283850	1605655	110	40	5	4361
7	Nong Snouk	หนองสโนก	284003	1606464	180	90	15	15594
8	Nong Sras Tapleng	หนองสระตา เพลิง	281071	1608080	170	100	10	27360
9	Nong Thom	หนองทม	283240	1607522	115	85	15	9807

**Table 3- 2:** List of water structures at Phnom Rung, Buriram Province.



**Map 3- 8:** General space lay-out of water reservoirs at Phnom Rung area. (map in 2010)

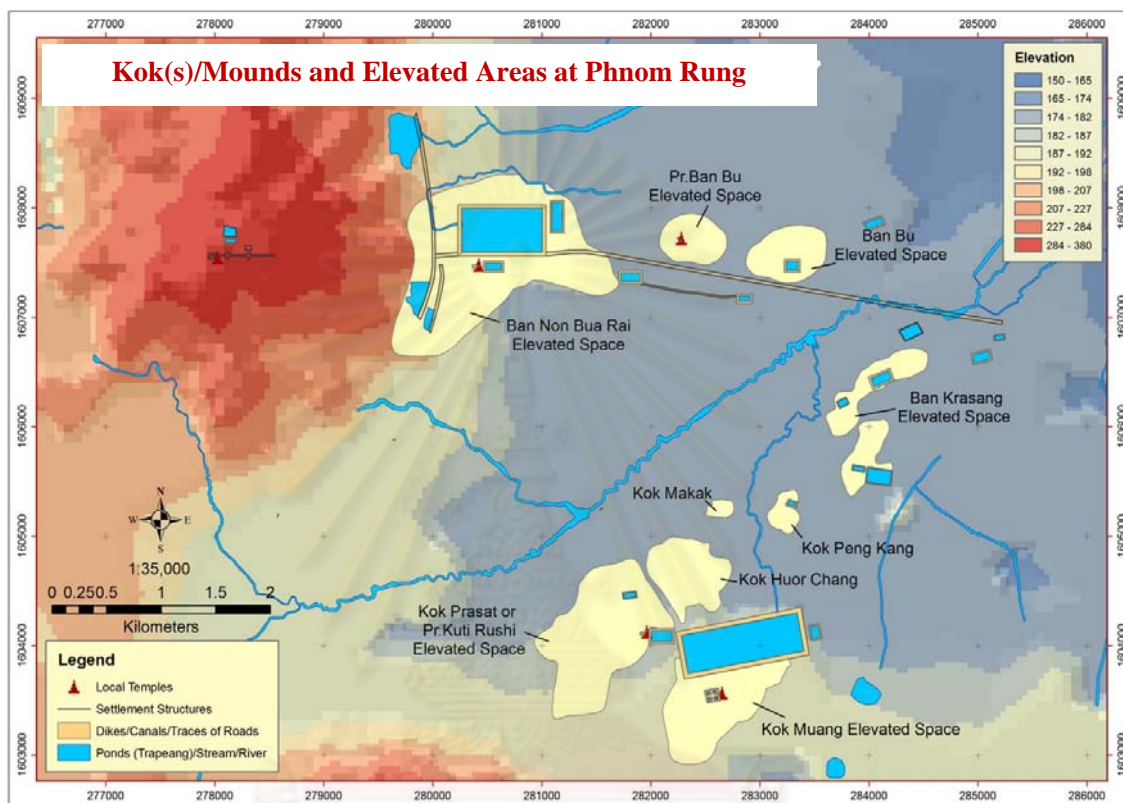
### 3.4 *Kok(s)* or Elevated Areas/Mounds

At least nine *Kok(s)* or elevated mounds were established in the vicinity of Phnom Rung. Based on the evidence found, such as ceramic fragments and other ancient objects, it is assumed that most of these mounds were used as human residential places in the past (Map 3-9). Archaeological excavations of the *Kok Muang* elevated space, the *Kok Prasat Kuti Rushi* elevated space and *Kok Makak* were carried out at the same time during the restoration and reconstruction of *Prasat Muang Tam* by the FAD in 1993 (FAD 1993: 31-53). At the *Kok Muang* elevated space, three sites were excavated in order to study the history of ancient habitation. In addition, one excavation pit was selected to study the history of *Kok Prasat Kuti Rushi* to the southwest of *Prasat Kuti Rushi*. As a result, the FAD team reported that:

- At the *Kok Prasat Kuti Rushi Muang Tam*, a humans started to occupy and populate this area since at least the 11<sup>th</sup> or 12<sup>th</sup> century and remained continuously until the reign of King Jayavarman VII in the 13<sup>th</sup> century, evident by the presence of the hospital monument on this mound, as well as ceramics and fragments from the excavation pits.
- At the *Kok Muang*, in accordance with the discovery of archaeological objects, people started to settle down at and around this area during the same time as *Kok Prasat Kuti Rushi* between the 11<sup>th</sup> to 12<sup>th</sup> centuries.

According to an interview with local people, *Kok Makak* was also excavated by the FAD team. Interestingly, *Kok Ban Bu* has recently been identified as a pre-historic site by the FAD (Per. comm. with Dr. Surat Lertlum 2010). Today we can still see some ceramic fragments spread over this elevated mound. Similar to the previous mounds, many ceramic fragments and other archaeological objects were found around these elevated mounds, such as *Kok Peng Kang*, *Kok Ban Krasang*, and *Kok Bua Rai*. From general observation, these ceramic fragments are similar to the ceramic fragments found at *Kok Muang* and *Kok Prasat Kuti Rushi Muang Tam*. Therefore, it can be concluded that these elevated mounds or spaces were probably settled and developed at about the

same time between the 11<sup>th</sup> to 13<sup>th</sup> century when the imperial state of Angkor was strongly powered and centralized.



Map 3- 9: Kok(s) or Elevated mounds at Phnom Rung area. (map in 2010)



Figure 3-30: Archaeological object remains at Ban Nong Bua Rai elevated space. (photo in 2009)





**Figure 3-31:** Archaeological object remains at Kok Muang elevated space. (photo in 2009)



**Figure 3- 32:** Archaeological object remains at Ban Bu and other elevated spaces. (photo in 2009)

### **3.5 Other Man-made Structures**

Unfortunately, rapid development of the agricultural plantation fields, together with modern technology, has caused many traces of archaeological settlements, including old road networks and other small ancient features, to be destroyed and moved to other places. At Phnom Rung, it is difficult to identify all the old traces of settlements without technical support because of the expansion of agricultural land that has occurred in this region. However, through the use of new technology in the geography field (GIS and Remote Sensing), some disappeared traces of settlement have been discovered (see LARP 2007, 2008, Lertlum & Mamoru 2009).

In a similar way, in this study, some traces of road networks in the Phnom Rung area were identified, together with ground truthing, utilizing GIS and Remote Sensing methods in order to discover these traces. As a result, some canals or dikes and road traces have been discovered at this area. These traces are discussed as follows:

#### ***3.5.1 Traces of local roads and Dikes or Canals***

##### ***a. Trace of old road at the eastern part of Phnom Rung***

The trace of an old road can be seen extending over four villages – Ban Nong Bua Rai, Ban Ban Kok Klor, Ban Bu and Ban Chorake Mak – in Chorake Mak sub-district, Prakorn Chai district, Buriram province. This trace road can be seen to be continuously connected from the southern dike of Baray Phnom Rung extending eastward until a lost trace at the Chorake Mak elevated space village, passing by Prasat Ban Bu (*Dharmasala*), and the Ban Bu elevated space to the north; and a short trace of a minor old road linking from pond to pond in Ban Kok Klor to the south with some rectangular ponds (Nong or Trapeang) and stone pillars (Kol Lak) along both side of this trace. This old road measures some four kilometers long and 30 meters wide. Today some parts of this trace road have been covered with rice fields. According to Dr. Surat Lertlum, head of Living Angkor Project, this trace is probably a part of the Angkor to Phimai route due

to the presence of the rest-house temple and its connection to the main sacred place of Prasat Phnom Rung (Per.commu. 2009). Interestingly, this trace was also sketched into a map made by Sunchet Vonkamvichai in 1987 (Vonamvichai 1987: 52). Utilizing and analyzing the trace road by GIS and Remote Sensing techniques, together with a series of aerial photographs and Satellite images, the results shows that the body of the road trace appeared clearly in 1945, but some years later started disappearing, becoming rice fields in some parts (see inside the dot-line area of Map 3-9, 10).

***b. Traces of dikes in the foot hill of Phnom Rung***

There are traces of dikes, extended from the north to the south direction on the eastern foot hill of Phnom Rung, located in Nong Bua Rai village, Chorake Mak sub-district, Prakorn Chai district, Buriram Province. There are two traces of dikes: a short one located to the southwest of Baray Phnom Rung, measuring some 650 meters long and some 25 meters wide; and a long one located to the west of the same Baray, measuring about two kilometers long and some 30 meters wide. These dikes probably played a role in collecting water from Phnom Rung hill and directing this water into Baray Phnom Rung. In addition to fulfilling the water needs of the reservoir, these dikes also prevented the village on the eastern side from flooding and distributed the water to other tanks or small streams or creeks on the downward slope. These dikes were revealed on the old sketched map of 1917 (Lertlum 2003) and, in 1987, were displayed again on the map of Sunchet Vonkamvichai (Vonamvichai 1987: 52). Today, these dikes still function as in the past (Map 3-12).

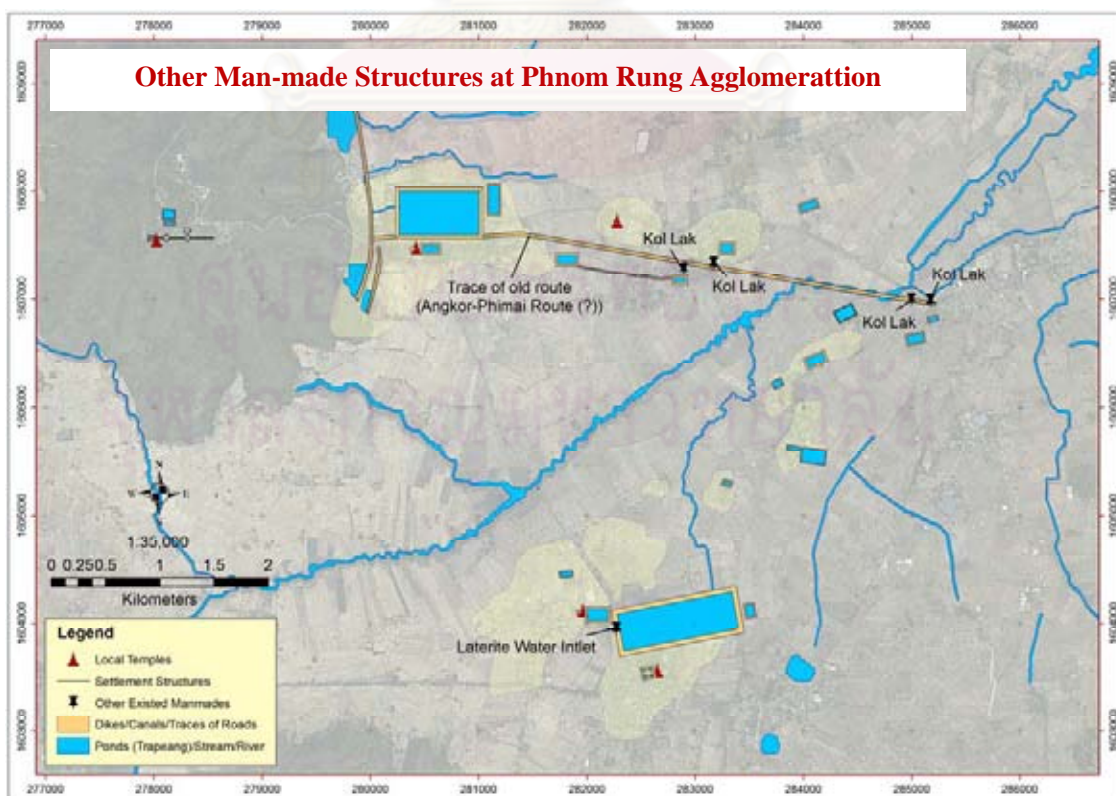
**3.5.2 *Other Archaeological artifacts***

According to the LARP reports (2007-2008) and Vonamvichai (1987), there are many sandstone pillars which were discovered around the Phnom Rung region, particularly at Kratai Tai village. Some were sculptured with Buddhist images and some

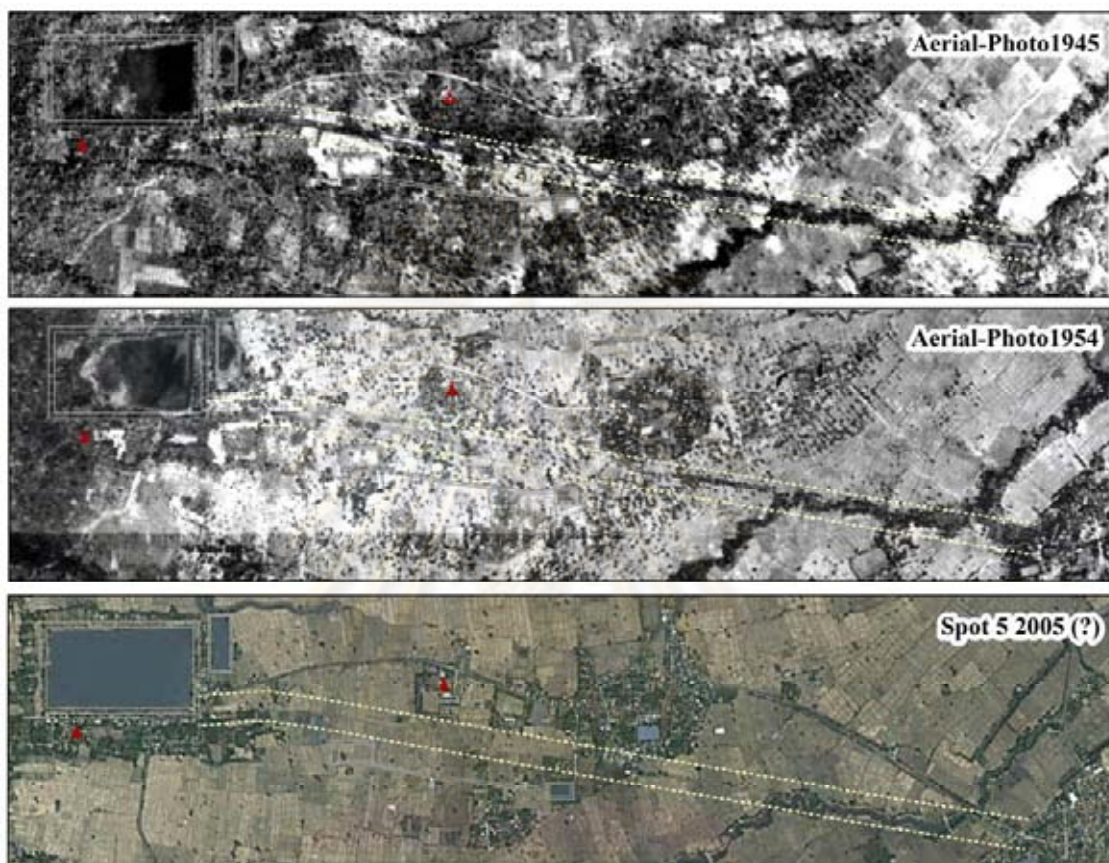
were not decorated. Some pillars are similar to the stone pillars that flank the Phnom Rung causeway.

In this study, four stone pillars laid down in an alignment line along the trace of the old road forwarding to Baray Phnom Rung were examined. Only one is decorated with a seated *rishi* found in Ban Bu village; the others, located in Ban Kok Klar and Ban Charake Mak villages, are not decorated (Map 3-11).

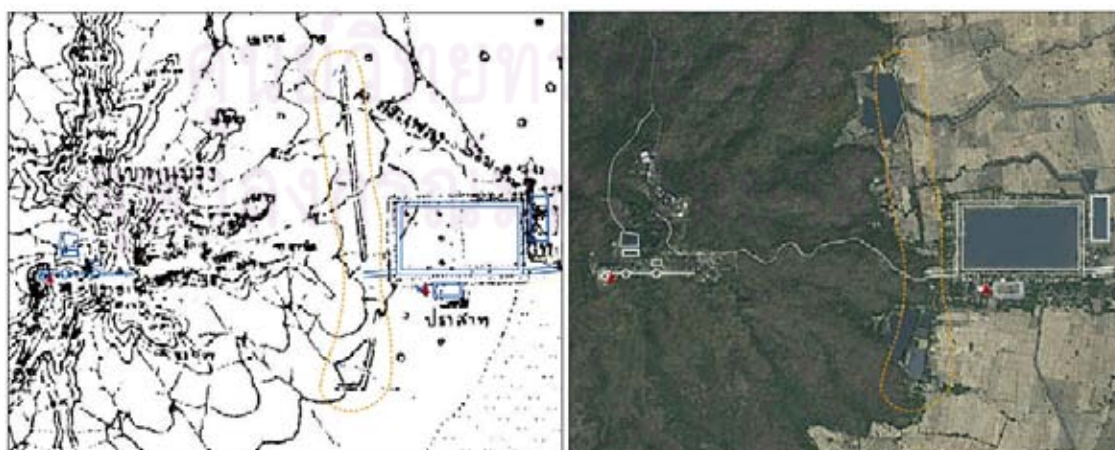
In addition, near Tonle Muang Tam at Kok Muang village, a laterite water inlet of Tonle Muang Tam to the west was found. This water inlet directs the water from Mount Plai Bat to the southwest into Muang Tam reservoir. It is located at the coordinate point X: 283154 and Y: 1604328 in Kok Muang village, Chorake Mak sub-district, Prakorn Chai district, Buriram Province. This inlet is completely built of laterite blocks on two platforms on both sides of the channel, measuring 30 meters in length by 20 meters in width, each side 15 meters in width of the channel inlet. Today, some parts of this inlet have broken its channel and have been replaced by cement pipes. Over this channel inlet, there is a broken and unusable wooden bridge remaining (Figure 3-34).



Map 3- 10: Traces of old roads in the eastern part of Baray Phnom Rung. (map in 2010)



**Map 3- 11:** Traces of old roads in the eastern part of Baray Phnom Rung. (Map in 2010)



**Map 3- 12:** Traces of old dikes in the eastern part of foot hill of Phnom Rung comparing the old map in 1917 on the left and new SPOT 5 satellite image in 2007(?) from Google Earth in 2010.



**Figure 3- 33:** Sandstone post/stake in the vicinity of Phnom Rung. (photo in 2009)



**Figure 3- 34:** Laterite inlet channel of Muang Tam's reservoir (Tonle or Baray). (photo in 2009)

### 3.6 Conclusion

Given the numerous and significant archaeological remains in the vicinity of Phnom Rung area, it can be assumed that Phnom Rung started to be settled from the pre-historic time and continuously occupied and disturbed by the pre-Angkorian sites during the 7<sup>th</sup> -8<sup>th</sup> centuries. More interestingly, this area was increasingly populated during the Angkorian time in the 9<sup>th</sup> -13<sup>th</sup> centuries. For example, there were many monumental sites scattering over this area most of them had been indicated the achievements during the reign of King Jayavarman VII such hospital and rest-house chapels . In addition, existing significant sacred worship places were also illustrated the remaining achievements of the Angkorian kings who were interested in developing this area. At the same time, the ornamented artistic styles and other architectural features make it clear that the Angkorian kings visited and paid significant attention to this area by probably sending workshop teams from the Angkor capital to control or/and erect these monuments. In addition, from the inscription sources, a better understanding about this area's story can be seen. For instance, almost all the 11 stone inscriptions found at and around this area and three other stone inscriptions found near the Angkor capital mention dates from the 7<sup>th</sup> to 13<sup>th</sup> century, the names of Angkorian kings and the king's donations of important articles and people to the temples. Another important factor, because this area was probably located close to the royal road from Angkor to Phimai and comprised a large ancient agglomerate cities/areas, two important hospitals chapels (*Arogyasalas*) and one rest-house chapel (*Dharmasala*) were built in this vicinity during the reign of the Angkorian king, Jayavarman VII.

Furthermore, sacred monuments, many rectangular water reservoirs, dikes and roads were established in order to facilitate the people in this area. In addition to the rectangular water structures – Baray Phnom Rung and Baray Muang Tam, it is likely that this area was strongly influenced by the public water management way from the Angkor during that time. Furthermore, on the Kok(s), or elevated mounds and spaces, the results of the excavation of ceramic fragments and other archaeological objects revealed that these places had human occupation during the Angkor period as well.

Therefore, Phnom Rung could have been a crowded ancient agglomerate area during the Angkor period from 9<sup>th</sup> to 13<sup>th</sup> centuries and may have been a crucial settlement along the principal royal route from Angkor to Phimai. Moreover, this area received strong influence from the Angkor center and got significant attention from the Angkorian kings, even though this area was located a long distance from the capital.



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย



## CHAPTER IV

### COMPARISON BETWEEN THE ANCIENT SETTLEMENTS OF KOL AND PHNOM RUNG

In the previous sections, the ancient settlements of the worship temples; the inscriptions and characteristic features; the water structures; *Kok(s)* or elevated mounds; and other man-made structures at Kol and Phnom Rung were extensively examined. In this chapter, these features will be analyzed and a comparison of these two settlements will be made in order to reflect the objectives and hypothesis of this research.

#### **4.1 Utilization of GIS and Remote Sensing for this research**

As stated in the research methodology and data analysis sections of Chapter I, the techniques of GIS and Remote Sensing are considered important tools to gather and analyze data for this research. In order to make a comparison of these two ancient settlements, the following will explain how buffer rings were applied and set up in order to analyze the settlements through the archaeological data collected from the surveys.

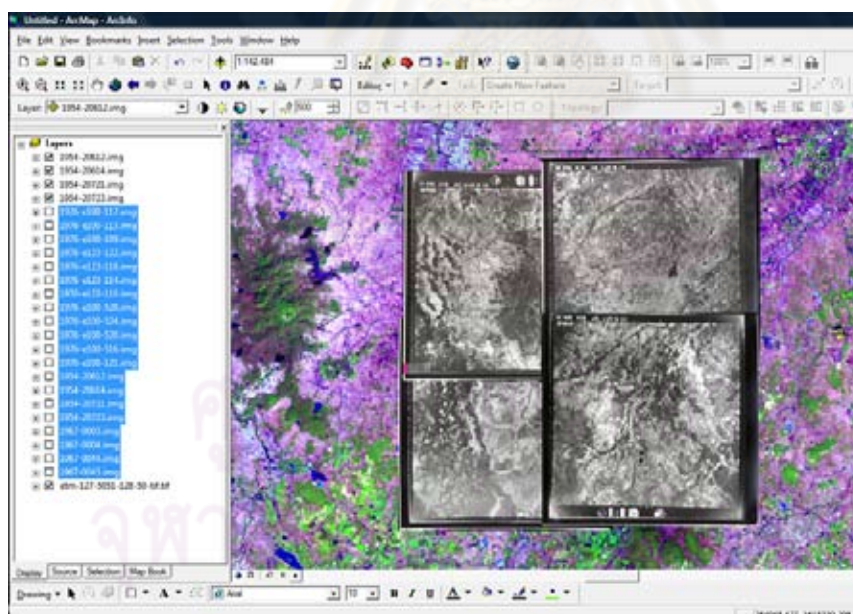
##### ***4.1.1 Process of Development of Geo-spatial Data***

In this research study, a series of geo-spatial data were collected and systematically developed into a one map projection system, known as World Geographic System 1984 (WGS 1984)<sup>37</sup>, from a series of vector and raster topographic data, a series

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<sup>37</sup> The World Geodetic System (WGS) 1984 is a standard for use in cartography, geodesy, and navigation. It comprises a standard coordinate frame for the Earth, a standard spheroidal reference surface (the datum or reference ellipsoid) for raw altitude data, and a gravitational equipotential surface (the geoid) that defines the nominal sea level. ([http://en.wikipedia.org/wiki/World\\_Geodetic\\_System](http://en.wikipedia.org/wiki/World_Geodetic_System))

of aerial photographs, satellite images, and elevation data (ASTER DEM<sup>38</sup> and SRTM<sup>39</sup>). Among this geo-spatial data, the old maps and aerial photographs recorded and taken fifty to hundred years ago are the most valuable information in order to illustrate precisely the development of the shape of settlements in the past. For instance, in this study, a series of aerial photographs taken in 1945, 1954, 1957, 1967, 1976, and 2004 were geo-rectified and generated into a map system, which allowed more precise understanding of the lay-out characteristic of sites and the measurement of the real size of objects. This ortho-rectification is made possible using the existing satellite images and vector topography data (Figure 4-1). Using the same views, after all geo-spatial data were geo-rectified and transformed into the same system and projection, a comparison of the ancient settlements in the vicinity of the study area could be discussed and analyzed through integration with the archaeological survey database in order to find out the similarities and differences.



**Figure 4-1:** Sample of the ortho-rectification of aerial photographs taken in 1954.

<sup>38</sup> ASTER DEM: (Advanced Spaceborne Thermal Emission and Reflection Radiometer Digital Elevation Model). It can be used to the slope terrain or the watershed.

<sup>39</sup> SRTM (Shuttle Radar Topographic Mission) is digital elevation data produced by NASA originally. URL:<http://srtm.csi.cgiar.org/Index.asp> (Lertlum & Mamoru 2009: 547).

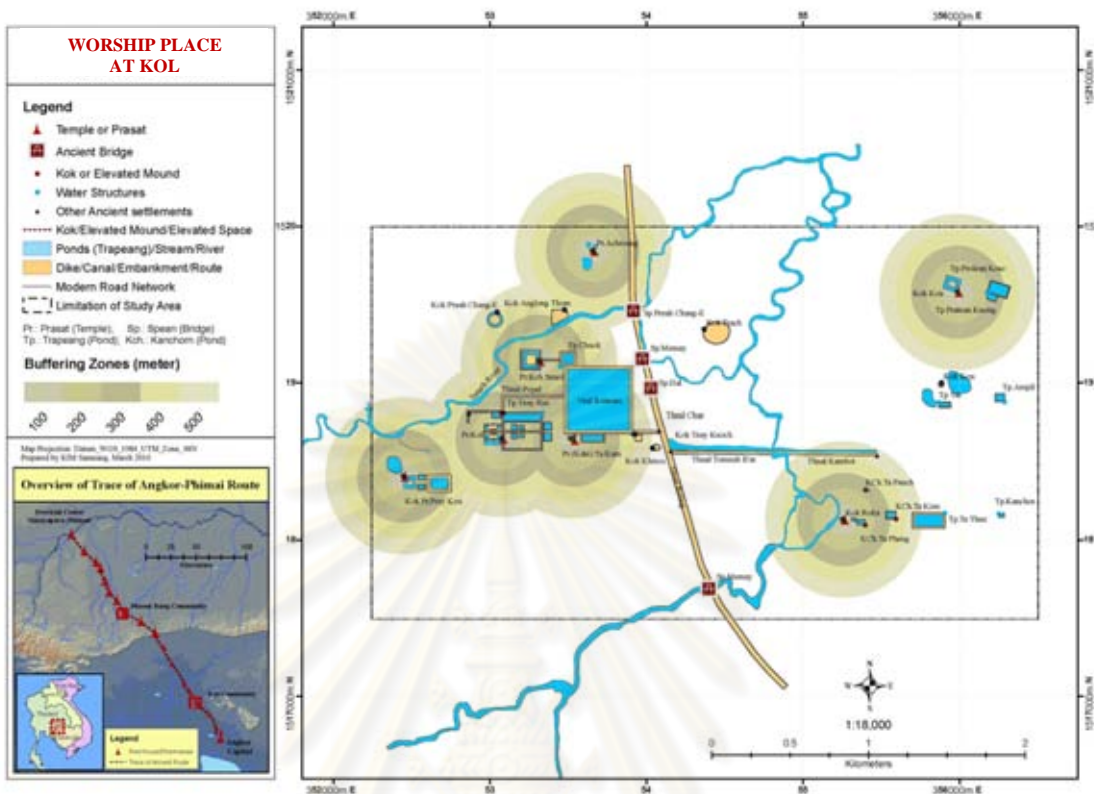
#### **4.1.2 Proposed Buffer Zones for Analysis**

After the field surveys were completed, all archaeological sites were plotted for real locations and generated to geo-spatial data as vector, together with their database, in the same map projection system (WGS1984) as various geo-spatial data stated earlier, both at the Kol and Phnom Rung areas, by the GIS and Remote Sensing applications, such as ArcGIS Desktop 9.3, Erdas Imagine 9.1 and Map Source 6.5. Then, the geo-spatial data of the survey sites were integrated and overlapped with information which was derived from various geo-spatial data (both vectors and raster data) in order to identify and draw the accurate physical features of each ancient settlement. As a result, the accurate feature shapes of the ancient settlements emerged in a clear picture of the environmental landscape of the ancient areas at Kol and Phnom Rung.

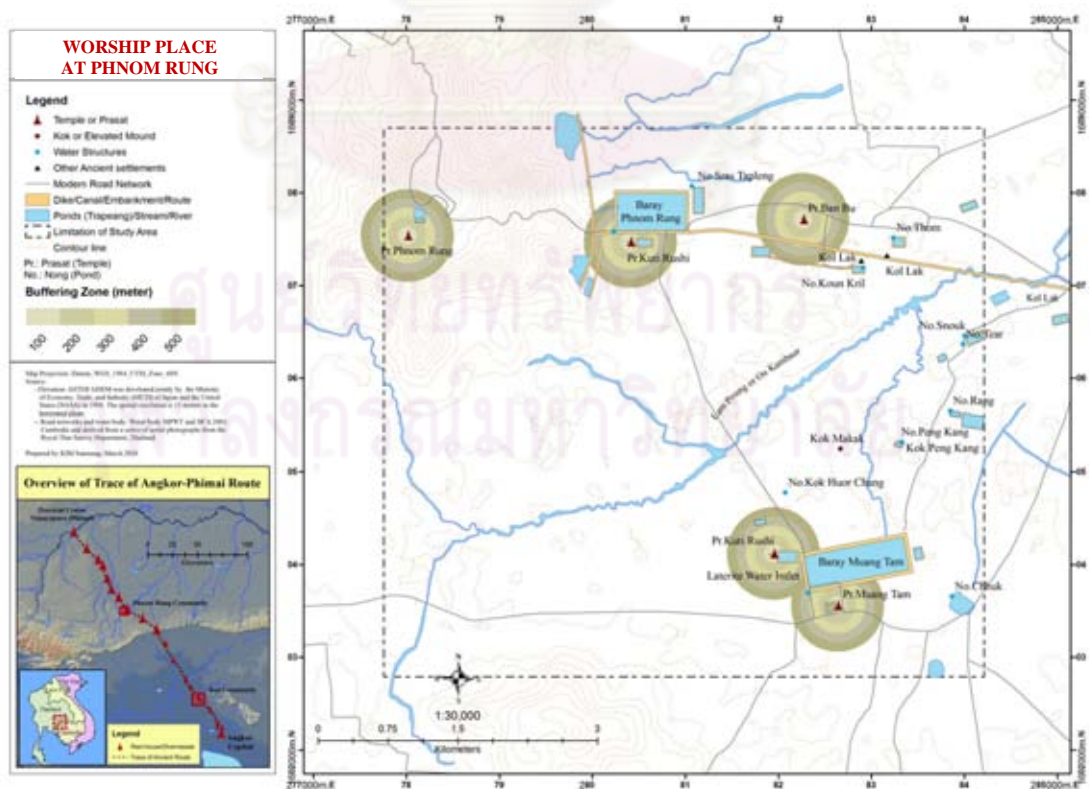
In order to discover similarities and differences of the ancient settlements of Kol and Phnom Rung, some proposed buffer zones were established to analyze and discuss these ancient settlements.

The series of maps of the proposed buffer zones of the general space lay-out of the ancient settlements and general environmental geographies of Kol and Phnom Rung areas will be show as follows:

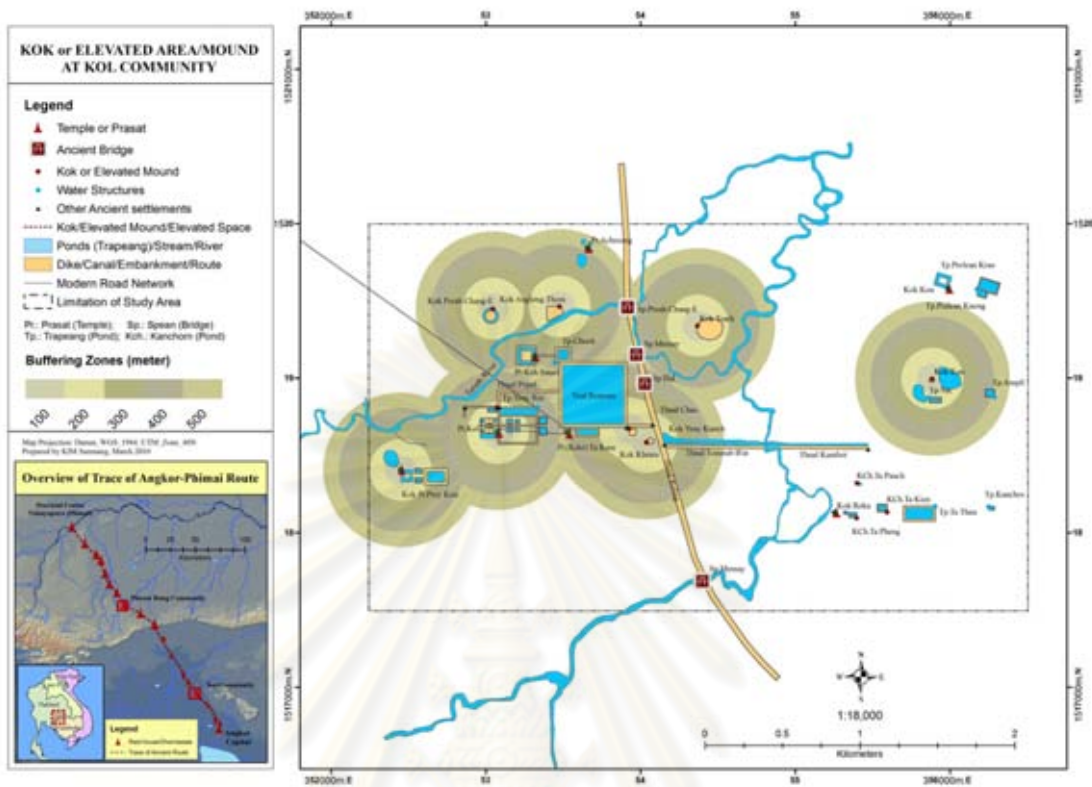
- Map of proposed buffer rings of 100 meters of significant worship places;
- Map of proposed buffer rings of 100 meters of *Kok(s)* or elevated areas/mounds;
- Map of proposed buffer rings of 100 meters of other man-made structures;
- Map of proposed buffer zone of 30 kilometers radius of the general environmental geographies of the neighboring ancient sites of the Kol and Phnom Rung areas.
- Map of proposed buffer zone of 100 kilometers radius of Angkorian stone bridges



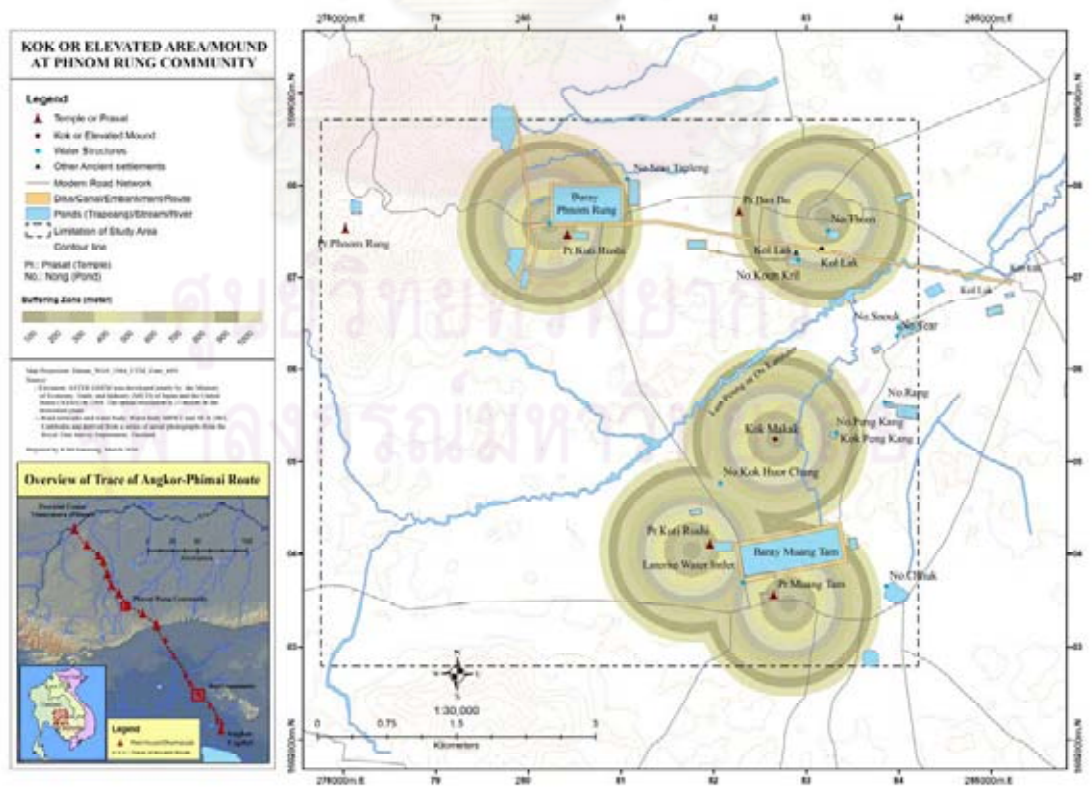
Map 4-1: Proposed buffer zone of worship places at Kol. (map in 2010)



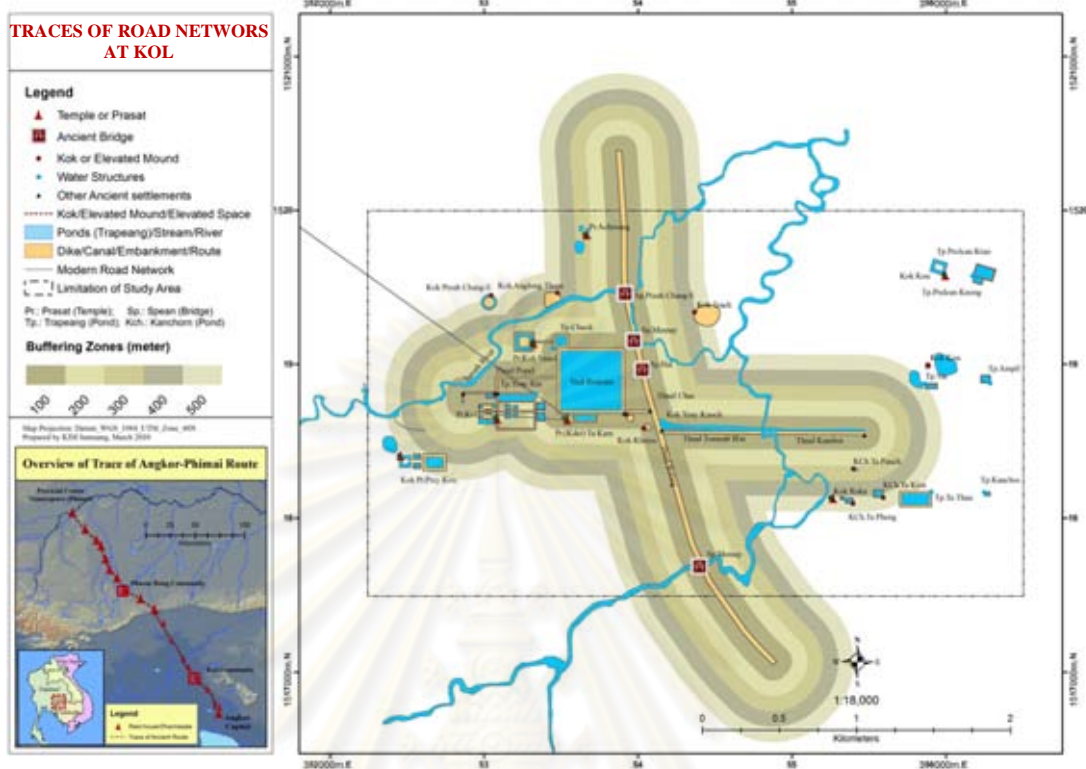
Map 4-2: Proposed buffer zone of worship places at Phnom Rung. (map in 2010)



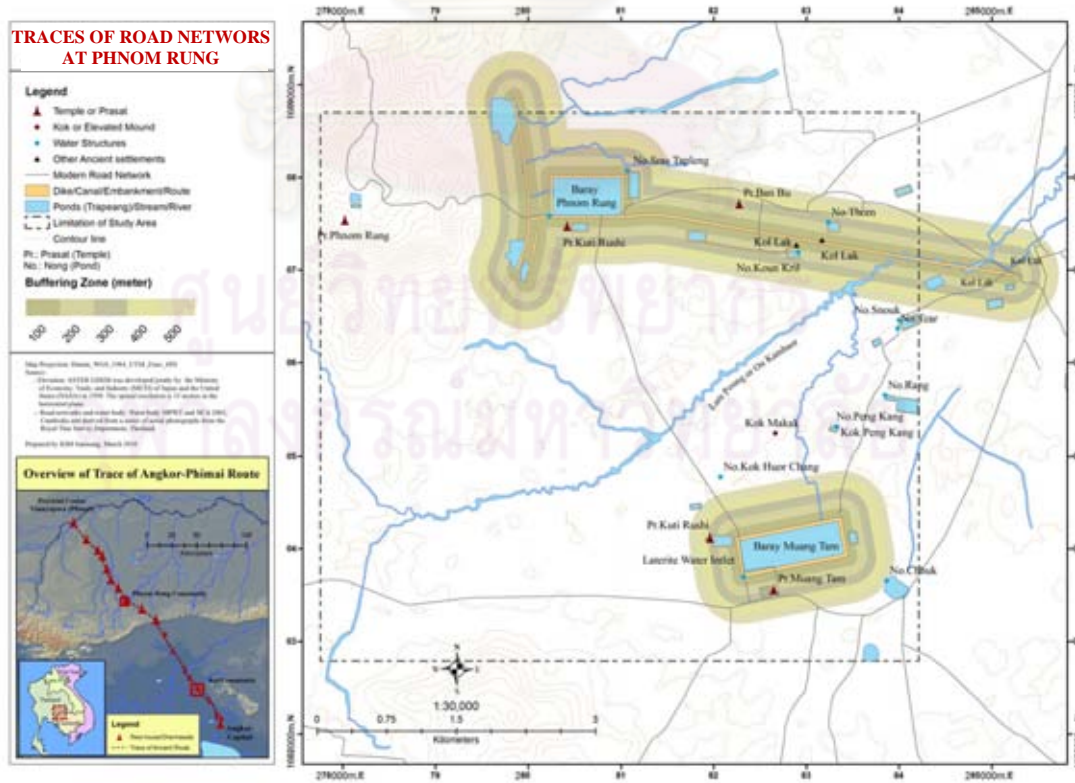
Map 4-3: Proposed buffer zone of Koks or elevated places at Kol. (map in 2010)



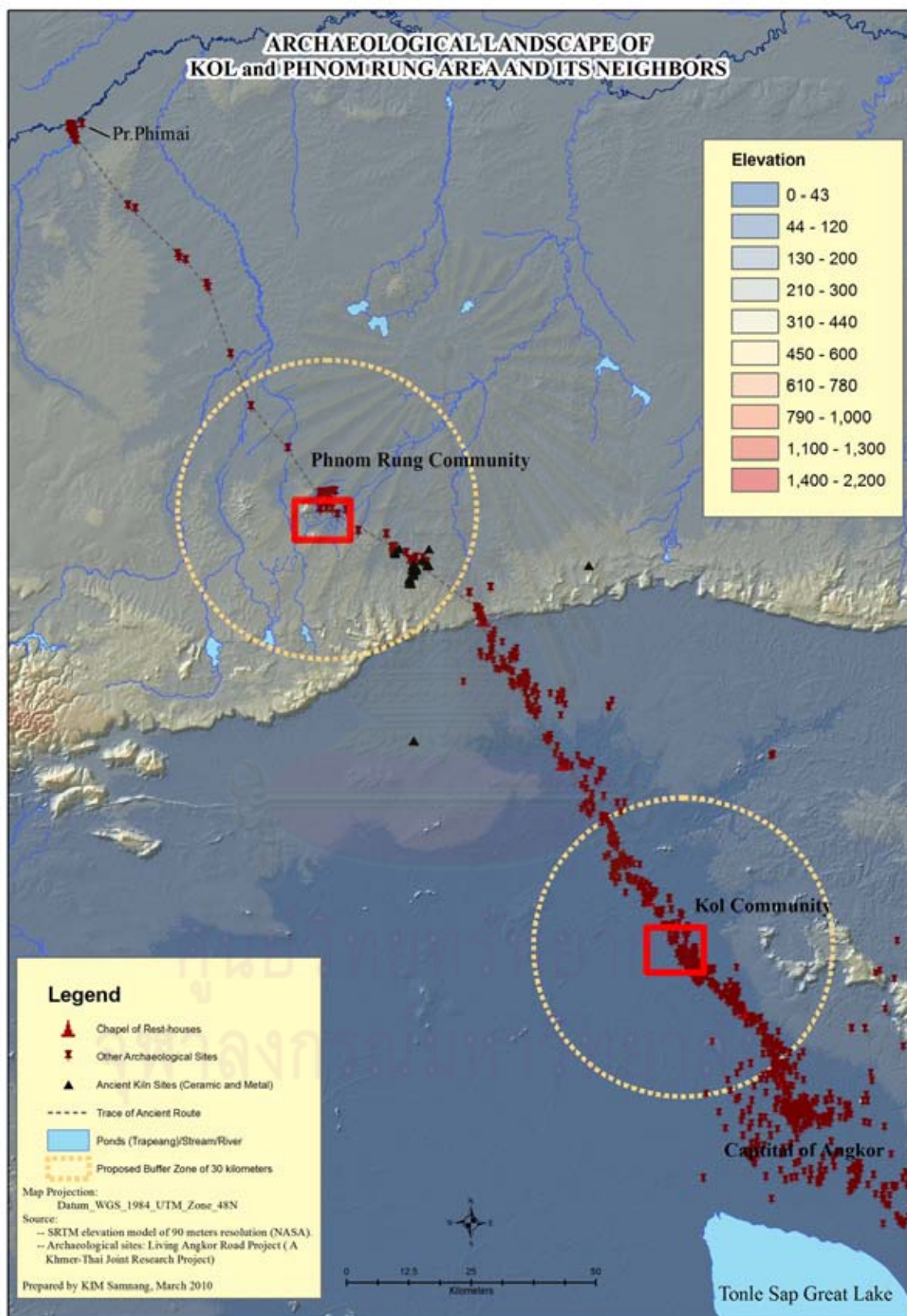
Map 4-4: Proposed buffer zone of Koks or elevated places at Phnom Rung. (map in 2010)



Map 4-5: Proposed buffer zone of man-made structures at Kol. (map in 2010)



Map 4-6: Proposed buffer zone of man-made structures at Phnom Rung. (map in 2010)



Map 4-7: Proposed buffer zone of environmental and geographical of Kol and Phnom Rung. (map in 2010)

## 4.2 A Comparison between the Kol and Phnom Rung Agglomerations

### 4.2.1 Similarities

#### a. General Space Lay-out of the Ancient Settlements

Generally observing, some of the current villages or areas as seen today have monastery or pagoda, local public hospital, and public rest-house located at or nearby those villages or areas. The Buddhist monastery is, known as “*Wat*”<sup>40</sup> in both Khmer and Thai. The public hospital is a place for local people to get the medical service, while the public rest-house is, known as “*Sala*”<sup>41</sup> in both Khmer and Thai for the travelers to take a rest during the journey. In all these probabilities, this concept would happen a long time ago in the region of mainland Southeast Asia, particularly in the Angkorian period. For instance, looking carefully through the sketched plan engraved on the stone inscription K.542 of the North Khleang temple (Figure 1-3), this plan shows that people in the past had similar ideas in establishing sacred worship places surrounded in the vicinity of their living place for paying respect or arranging the ritual religious ceremonies. Because of these consequences, Kol and Phnom Rung areas, in which were crowdedly developed as big ancient agglomerate areas in the Angkorian time, were emerged and shared many similar characteristics. For example, the remains of small and big temples which represented as sacred worship places, pilgrimage shrines of hospitals and rest-houses were located at these areas. In the following parts, I will illustrate the similarities in terms of space lay-out of worship places and its associations, space lay-out of water reservoirs, and space lay-out of Kok(s) or elevated areas/mounds found in the both areas.

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<sup>40</sup> *Wat* is Buddhist monastery.

<sup>41</sup> *Sala* is an open pavilion, used as a meeting place and to protect people from sun and rain.



### **a.1. Space Lay-out of Significant Worship Places**

#### **- *Kol***

Seven significant temples in the Kol area have been uncovered, four of which could be considered as principal worship places based on their size and space lay-out, with the other three temples considered minor worship places. Of the four major worship monuments, Prasat Kol is the largest temple, with significant architectural features (artistic sculptures and lintels) and inscriptions still remaining. On the other hand, for the other three temples, Prasat Kok Prey Kou, Prasat Koh Snoul and Prasat Kok Kou, only the structural foundations and some fragment objects or building materials remain, creating some difficulty in determining the chronological period and their function and histories. With respect to the three minor monuments, two laterite temples have been confirmed as a hospital chapel (*Arogyasala*) (Prasat Ta Kam) and a rest-house chapel (*Dharmasala*) (Prasat Achroeng) erected during the reign of King Jayavarman VII (1181-1218 A.D.).

According to the proposed buffer zone within 500 meters of these worship places (Map 4-1), the temples are all located to the western part of the royal road (Angkor-Phimai), and are organized in good relationship to each other, being connected by dikes and water reservoirs that served as roads, likely for communicating from one to the other. For instance, Prasat Kol, which served as a central point and a main worship place, with the other temples, such as Prasat Ta Kam, Prasat Koh Snoul and Prasat Prey Kou, and Prasat Achroeng, acting as satellite temples, is well connected with the other temples through roads, dikes and embankments, such as the royal road (Angkor-Phimai), *Veal Roneam*, *Thnal Popel* and other old roads. To the eastern part of the royal road (Angkor-Phimai), two worship places are also connected with the western part using the access roads of *Thnal Tomnub B'at* and *Thnal Kambot* (See Map 4-1). Generally speaking, the characteristics of the space lay-out of each worship place shows that there were moats surrounding the main buildings, ponds (*Trapeangs*) (both small and large in size) at the northeast and mostly at the east connecting to the temples through a causeway and/or

earthen embankment or plain mounds on the same level as the basements of the temple. These characteristics are the same characteristics as for the monuments found inside the urban complex at the Angkor center (Map 4-7). For example, the largest worship place of Prasat Kol can be distinguished in terms of the complexity of the plan and general space lay-out from the others in the same area. This temple is comprised of a main sanctuary and two small edifices of libraries and is surrounded by L-shape moats and the two enclosure walls. Fine grain pink stone block was used as the main construction material and there were elaborately curved lintels, pediments, and other architectural features. In addition, a massive rectangular earthen enclosure embankment and stone causeway is erected to the east and attached to each other. Along the causeway, stone pillars are aligned on both sides and end with a laterite cruciform and steps (Plan 4-1).



**Map 4- 8:** Angkor complexities of archaeological settlement map (Pottier and Evans 2007).

Prasat Ta Kam is in the unique space lay-out of the hospital chapels or *Arogyasalas*<sup>42</sup> in terms of architectural structure plan and building material that were designed and erected during the reign of Jayavarman VII. Architecturally speaking, the general characteristic of this chapel use laterite blocks as the major construction material, with the lay-out composed of a main sanctuary in the center facing to the east, a small library edifice to the southeast of the central tower, an enclosure wall surrounding these towers, a small pond to the northeast and a large pond (*Trapeang*) to the east. Looking closer, this temple not only has associated water reservoirs, which were all formed according to the common model found elsewhere in the kingdom as stated in the Ta Prohm's inscription, but it is located very closely to the other large water reservoirs and major sacred worship monuments. For example, inside the buffer rings of 100 meters to 500 meters of this hospital chapel, the most significant worship place, Prasat Kol and the largest water reservoir, *Veal Roneam*, are located (Map 4-1, Plan 4-6).

Similar to the hospital chapel, the rest-house chapel or *Dharmasala*<sup>43</sup> also indicates the achievement of King Jayavarman VII, who established such chapels along

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<sup>42</sup> After successfully driving away the Cham out of Angkor, King Jayavarman VII started to reorganize the kingdom again by focusing on building up small or large temples and extending his authority to more territory following as what his ancestors had done. Interestingly, he paid strong attention to his people by launching a number of public welfare programs, such as the network of public hospitals (*Arogyasalas*) throughout the kingdom (Kapur & Sahai 2007). In this regard, the late 12<sup>th</sup> century inscription of Ta Prohm temple mentioned clearly that "...102 hospitals (*Arogyasalas*) were built in cities and in various provinces..." (Coedes 1906: 80, Face C: Stanza CXVII). According to Briggs, these hospital temples were built in dedication to Bhaishajyaguru, the god of healing (Briggs 1999 [1951]). In addition, Briggs illustrated the spirit of the inscriptions that were found at a hospital temples in stanza 13, which states "...He (*Jayavarman VII*) suffered from the maladies of his subjects more than from his own; for it is the public grief which makes the grief of kings, and not their own grief..." (Briggs 1999 [1951]: 233).

<sup>43</sup> In total, 121 rest-house chapels or *Dharmasalas* were built along the principal routes throughout the Kingdom, as noted in the Prasat Preah Khan inscription (Coedès 1941:60-161; Maxwell 2007:84-85). Similarly, the Sdok Kok Thom Inscription, translated by Coedès in 1943, described the general public infrastructures as well: "...rest-houses and water structures were built along the roads for the convenience of travelers...". Again, more noticeably, a Chinese envoy, Zhou Ta

the royal road networks for travelers to take a rest. Prasat Achroeng was identified as a *Dharmasala* in 1925 by Finot, which follows the special characteristic of the plan and general space lay-out of this type of chapel, being formed using laterite blocks as the main construction material, a long hall of sanctuary facing to the east, a part of a fronton or pediment decorated with *Lokeśvara* and four ponds surrounding the temple (Map 4-1, Plan 4-8). In addition, the chapel was built not far from the road due to its function to facilitate the traveler to stop and take a rest.

#### - *Phnom Rung*

Similar to Kol, two of the five worship places, known as Prasat Phnom Rung and Prasat Muang Tam, are presented as the principal and largest sacred worship places erected in the vicinity of the area of Phnom Rung. One was constructed on the top of a natural mountain with an elevation of 383 meters, while the other was erected on a flat plain with an elevation of 180-190 meters. They served as crucial sacred worship places for people to pay respect and organize significant ritual ceremonies. From the general view of the space lay-out of these two temples, their characteristics are similar to Prasat Kol at Kol, as well as the monumental sites within the Angkor capital, due to the general architectural plans of the temples and their associations (the big water reservoirs or *Baray*). For example, Prasat Phnom Rung is comprised of a main central sanctuary grouped according to the Angkor Wat style, an older minor sanctuary to the southwest, two libraries at both sides when entering, a ruined brick tower to the northeast and is surrounded by a laterite rectangular enclosure wall. Extending from the laterite enclosure wall to the east, there are two Naga Bridges, a long causeway flanked by two rows of stone pillars and a large artificial *Baray* at the eastern part of the foot hill (Plan 4-2). In a similar way, Prasat Muang Tam was constructed in a rectangular plan, encircled by a laterite enclosure wall and four L-shape moats surrounding a second wall where the five

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Daguan, who visited Angkor in the late 13<sup>th</sup> Century, recorded in his notes the following: “...along the grand roads there are rest stations which they called *Samnak*...”. In this sense, he is comparing “*Samnak*” with the Chinese post halts along the main highways (Pelliot 1902:173).

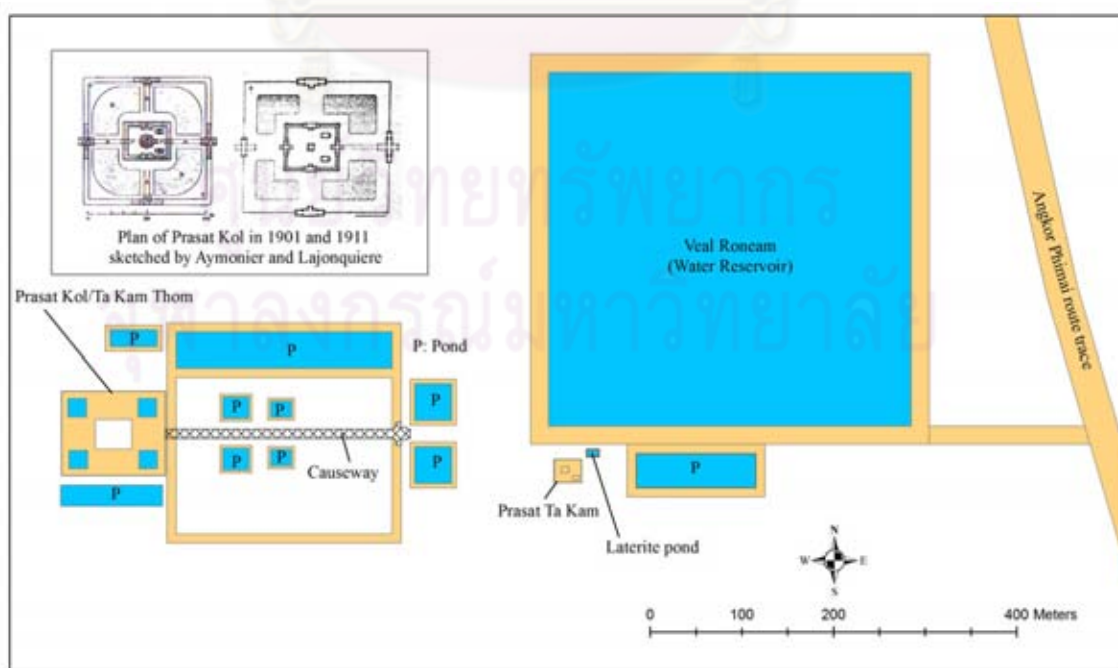
main brick towers and two library edifices are located. At the northern part of this temple, there is a large artificial water reservoir (*Tonle* or *Baray*). Generally speaking, two characteristics of the space lay-out of the architectural plans of these two temples, the causeway flanked by the stone pillars at Phnom Rung and the L-shape moats of Prasat Muang Tam, are the same as can be seen in the general space lay-out of Prasat Kol, the main worship place at Kol (Plan 4-3, 4).

There are also three other small temples in the vicinity, Prasat Kuti Rushi-Kok Muang, Prasat Kuti Rushi-Nong Baray and Prasat Ban Bu, identified as hospital chapels (*Arogyasalas*) and a rest-house chapel (*Dharmasala*), that were built during the reign of King Jayavarman VII. Based on the unique model of Jayavarman VII's hospitals and rest-houses, the general space lay-out and architectural plans and construction materials of these three temples were designed and erected in a similar way as Prasat Ta Kam and Prasat Achroeng at the Kol area. For instance, the hospital chapels (Prasat Kuti Rushi-Kok Muang and Prasat Kuti Rushi-Nong Baray) used laterite blocks as the main construction material and respected the unique architectural model of the plan for a hospital chapel. This unique architectural model is comprised of a main central sanctuary and a southeastern library edifice, encircled by an enclosure wall, a northeastern laterite pond and a large earthen water reservoir to the east. Moreover, based on the proposed buffer zone of 500 meters, these chapels were established around both small and large water reservoirs and the main worship places. For instance, the hospital chapels found at the Phnom Rung area were built close to the *Baray* Phnom Rung and *Baray* Muang Tam and the main worship places of Prasat Phnom Rung and Prasat Muang Tam (Map 4-2, Plan 4-7).

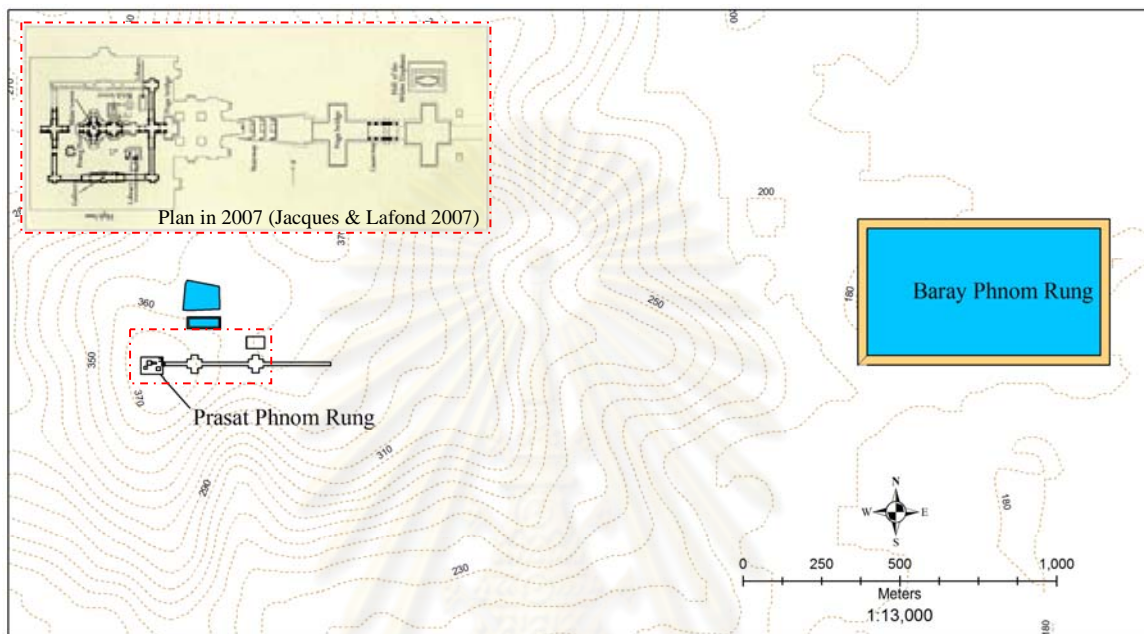
Prasat Ban Bu, a rest-house chapel, was designed in the same way as Prasat Achroeng in Kol. This chapel used laterite block as the main construction material and was built in the same unique architectural model as the other rest-house chapels. The plan is comprised of a long sanctuary hall facing to the east, surrounded by ponds, with the location not far from the road. Even though only one pond is still present to the southwest of this temple, according to the Preeyanuch 2005, there were four ponds surrounded this

pilgrimage shrine at one time. Thus, it can be concluded that the general space lay-out of this temple is similar to the general lay-out space of Prasat Achroeng at Kol (Map 4-2, Plan 4-9).

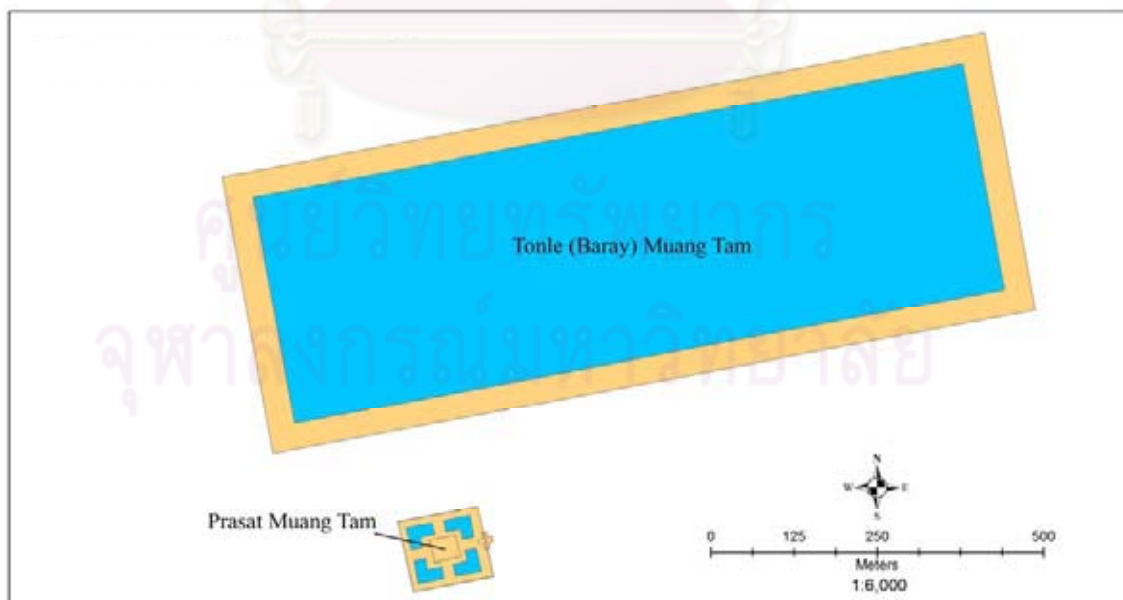
In summary, at the Kol and Phnom Rung areas, even though they were located far from each other, the principal worship temples and other small pilgrimage temples share many aspects in common, specifically in terms of the architectural feature styles, construction material and characteristics of their general space lay-out. In general, the Khmer temple plan was composed of a general access causeway leading to the central shrine, called an “axial plane” space lay-out by various scholars (see Boisselier 1966: 33-34, 53-56; Jacques 2008: 4-5). In this view, Prasat Kol and Prasat Phnom Rung were similarly constructed following the concept of the axial plane which was so popular in town or cities during the Angkorian time, for example, Prasat Banteay Srei, Prasat Preah Vihear, Prasat Thom at Koh Ker. Meanwhile, the centered plan of Prasat Muang Tam, which is surrounded by an enclosure wall and L-shape moats encircled the main sanctuaries, is similar to the centered plane of Prasat Kol, composed with the same lay-out. In addition, all the hospital (*Arogyasalas*) and rest-house chapels share the same characteristics and general space lay-out.



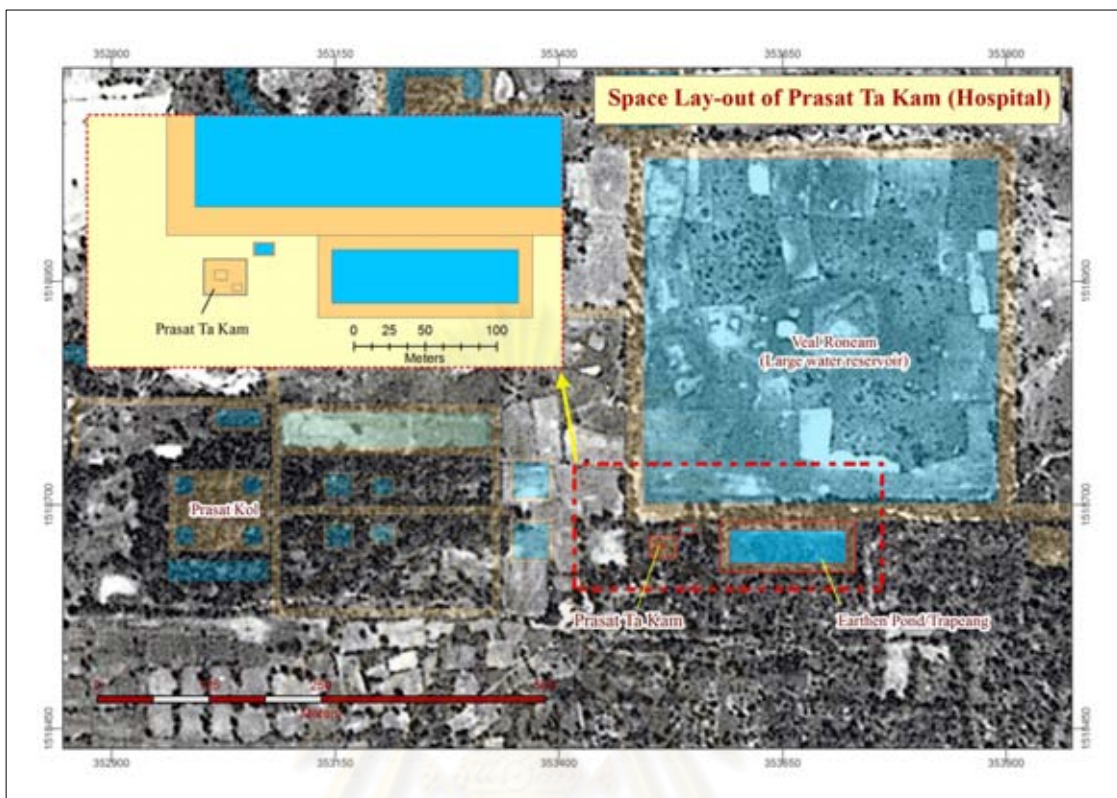
**Plan 4- 1:** General lay-out space of Prasat Kol/Ta Kam Thom and its neighbor ancient settlements at Kol area. (plan in 2010)



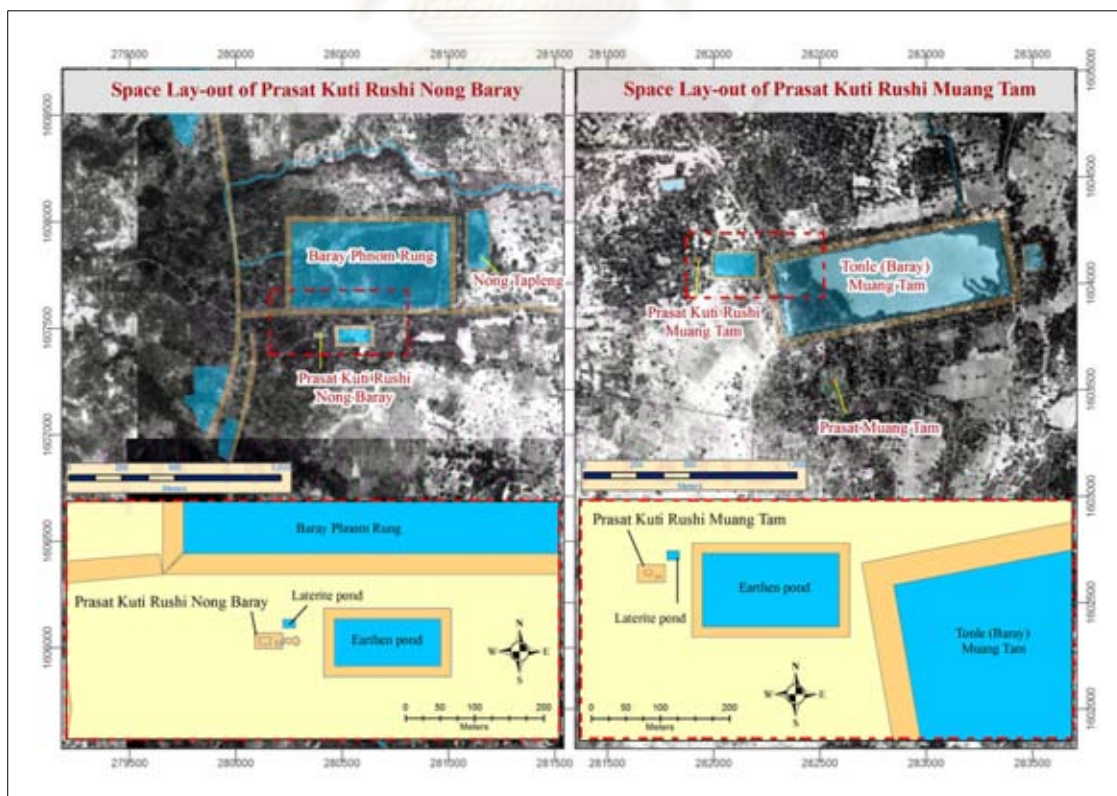
**Plan 4- 2:** General space lay-out of sacred worship temple of Prasat Phnom Rung. (plan in 2010)



**Plan 4- 3:** General space lay-out of sacred worship temple of Prasat Muang Tam. (plan in 2010)

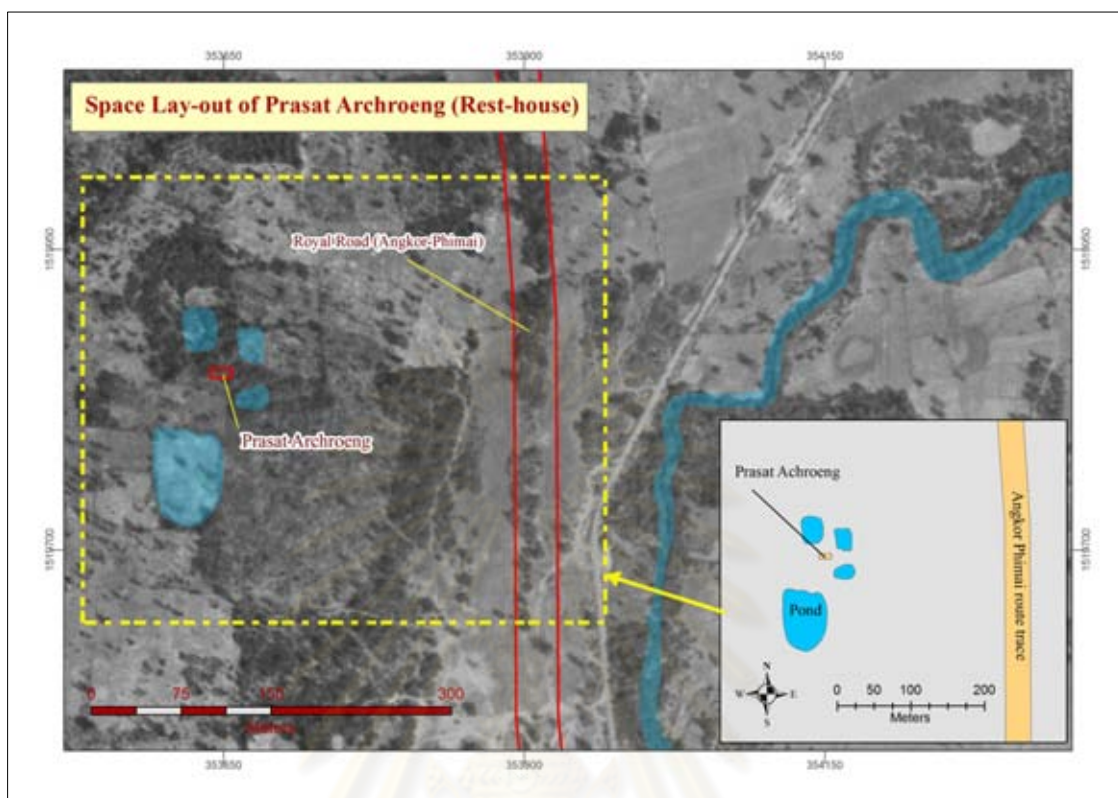


Plan 4-5: Space lay-out of chapels of hospitals in Kol area. (plan in 2010)

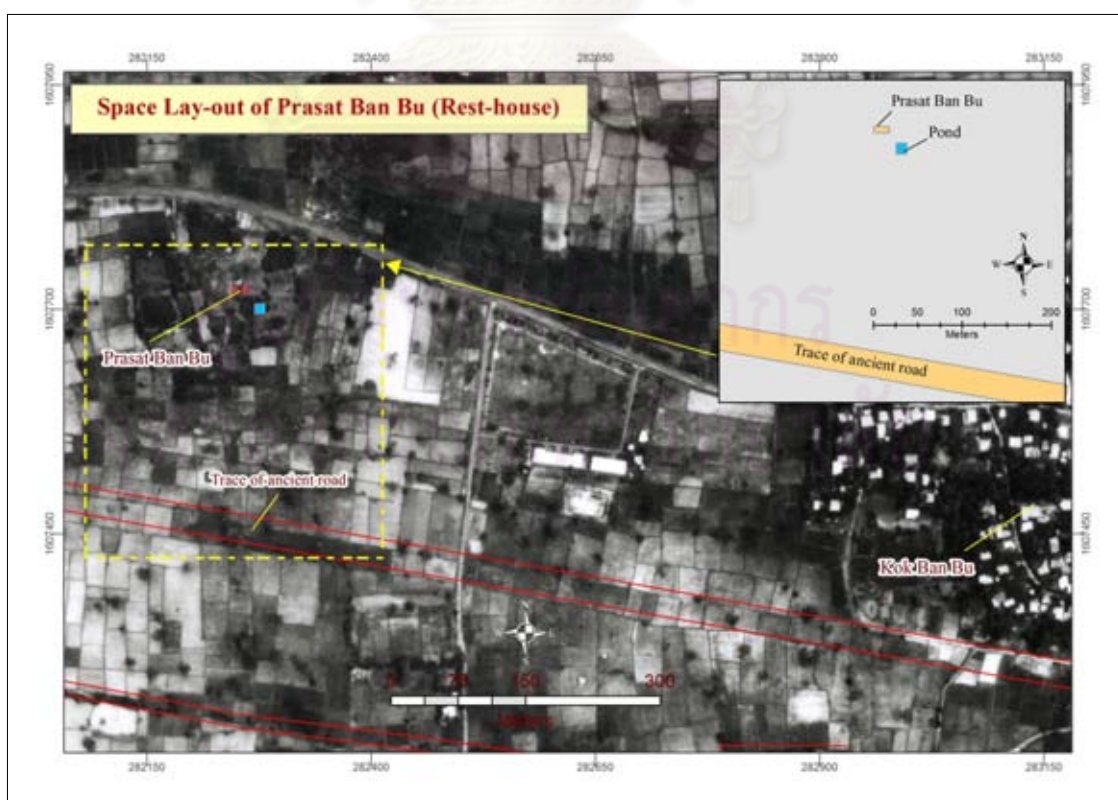


Plan 4- 6: Space lay-out of chapels of hospitals at Phnom Rung area. (plan in 2010)





Plan 4-7: Space lay-out of chapels of rest-house in Kol area. (plan in 2010)



Plan 4-8: Space lay-out of chapels of rest-house in Phnom Rung area. (plan in 2010)

### **a.1.1. Decoration of Architectural Features**

As mentioned previously, in the Kol area most of temples have deteriorated due to nature and human intervention. Prasat Kol, which had been standing in good condition for hundreds of years, was extensively damaged by a group of military in 1997, according to the local interviews. Most of the architectural features of this temple, especially the pediments and the colonnades, disappeared, with others left unrecognizable. Fortunately, there are some remaining lintels from which artistic decorations can be discerned. Accordingly, this research selected to study in detail these lintels in order to modify the dates of these temples as stated in the inscriptions. With respect to Phnom Rung, all of the architectural features (pediments, colonnades, lintels and so on) have been intensively studied by various scholars. Notwithstanding the poor information of architectural features at Kol, and the conversely rich information of architectural features at Phnom Rung, the following presents a comparison of the lintel styles at these two areas in order to introduce the similarities and periods.

#### **- *Kol***

Two groups of lintel style groups, Kompong Preah (7<sup>th</sup> -8<sup>th</sup> centuries) and Khleang (10<sup>th</sup> – 11<sup>th</sup> centuries), have been found at Prasat Kol and Prasat Ta Kam. At Prasat Ta Kam, the completed shape of a lintel, attached to the western upper doorframe of the main sanctuary, has been grouped to the Kompong Preah lintel style groups and other fragments of lintels categorized to the Khleang lintel style groups. At Prasat Kol, one lintel found at the upper part of the first top of the eastern face of the *gopura* which has been grouped to the Kompong Preah lintel style groups. The other lintels at the same *gopura* and other fragments have been grouped to the Khleang lintel style groups.

#### **- *Phnom Rung***

Because Prasat Phnom Rung and Prasat Muang Tam are considered important monuments in Northeast Thailand, numerous research studies have precisely identified the classification of style of lintels following Phillip Stern's lintel style classification

theory. Inside Prasat Phnom Rung's enclosure compound, there are many towers and small edifices built in different periods. According to the presence of the ornamentation of the lintels at the main central sanctuary, all of these lintels were assigned to the Baphuon and Angkor Wat lintel style group. However, the lintels decorating the minor tower, or Prasat Prang Noi, have been categorized in the transition between Khleang and Baphuon lintel style (11<sup>th</sup> century). Generally speaking, Prasat Muang Tam's lintel style fall into the Khleang and Baphuon style (late 10<sup>th</sup> to 11<sup>th</sup> centuries). For example, three among seven lintels that were selected to study in this research, belong to the Kleang lintel style, while the four other lintels indicate the Baphuon style group.

Therefore, it would be concluded that characteristics of lintel styles both at Kol and at Phnom Rung shared the similar characteristics and periods. In addition, those characteristics of lintels were a significant part of evidence to modify the dates that engraved in the stone inscriptions.

#### **a.1.2. Inscriptions**

##### **- *Kol***

##### **- *Inscriptions of Prasat Kol***

Three important inscriptions K.246, K.247 and K.248, all in the Khmer language, were found at this temple and were fully translated by Coedès in 1951. The following is a briefly description of the significant information from these inscriptions:

- **Inscription K.246:** only one line remaining on the doorjamb of the second interior wall of the eastern *gopura* mentioning the date of 986 Saka or 1064 A.D.
- **Inscription K.247:** a piece of stone remaining with four lines stating the date of 982 Saka or 1060 A.D.
- **Inscription K.248:** having 20 lines, mentioning a king's name, Jayavarman II, and a date between 982 Saka to 986 Saka or 1060 to 1064 A.D., according to Coedès' suggestion.

According to the dating above, Prasat Kol would have been erected between 1060 A.D. and 1064 A.D., at the end of the reign of King Udayadityavarman II (r.1049-1066 A.D.).

**- Inscriptions of Prasat (Kdei) Ta Kam**

There are two bilingual inscriptions in Khmer and Sanskrit, K.244 and K.245, that were found at this temple, which were also interpreted by Coedès in the same year as for those found at Prasat Kol. The important information from these inscriptions is:

- **Inscription K.244:** presenting only two lines in Sanskrit language, indicating a date of 713 Saka or 791 A.D., together with the name of Lokeśvara, “*Jagadīśvara*” (Coedès 1951: 89).
- **Inscription K.245:** 35 lines remaining in the Khmer language, engraved in the reign of King Suryavarman I (r.1002-1049) and containing the date of 884 Saka or 962 A.D.

According to these inscriptions, Prasat Ta Kam would likely have been built around the late 8<sup>th</sup> century, re-organized and further developed in the reign of Suryavarman I, and finally transformed to a hospital chapel during the reign of Jayavarman VII.

**- Phnom Rung**

In the region of Phnom Rung, overall 11 stone inscriptions have been found and entirely translated by H.R.H. Princess Sirindhorn, with only the upper part of inscription K.384 translated by Coedès in 1953, all of them belonging to Prasat Phnom Rung. The essential information relating to these inscriptions is as follows:

- **Inscription K.1029:** dated to around the 7<sup>th</sup> – 8<sup>th</sup> A.D., in the Sanskrit language.
- **Inscription K.1120:** states the name of King Rajendravarman who ascended the throne in 944 A.D. and the name of King Jayavarman V (968-1001 A.D.).
- **Inscriptions K.1067 and Phnom Rung Inscription No. 11:** one dated to 968 A.D. in the Khmer language, and the other dating to 977 A.D., in two languages, Sanskrit and Khmer. It is noteworthy that these inscriptions indicate the reign of King Jayavarman V, also mentioned in inscription K.1120.
- **Inscriptions K.1066, K.1071, K.1072 and K.1090:** dated to about the 10<sup>th</sup> – 11<sup>th</sup> centuries, in the Khmer language.
- **Inscriptions K.384, K.1068 and 1091:** the first one dated to 1150 A.D., in the Sanskrit language; and the other two dated to around the 11<sup>th</sup> – 12<sup>th</sup> centuries, in the Khmer language.

In addition, the names of some Angkorian kings were inscribed on some of the above referenced inscriptions. For example, K.1120 mentions the name of King Rajendravarman (r.944-968) and King Jayavarman V (r.968-1001), and K.384 states the name of King Jayavarman VI (r.1080-1107), Dharanindravarman I (r.1107-1112) and Suryavarman II (r.1113-1150).

In addition, three inscriptions found in Cambodia talk about the donations from the kings to Prasat Phnom Rung. For instance, the Lovek bilingual inscription K.136 mentions donations to Prasat Phnom Rung from high ranking officials of King Suryavarman I (r.1002-1050) and Udayadityavarman II (r.1050-1066) during the 11<sup>th</sup> century. The Trapeang Don Ong inscription K.254 also talks about donations to Prasat Phnom Rung from high ranking officials of King Udayadityavarman II (probably the same officials) and Suryavarman II (r.1113-1150) and to other temples in this region. Finally, the famous inscription K.485 of Prasat Phimeanakas, written by King Jayavarman VII's wife, Princess Indradevi, declares the donations of large Buddha images to Prasat Phnom Rung.

In conclusion, based on the inscriptions found at the Kol and Phnom Rung areas, both areas were occupied during similar periods and were especially developed and populated during the reign of Jayavarman VII.

Therefore, based on the discussion above, Kol and Phnom Rung shared many things in commons. For example, all the temples of these two areas were erected in similar periods and were sponsored by the Angkorian kings. This means that these two areas started to develop at these regions as ancient agglomerate areas since the 7<sup>th</sup> and 8<sup>th</sup> centuries and were continuously developed and densely populated to become large agglomerate areas during the 11<sup>th</sup> – 13<sup>th</sup> centuries. Furthermore, in each area, there were at least two major sacred worship places for local people to pay respect or to organize ritual ceremonies. In addition, there were one or two hospital temples for people to pay respect during the treatment or healing of their illness and at least one rest-house chapel for travelers to take a rest during their journey. Even though these areas were located far from each other, the general characteristics of the architectural features were established with similar space lay-outs. Interestingly, despite the fact that the Angkor court was a long way from these areas, the Angkorian kings paid close attention to the people in these areas by making donations or constructing temples or ponds in the vicinity.

### **a.2. Space Lay-out of Water Reservoirs**

In the development of Angkorian civilization, the water reservoir management system played a crucial role and is one of the key elements reflecting the “civilization of Angkor” during the Angkorian period. For example, the first large water reservoir, known in Khmer as “*Baray*”, was established by adapting the physical characteristics of the earth during the reign of King Indravarman I (877-889 A.D.) to the north of the first capital of Angkor, *Hariharalaya* (Ang, Erich, Ashley 1998: 42, Moore 1989). Since then, this adaptation was widely used elsewhere in the Angkor plain; for example, the water reservoirs of Indratataka or *Baray Lolei*; Yaśodharatataka (the Eastern *Baray*); the Western *Baray* (the largest of the *Barays*); and Jayatataka (the Northern *Baray*) (Map 4-7) (Ang, Erich, Ashley 1998: 42, Moore 1989). The water management system was not

established only at Angkor, but was also adapted elsewhere, in both large and small scale throughout the kingdom during 9<sup>th</sup> to 13<sup>th</sup> century.

With the apparent adoption and adaptation of this water management system, numerous rectangular water reservoirs can be found at Kol. It is noteworthy that both large and small temples are typically associated with water reservoirs to the eastern side and/or around the sacred worship places. Based on the findings from this research, there have been 16 artificial water reservoirs found in the vicinity of Kol, most of them with rectangular physical characteristics. For instance, the largest one, nearly a square structure named *Veal Roneam*, is 450 meters on each side and is surrounded by a high embankment 20 meters wide. This embankment plays a dual role: to retain the water and to serve as a local road. Moreover, some ceramic fragments have been discovered on the surface of some of the embankments, which could mean that these might also be categorized as old water reservoirs.

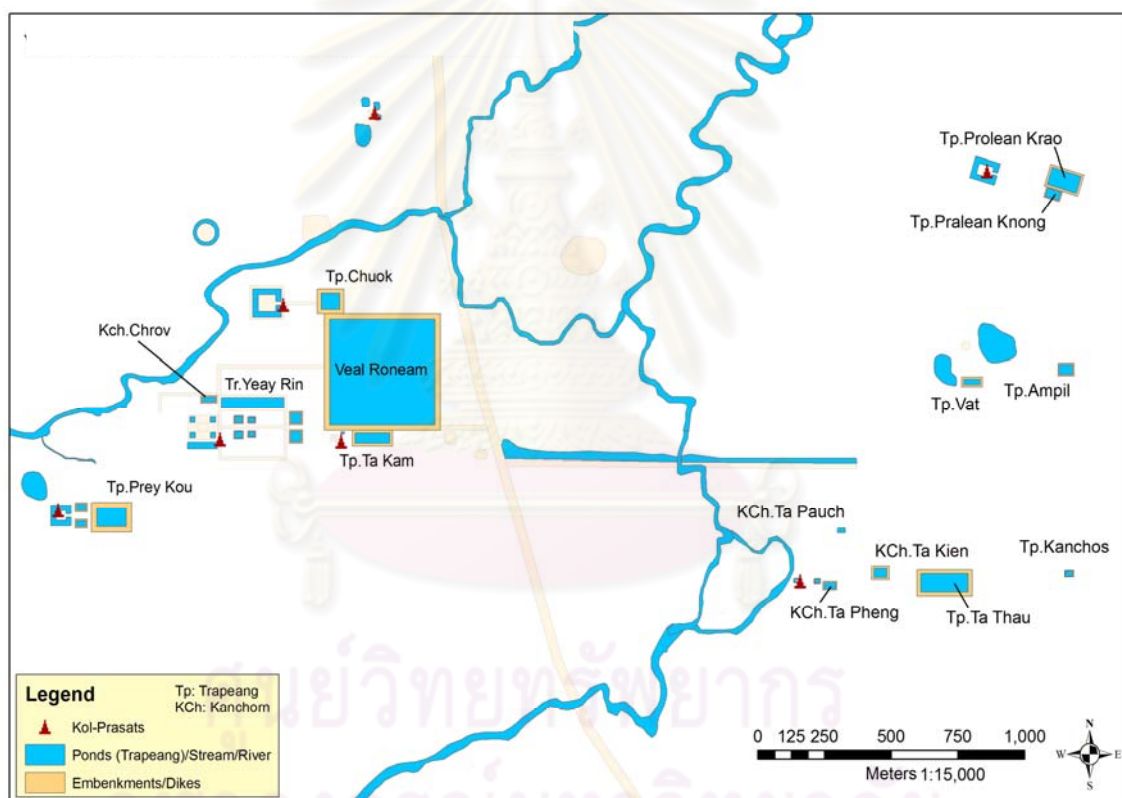
Similar to Kol, the Angkor water management system influenced and was adapted into the Phnom Rung area since this area probably represented a symbol of a small town or city. Based on the findings, at least two large water reservoirs were set up in this area during the Angkor period. One of which was described in the Phnom Rung inscription No. 8 by indicating the name of “*Srisurya*” in memory of King *Srisuryavarman* in the 12<sup>th</sup> century. At present, this large water reservoir is known as *Baray Phnom Rung*, measuring 800 meters long by 450 meters wide, with an embankment 30 meters wide. In addition, another baray is associated with Prasat Muang Tam, known as *Tonle*<sup>44</sup> or *Baray Muang Tam*, comprising 1100 meters long by 450 meters wide, with an embankment 30 meters wide. In addition to these two significant water reservoirs (*Baray* or *Tonle*), there are at least seven other rectangular artificial water reservoirs spread over this area. Some of them would be considered as ancient ponds or *Trapeangs* due to the presence of archaeological evidence: ceramic fragments and other old objects on the surface of their embankments. For example, ceramic fragments and other objects have been found at Nong Sras Tapleng at Ban Nong Bua Rai, Nong Trapeang Thom at Ban

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<sup>44</sup> *Tonle* is a kind of water structure and is bigger than *Veal*.

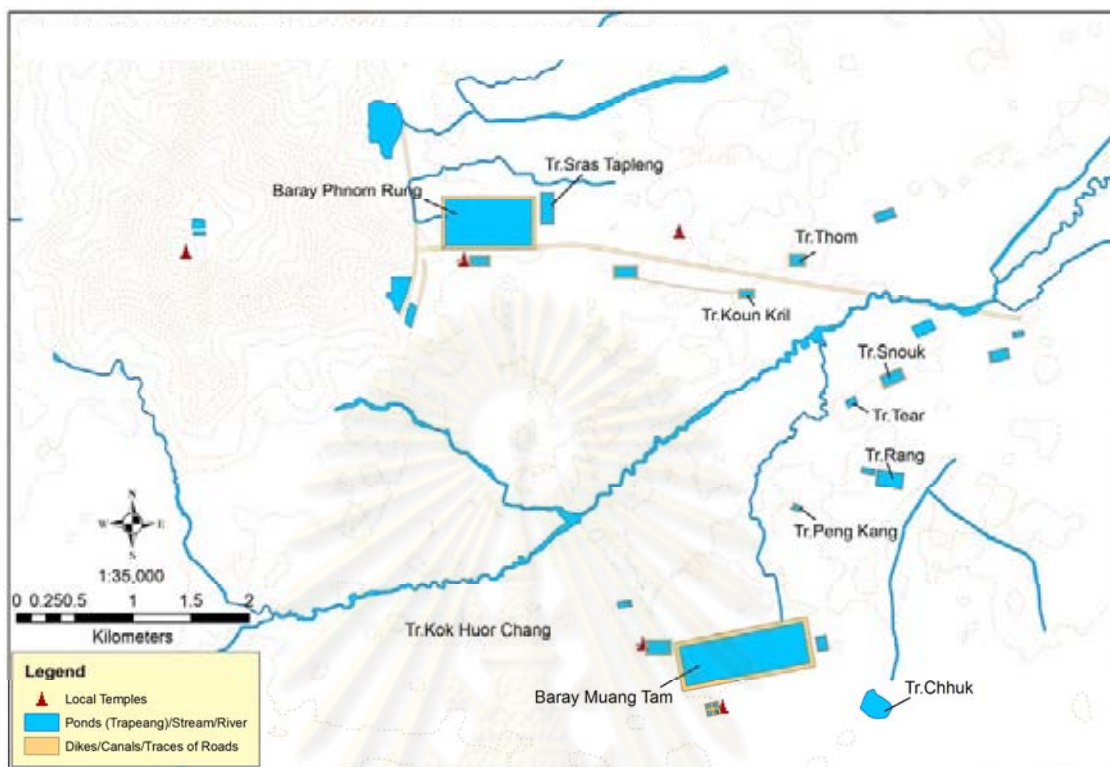
Bu, Nong Trapeang Snouk at Ban Krasang, and Nong Trapeang Peng Kang at Ban Kok Rang.

In light of the evidence from the physical space lay-out of the water reservoirs mentioned above, it can be concluded that the Kol and Phnom Rung areas share similar characteristics in their water structures as evidenced by the presence of rectangular shaped water reservoirs located throughout these areas.



**Map 4- 9:** Space lay-out of water structures or water reservoir in Kol. (map in 2010)





**Map 4- 10:** Space lay-out of water structures or water reservoir in Phnom Rung area.  
(map in 2010)

### a.3. Space Lay-out of Kok(s) or Elevated Areas/Mounds

Many *Kok(s)* or elevated areas/mounds situated inside the vicinity of the Kol and Phnom Rung areas, most of which were used as habitation or residential areas, were identified by the LARP team in 2007 & 2008 and FAD team in 1993. The results from both teams illustrate that most of these *kok(s)* dated back for a long time evidenced by the presence of archaeological remains which came from excavations and the collection of surface objects, such as ceramic fragments, stone tools, and so on. Using a 500 meter buffer zone for each *Kok* found in these two areas, the results show the close space lay-out of these *Kok(s)*, either those newly settled or/and the continuous modification of the old *Kok(s)*, and that they were established around the sacred worship places and the water sources, such as streams, rivers, ponds and lakes. Notably, they were not accidental settlements since it is clear that the settlers adopted and adapted their ancestor's idea to set up their residential places not far from the water sources. In this

case, in both the Kol and Phnom Rung areas, the *Kok(s)* share similarities in terms of the characteristics of their space lay-outs.

For example, according to the findings, there were six *Kok(s)* and six general elevated spaces, some of them dating back to prehistoric times, which were continuously developed and modified from period to period until the present day. The prehistoric *Kok(s)* found at the Kol area are: *Kok Preach Chang Er* (a circular moated site), *Kok Anlong Thom*, *Kok Prasat Prei Kou* and *Kok Prasat Kol* (Kol elevated space), identified as such because of the archaeological remains, such as heads of axes of stone tools and prehistoric ceramic fragments, together with the characteristic of the *Kok(s)* found. In addition, some *Kok(s)* were continuously and densely populated and developed into agglomerate places and structures around the 9<sup>th</sup> to 15<sup>th</sup> century, as evidenced by the presence of pieces of temple stone and ceramic fragments (Im et al. 2007) found at *Kok Yeay Kuoch*, *Kok Kou*, *Kok Khmoc*, *Kok Trach* and other elevated spaces nearby the temples. Furthermore, the space lay-out of most of the *kok(s)* is integrated around the worship places and water reservoirs inside the proposed buffer zone of 500 meters (Map 4-3).

Similar to Kol, in the Phnom Rung area, many *Kok(s)* are clearly identifiable as ancient human habitation places and were developed during a similar period as the nearby worship temples (FAD 1993). For example, the FAD team performed excavations of many trenches at the *Kok Muang* elevated space, the *Kok Prasat Kuti Rushi* elevated space, and *Kok Makak*. As a result, it was discovered that these *Kok(s)* started to be settle as human residences around the 11<sup>th</sup> to 12<sup>th</sup> centuries and were densely populated around the 13<sup>th</sup> century. In addition, similar characteristics of archaeological fragments of ceramics, which were recently discovered from the field survey, have shed a light on other *Kok(s)* or elevated spaces that were occupied in this region during a similar period; for example, *Kok Peng Kang*, the *Kok Ban Bu* elevated space, and the *Ban Nong Bua Rai* elevated space. These *Kok(s)* not only were developed during similar periods, but they also shared similar characteristic of space lay-out. These *Kok(s)* and elevated spaces were established and developed close to the water reservoirs (reservoirs both large and small in

size) and are near the sacred worship places. For instance, inside the proposed buffer zone of 500 to 1000 meters, *Kok Muang*, *Kok Prasat Kutirushi* and *Kok Makak* were classified into one *Kok* group which shared connectivity and are surrounded by large and small rectangular ponds or *Trapeangs* and the river. In addition, the *Ban Bu* and *Ban Nong Bua Rai* elevated spaces show similar space lay-out and are also surrounded by large and small rectangular ponds or *Trapeangs* (Map 4-4).

Accordingly, it can be surmised that the *Kok(s)* or elevated spaces found in the *Kol* and *Phnom Rung* areas were densely populated and developed during a similar period, from the 9<sup>th</sup> to 13<sup>th</sup> centuries. In addition, regarding the general space lay-out, all of these *kok(s)* were built close to the sacred worship monumental sites and were all associated with large ponds or *trapeangs* around or inside the territory of the elevated spaces or *Kok(s)*.

***b. Civil Engineering Structures: Traces of Road networks***

Utilizing the GIS and Remote Sensing applications, together with a ground truthing survey, traces of ancient road networks, dikes, canals and pond embankments have been discovered. Identification of some of these public civil engineering structures has remained clearly visible in the *Kol* and *Phnom Rung* areas, although some of them have been destroyed due to disturbance by human activities. However, the old aerial photographs and satellite images could visibly detect and illustrate some parts of the remains and lost traces of settlements (Map 4-5, 6) (see Lertlum and Mamoru 2009). In this respect, in the *Kol* and *Phnom Rung* areas old traces of civil engineering structures were discovered, such as the vestige of the royal road from Angkor to Phimai, local connected roads, dikes, canals and embankments scattering over these areas.

For instance, based on the findings, inside the proposed buffer zone of 500 meters of the settlement traces in the vicinity of *Kol*, these structures were organized for ease of communication inside this area and to link the settlements to other cities or towns. Similarly, canals, dikes and ponds/*Trapeang* embankments played a dual function: as roads and reservoirs. For example, part of the royal road (Angkor-Phimai) known as

*Thnal* Roling, the old road of *Kok Kmoch*, dikes or canals of *Thnal Tomnub B'at*, *Thnal Kambot*, *Thnal popel*, and embankments of *Veal Roneam* are well connected one to another and from place to place in this area (Map 4-5).

Similarly, inside the proposed buffer zone in the vicinity of the Phnom Rung area, these structures are also evident. For instance, vestiges of old roads, embankments of the *Baray Phnom Rung* and *Muang Tam*, vestiges of canals or dikes near the foot hill of Phnom Rung were established in order to facilitate communication in the area (Map 4-6).

Based on this evidence, it can be seen that the Kol and Phnom Rung area were settled and developed with similar public civil engineering structures in terms of road networks, dikes, canals and embankments.

#### **4.2.2 Differences**

##### ***a. General Environment and Geography***

Based on the SRTM and ASTER DEM elevation geo-spatial data, the general geographic terrain maps of the Kol and Phnom Rung area were established and illustrated as follows:

The general geographic terrain of the Kol area is similar to the general geographic terrain of the capital of Angkor. Geographically speaking, the slope of the Kol area is from the northeast to the southwest. The mountain range at the northeastern part of the Kol area acts as an important water resource to feed the communities through the tributaries of rivers flowing from the northeast to the southwest, ended at the great lake of the Tonle Sap. For example, the twined rivers, known as the *Tanath* River, flow down from the mountainous region, from about the elevation of 300 meters of Phnom Mereach and Phnom Baydos to the northeast. The slope elevation of the Kol area is around 20 to 30 meters. Interestingly, inside the proposed buffer zone of 30 kilometers, the general environment of the Kol area indicates that there are many sacred worship temples and complicated civil engineering structures, such as traces of road networks, stone bridges, dikes, canals surrounding this area (Map 4-13).

On the other hand, the general characteristic of the natural terrain of the Phnom Rung area is completely different from the Kol area. The Phnom Rung area is located on a sloping terrace at an average elevation of 180 to 200 meters and inclines from a southwest to northeast direction. The complex of rivers, known as the Lum Poun River, is supplied from the mountains of Phnom Rung and Plaibat, where worship temples can be found on the top, one to the west and other to the southwest. The Lum Poun River flows from the southwest to the northeast, together with other tributaries, ending at the significant river of the *Mun* valley by following the slope. Accordingly, many artificial water reservoirs were erected matching this geography (Map 4-14).

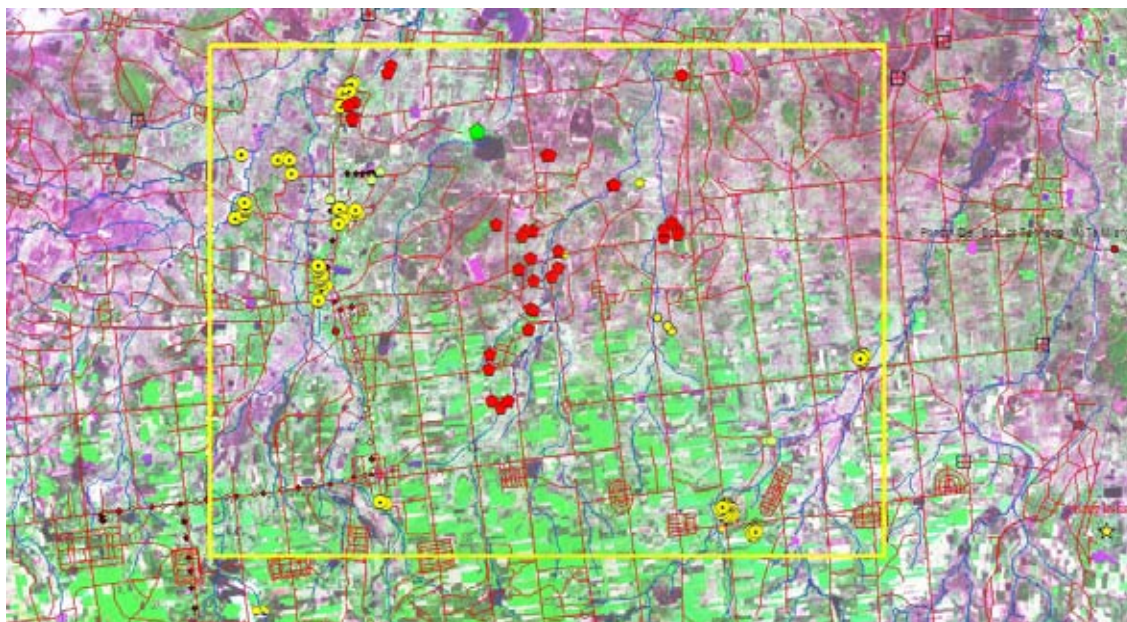
In the same proposed buffer zone as the Kol area, 30 kilometers, the general environment of the Phnom Rung area is surrounded by many pre-historic, pre-Angkorian and Angkorian settlements, with hundreds of these settlements being discovered along the southern part of the *Mun River* valley by various scholars and projects (see Groslier 1977, Williams Hunt 1954, Supajanya and Vallibhotama 1972, Moore 1988). More interestingly, the Phnom Rung area is also surrounded by numerous ancient industrial sites to the southeastern part of this area: ceramic and iron smelting kiln sites which were recently discovered by the LARP projects (Map 4-7, Map 4-11). These complex ancient industries were established in pre-historic times and were continuously in operation until the Angkorian time. For example, the excavations of the ancient iron smelting at Ban Khao Din Tai and Ban Sai Tho 7 indicates that these sites had been operated from a hundred years before the emergence of Angkor and continued until the Angkor period (LARP 2007: 29-40, LARP 2008: 113-183, GMSMP 2009: 54-64<sup>45</sup>). Moreover, according to the recent ground survey of the LARP teams at Ban Kraud district, Buriram province in April 2010, some iron smelting sites were discovered from pre-historic times (Per. comm. with Dr. Surat Lertlum 2010).

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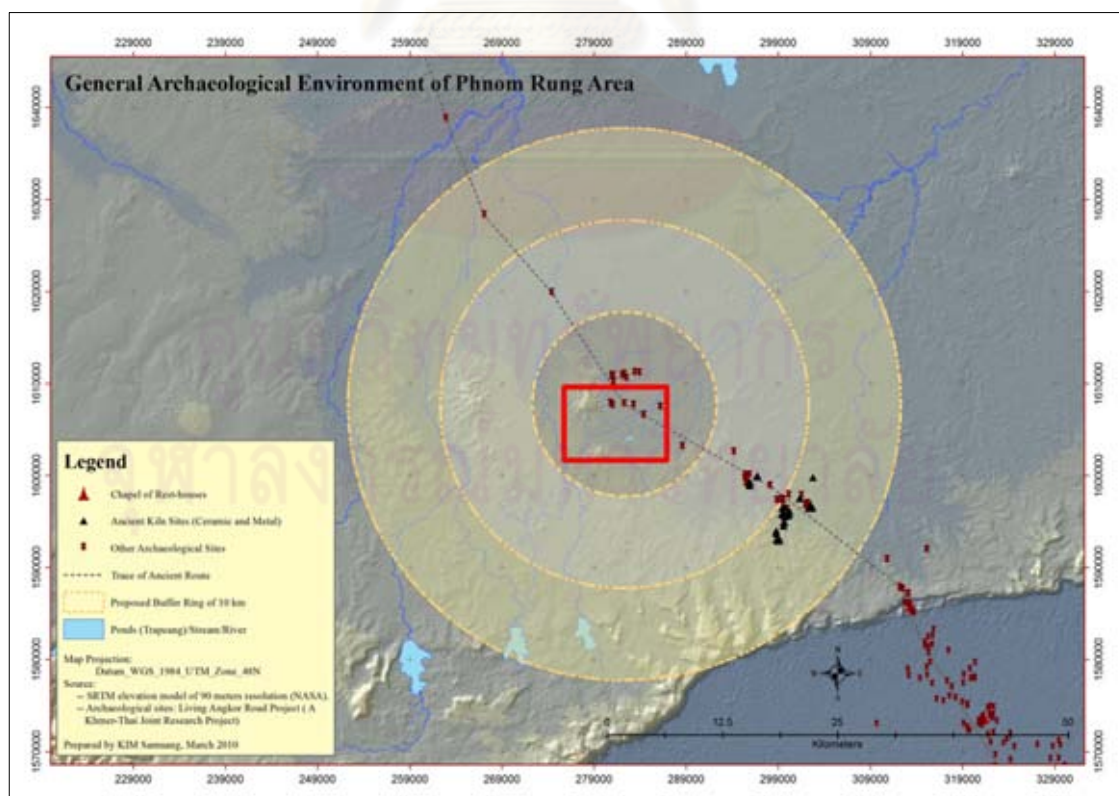
<sup>45</sup> GMS and Malay Peninsula Project (GMSMP) is a project studying the relationship of the ancient through present culture for the development of cultural and civilization database for GMS and Malay Peninsula regions. (Source: <http://gms.crma.ac.th/>)

Based on the large number of ceramic kiln sites and iron production sites located between the Dangrek mountain range and the Phnom Rung area, the general environment of the Phnom Rung area, which is situated in the proposed buffer zone of around 15 km to 30 km to the southeast, indicates that this area would have been a large significant ancient industrial zone, as mentioned earlier (Map 4-11, Map 4-12). Being a large and active industrial zone of ceramic and iron production, the general environment inside this zone would likely have been subject to pollution caused by the smoke from numerous ceramic and iron kilns. In this respect, it is not surprising that the residential places or towns/cities would have been set up a bit far from that zone.

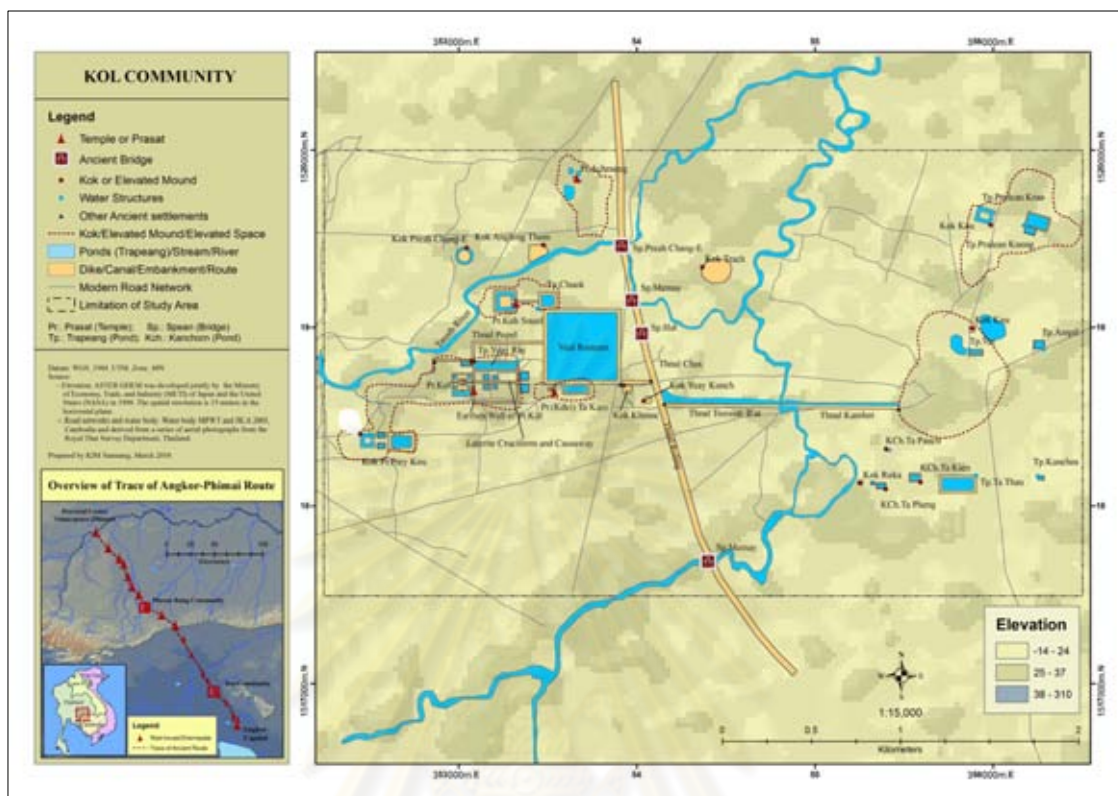
Accordingly, Phnom Rung, which has been identified as a large ancient agglomerate cities/area, was established at some distance from the industrial zone in order to avoid the pollution (Map 4-12). However, the Phnom Rung area was also close enough to the large industrial zone to facilitate and support the people who worked for the ceramic and iron kilns and lived around and inside this industrial zone. That is why in the vicinity of Phnom Rung, which was inside the area of this study, it is likely two public hospitals and one rest-house were established, even though not far from one another. In addition, all of the ceramic and iron production sites are located inside the study buffer zone of the LARP project (along the royal road from Angkor to Phimai) (LARP 2008: 31-33). Accordingly, Phnom Rung probably would have been a place to distribute and trade the ceramic and iron production to the capital of Angkor and to other provincial towns.



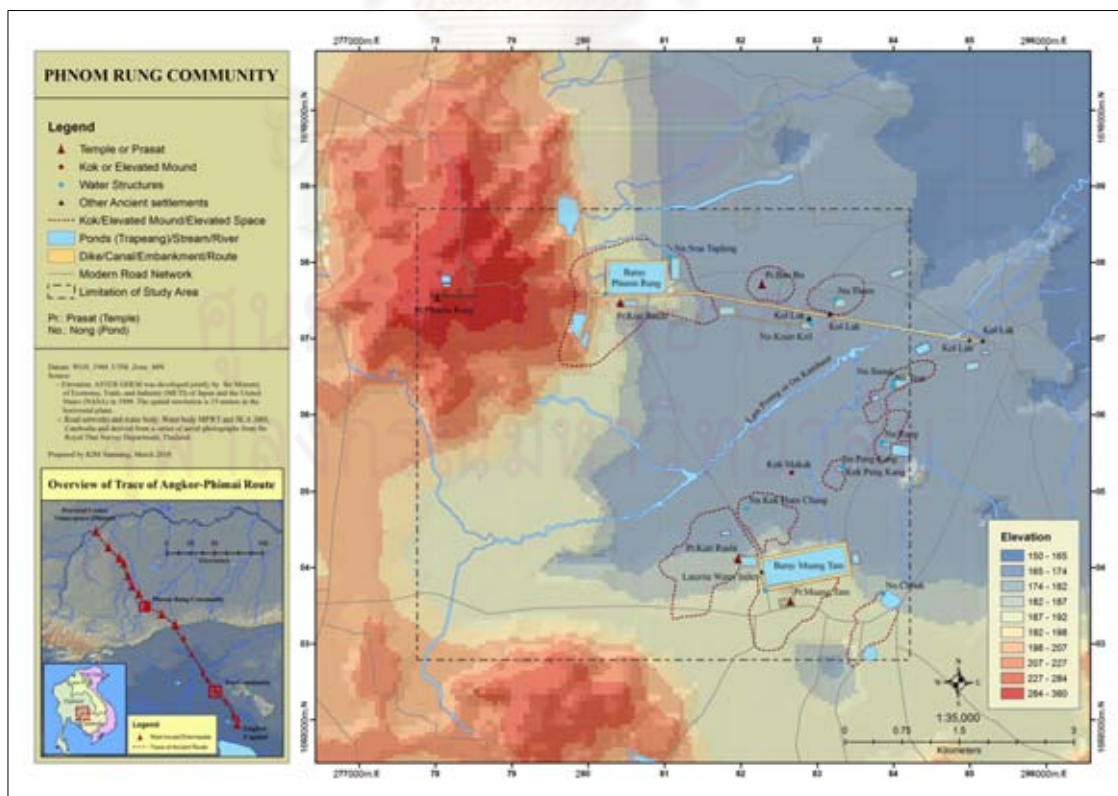
**Map 4-11:** Ancient industrial sites at Ban Krud, Buriram (Ceramic kiln sites (red dot) and Iron smelting sites (yellow dot)). (Larp 2008: 19).



**Map 4-12:** A proposed buffer ring of 10km of Phnom Rung (map in 2010)



Map 4-13: Elevation of Kol area (map in 2010)



Map 4-14: Elevation of Phnom Rung area. (map in 2010)



### ***b. Public Civil Engineering Structures: Ancient Stone Bridge***

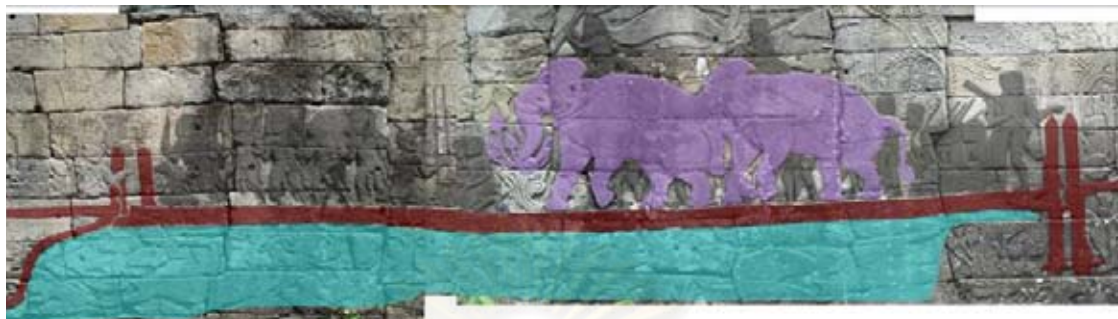
The civil engineering experts constructed numerous bridges made of sandstone and laterite block, as well as wood, in order to develop and facilitate the public infrastructure networks throughout the Angkorian kingdom. These bridges served multiple functions, acting as communication and transportation networks, as an irrigation system, and to protect the roads from flood waters (Vickery 1998, Groslier 1979, Hendrickson 2007, Bruguier 2000). At the present, many of the stone bridges still remain, but, naturally, the wooden bridges have long gone. Nevertheless, evidence of the wooden bridges is clearly showed on the bas-reliefs of Banteay Chhmar, which indicates that the wooden bridge could have supported hundreds of tons due to the presence of two large elephants accompanied by many armies show in the carvings (Figure 4-2) (Bruguier 2000: 541). Significantly and literately, the term “bridge” or “Spean” in Khmer was found in ancient stone inscriptions. For example, the inscription of Trapeang Don Ong during the 12<sup>th</sup> century (K.254) describes “*Saṅ svān*” (*Sang Spean*), which means “construct the bridge”. Physically, there are various sizes of bridges in accordance with the geographical area. The measurement of the stone bridges that have been discovered have an length in average from 6.5 to 149 meters and a width from 4 to 14.5 meters. The bridges have from 3 to 34 arches, with a height from 3 to 10 meters. Most of the bridges were decorated with Naga balustrade along both sides (Im 2004, Bruguier 2000). For example, the largest stone bridge, named Spean Top, encompassing 149 meters in length, 14.5 meters in width, 10 meters in height, 34 arches and is flanked by Naga balustrades (LARP 2007, 2008; Im 2004).

More interestingly, the expansion of the stone bridges and their construction material can be found in the inscription of Preah Khan temple during the reign of king Jayavarman VII: “*the bridge built of laterite in all directions [...]*” (Maxwell 2007: 77)

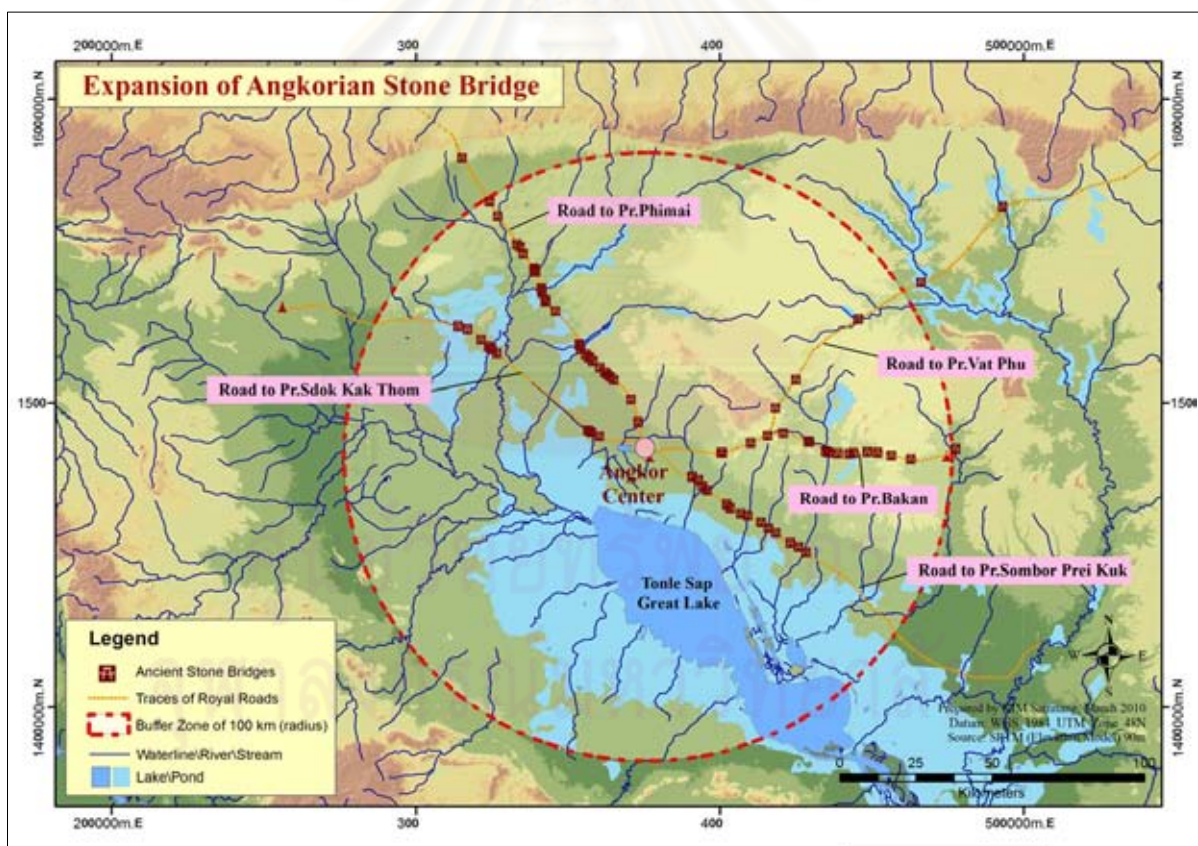
- 5 stone bridges inside the capital of Angkor (Im 2004)
- 23 stone bridges along the road from Yashodharapura to the pre-Angkorian city of Sambor Prei Kuk (the Southeast Road) (Bruguier, 2000; Im 2004)
- 19 stone bridges along the road from Yashodharapura to Preah Khan Kompong Svay or Bakan and further to the Champa capital and to Vat Phu temple (the East Road) (16 to Bakan and Champa, and 3 to Vat Phu temple) (Bruguier 2000, Hendrickson 2007),
- 23 stone bridges along the road from Yashodharapura to the Sdok Kok Thom temple (the West Road) (Bruguier 2000, Im 2004),
- 32 bridges along the road from *Yashodharapura* to *Vimayapura* (Angkor-Phimai) (the Northwest Road) (LARP 2007, 2008).

Therefore, hundreds of stone bridges were without a doubt scattered along all directions of the royal road networks which led from the Angkor capital of *Yashodharapura* to provincial towns. However, the identification of these stone bridges has only been inside the proposed buffer zone of 100 kilometers (Bruguier 2000, Hendrickson 2007). It could be supposed that the presence of stone bridges would illustrate the limits and/or demarcation of the influence of Angkor at that time, however until now, no further stone bridges have been discovered (Map 4-15) (per.comm. with Im Sokrithy 2010).

In this aspect, it is not surprising that Kol, which is located inside the proposed zone of 100 kilometers of the stone bridges analysis map, has stone bridges scattering along the royal road from Angkor to Phimai in the greater Angkor area. These stone bridges are the Preah Chang Er bridge, the Memay bridge and the Hal bridge laying on an alignment along the royal road. Conversely, at Phnom Rung which is situated outside the proposed buffer zone of 100 kilometers, no stone bridges have been identified.



**Figure 4-2:** Wooden flooded bridge on the bas-relief sculptured at Banteay Chhmar temple, 12<sup>th</sup> century. (Srun Tech 2009)



**Map 4-15:** The extension of stone bridges scattering along the royal roads of Angkor capital city to the provincial center towns. (map in 2010)

- ***Other Man-made Structures: Sandstone Posts/Stakes, Thmor Kol ?***

Interestingly, ‘*Kol*’ or ‘*Gol*’ which refers to a ‘stake, post, or pillar’ can be found in many inscriptions, such as inscription K.831, K.512, K.521, K.542 and K.248 (Prasat Ta Kam). For example, in the inscription of K.248 of Prasat Kol found at the Kol area, the term of “*Kol (Gol)*” is clearly described two times in the 9<sup>th</sup> and 13<sup>th</sup> stanzas as “*Samnan gol*” (Coedès 1951: 95). The term of “*Samnan gol*” means “stone post/stake structure”. In addition, this inscription mentions King Paramesvara (Jayavarman II) regarding a donation of land together with the installation of *Kol* (stone pillars) at the borders indicated by the four points of the compass (Coedès 1951: 95-96, Aymonier 1901a[1999]: 181). Likewise, *Kol* was discovered in the stone sketch plan of land parcels or villages in the inscription K.542 on the doorjamb of the 11<sup>th</sup> century of Kleang temple (Figure 1-3) (Coedès 1951:223).

According to the LARP report in 2008, the results describe that 14 *Thmo Kols* were discovered, some of which are located along the roads and others were installed along the border of the rice fields. These *Kols* were categorized into two forms of posts: “one was sculpted a lotus flower on top; and other one was curved on the top formed lotus petal or pyramid. Some posts were sculpted on its faces into Buddha images” (LARP 2008: 271). Thus, it could be supposed that this result of the LARP team obviously supported the inscriptions.

In this aspect, the four *Kols* that were found aligned along the old road in the vicinity of the Phnom Rung area would probably be the post road (???). However, these *Kols* are still debated and doubted among the scholars who need to conduct further study. On the contrary, at the Kol area, which has inscriptions describing the *Kol* structure to demarcate the border of the land parcels, no *Kols* were found around or at this area.

Therefore, it could be concluded that the differences in the Kol and Phnom Rung areas can be seen in the following: the general environment and geography, the presence of civil engineering structures of stone bridges together with doubtful remains of *Kols* (stone post/stake).

## CHAPTER V

### CONCLUSION

Along with the emergence of the Angkorian Empire from the 9<sup>th</sup> century onward, the Angkorian kings who ruled the capital at the sloping plain from the northeast to the southeast between the Kulen mountain range in the north and the Tonle Sap Lake in the south, expanded their territory over almost the entire mainland Southeast Asia. The existence of Khmer sacred worship monuments and other archaeological remains, particularly inscriptions, in the territory to the northwestern part of the former Angkor capital, including the area of Northwest Cambodia and Northeast Thailand, indicates that there were numerous significant Khmer monument sites in this area, together with a large number of important inscriptions, that had been spread throughout this region from the 6<sup>th</sup> or 7<sup>th</sup> centuries onward (see Aymonier 1999a,b [1902], Lajonquière 1902-1911, Coedès 1942, 1951, 1953, 1954, Wolters 1974, Jacques 1989, H.R.H. Sirindhorn 2004, LARP 2007, 2008). Later, because of the presence of these older settlements that occupied this region, the Angkorian kings were interested in further expanding their power and territory by establishing satellite provincial towns, public route networks, and small and large sacred worship temples throughout this area, including to the ancient town of *Vimayapura*, Prasat Phimai, Prasat Phnom Rung, Prasat Muang Tam and a royal route network and its associated structures from Angkor to Phimai.

According to a previous studies of the LARP team (2007, 2008), Im et al. (2007) and Preeyanuch (2005), Kol and Phnom Rung were ancient agglomerate areas located along the principal royal road from Angkor to Phimai which were densely populated during the Angkor period, evidenced by the presence of numerous sacred Khmer monument sites and other ancient settlements, such as worship temples, rest-houses chapels (*Dharmasalas*), hospital chapels (*Arogyasalas*) and local road networks. Accordingly, and similar to LARP's research methods, in order to collect all necessary data for this research, advance technology using the GIS and Remote Sensing techniques have been applied to this study. To ensure the accuracy of the needed data, ground truthing surveys were conducted in the field using a GPS to pinpoint locations of each

site and the drawing of manual maps of the general characteristic lay-out of each ancient settlement using a sketchbook and army compass. Furthermore, inscriptions and the artistic decorations of architectural features of the temples, such as lintels and pediments or frontons, have been studied in order to modify previous studies and to ascertain to what extent the influence of Angkorian civilization influenced these two areas.

The results illustrate that as a result of the expansion of Angkor from the 9<sup>th</sup> to 13<sup>th</sup> century, the civilization of Angkor had a strong influence throughout the huge territory which almost completely covered all of mainland Southeast Asia. For instance, the ancient agglomerate areas of Kol and Phnom Rung areas were significantly influenced by Angkor civilization in such areas as public infrastructure (artificial water structures and road networks), sacred worship places and their general space lay-outs, ornamentations of architectural features and other man-made structures.

Finally, as crucial agglomerate areas along the same royal road, Kol and Phnom Rung shared many more similarities than differences. The similarities found at these two areas can be divided into four significant categories.

Firstly, the principal sacred worship temples located inside the vicinity of these two areas share similar aspects in terms of architectural plan features, construction materials, periods of construction, lintel artistic ornamentation styles and characteristics of general space lay-out. For instance, Prasat Kol and Prasat Phnom Rung were erected in the same architectural plan lay-out, called an “axial plane”, which was popularly used in town or cities during the Angkorian time. The axial plane of these temples consists of an access causeway flanked by two lines of stone pillars leading to the main structural worship building. On the other hand, without the access causeway of Prasat Kol, this temple and Prasat Muang Tam were similarly designed in terms of a plan and some lay-out features. The plan of these two temples is called a “centered plane” with the same L-shape moats within enclosure walls. Furthermore, all of these temples used fine grain pink, red, or grey sandstone block as the main construction material. Finally, the artistic decoration of the lintel styles indicates that Prasat Kol, Prasat Phnom Rung and Prasat Muang Tam can be grouped in a similar decorative lintel styles groups: Khleang and Baphuon lintel styles between the late 10<sup>th</sup> to 11<sup>th</sup> centuries.

In addition to the general characteristics of the space lay-out, the temples were designed with similar specific space lay-outs as the temples situated in the Angkor capital. In short, all principal sacred monument sites were erected together with at least one large man-made water reservoir associated with the temples, such as the large water reservoir of *Veal Roneam* to the east of Prasat Kol, *Tonle/Baray Muang Tam* to the north of Prasat Muang Tam, and the *Baray Phnom Rung* to the east of Prasat Phnom Rung.

Apart from these main temples, there are a number of worship temples including hospital chapels (*Arogyasalas*) and rest-house chapels (*Dharmasalas*) that were built in particular forms during the reign of King Jayavarman VII. The particular way of building hospitals and rest-house chapels was with laterite block as the main construction material and they were generally designed with the same form throughout the kingdom. The form of a hospital chapel is composed of a main central sanctuary facing the east, a small library edifice to the southeast, a laterite enclosure wall surrounded these two buildings, a laterite pond to the northeast and an earthen pond to the east. The form of a rest-house chapel is comprised of a main sanctuary facing the east, with open windows to the south and ponds surrounded the main sanctuary. More importantly, the general space layout-out of these chapels meant that they were typically constructed close to a large water reservoir, a sacred worship temple, and near the royal road and local roads. For example, the hospital chapel, Prasat Ta Kam, is situated at the southern end of the large water reservoir of *Veal Roneam* and to the eastern side of Prasat Kol. The two hospital chapels, Prasat Kuti Rushi Muang Tam and Prasat Kuti Rushi Nong Baray Phnom Rung, are located near large water reservoirs, *Baray Muang Tam* and *Baray Phnom Rung*, respectively. In the case of the rest-house chapels, Prasat Archroeng and Prasat Ban Bu, they are located not far from the traces of ancient roads.

In relation to the date and the development of these two areas derived from the inscriptions and other archaeological artifacts, the results indicate that the areas started to be occupied from the 7<sup>th</sup> century and gradually became more populated from the 9<sup>th</sup> to 13<sup>th</sup> centuries. More interestingly, data derived from the inscriptions provides considerable information concerning the relations between the Angkorian kings and these two areas. For instance, various names of kings and important deities are described in the inscriptions found at Kol, such as: Jayavarman II in inscription K.248, Suryavarman I in

inscription K.245 and the name of the deity Lokeśvara, *Jagadīśvara*, in inscription K.244. Likewise, numerous names of kings, together with a description of their donation of servants, lands and other gifts, and the original name of Prasat Phnom Rung, are stated in the inscriptions found at Phnom Rung and three other inscriptions found at the Angkor capital. For example, Rajendravarman and Jayavarman V in inscription K.1120, and Jayavarman VI, Dharanindravarman I and Suryavarman II in inscription K.384. Furthermore, the original name of Phnom Rung can be found in many inscriptions: K.1067, K.1068, K.1090 and Phnom Rung inscription No. 8 found at Phnom Rung and Lovek inscription K.136, Trapeang Don Ong inscription K.254 and Phimeanakas inscription K.485 found in Cambodia. The words “Phnom Rung” refer to “Great or large mountain” and is derived from the Khmer words “*Vnam Run*” and the Sanskrit word “*Prthuśaila*”. Furthermore, the result of artistic lintel styles illustrates that in both the Kol and Phnom Rung areas, the lintel styles share similar characteristic style groups and periods. Additionally, a study of the lintel styles modifies the dates that appear in the inscriptions.

Secondly, there is a similarity in the general space lay-out and general characteristics of the numerous water reservoirs scattered throughout the vicinity of these two areas, in that they are constructed with similar physical characteristics, particularly the rectangular shape. These water reservoirs function to retain the water to supply the community’s annual consumption. The characteristic rectangular shape is generally erected in an east-west direction, although a small number of other physical characteristic might have been adapted to the actual geographical terrain.

Thirdly, the general space lay-out of *Kok(s)* or elevated places/spaces that appear in these two areas were developed in similar periods and their general characteristics were designed with similar space lay-outs. For instance, some *Kok(s)* found at Kol were established from pre-historic times and many were densely populated and urbanized from the 9<sup>th</sup> to 13<sup>th</sup> centuries. The *Kok(s)* found at Phnom Rung were settled from at least the 11<sup>th</sup> – 12<sup>th</sup> centuries and densely inhabited during 13<sup>th</sup> century during the reign of King Jayavarman VII. Moreover, generally speaking, the general characteristic of the space lay-out of these *Kok(s)* is that they are located near the sacred worship monumental sites and can be associated with surrounding water reservoirs, both small and large.



Fourthly, the general space lay-out of civil engineering structures, such as traces of road networks, canals, dikes and embankments, were established in similar ways in the vicinity of these two areas. For example, at Kol there were many ancient road networks, dikes, and embankments which are well connected with each other, both inside and outside the area. In particular, these roads are linked to the royal road from the Angkor capital to the provincial town of *Vimayapura* (Prasat Phimai in the northeast Thailand today). In addition, due to the presence of three ancient laterite bridges across the rivers flowing from the northeast to southwest inside the vicinity of Kol, it can be assumed that Kol was located in the greater area of Angkor, such that the Angkor court paid close attention to the development and organization of the public services similar to the areas inside the Angkor capital. Similarly, in the vicinity of Phnom Rung, traces of roads, canals, dikes and embankments also played an important role in order to serve that area.

Conversely, there are two general differences that can be seen in the Kol and Phnom Rung areas: the general environment and geography and the presence of civil engineering structures of stone bridges. Firstly, the difference of general environment and geography between Kol and Phnom Rung is: (1) the general geography: Kol is established on a slope from the northeast to the southwest with an elevation of around 20 to 30 meters, while Phnom Rung is set up on a slope from the southwest to the northeast with an elevation of around 180 to 200 meters; (2) the general environment: Kol is mainly surrounded by worship temples, while Phnom Rung was settled close to an industrial zone of ceramic and iron production. Secondly, the difference of the civil engineering structure of ancient stone bridge is that all of the stone bridges that have been discovered are only inside the buffer zone of 100 km radius of Angkor center, of which Kol is within and Phnom Rung is outside of.

In summary, Kol and Phnom Rung were developed into large and crowded agglomerate areas during the Angkor period from the 9<sup>th</sup> to 13<sup>th</sup> centuries evidence by the density of ancient settlements spread over these areas. Even though the Kol area was geographically very close to the Angkor capital and the Phnom Rung area can be considered to be a long distance from the Angkor capital in the provincial sphere, Angkor civilization strongly influenced the power and general public policies of both these areas. For example, the names of Angkorian kings and significant donations made to these areas

in past are inscribed on many inscriptions, as well as the presence of small and large worship temples, traces of road networks, water reservoirs (Baray Muang Tam and Baray Phnom Rung, in particular) and other man-made structures.

Utilizing the relatively new technology of GIS and Remote Sensing, together with a ground truthing survey and sketching each sites by using Global Positioning System (GPS), compass direction and sketch paper, a clear picture of the ancient settlement patterns of these two areas made it possible to discern the similarities and differences when comparing the areas to each other, as well as to the Angkor capital. As detailed above, these two areas share more similarities than differences. These similarities are: at least one large worship monument site with similar architectural plan, hospital and rest-house chapels and space lay-out, numerous water reservoirs in rectangular shape, and *Kok(s)* or elevated mounds or spaces developed during a similar period and with similar general characteristics. The differences are: the general environment and geography, and the presence of civil engineering structures of stone bridges.

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