



## Digitalisation of Heritage Conservation Documents of Rumah Uda Manap

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### Abstract

Pure's aspiration to preserve traditional Malay legacy deserves respect. However, heritage preservation and conservation are complex and costly. Reconstructing buildings through digitalisation to document the heritage conservation virtually would be the solution to save costs and time. The study was conducted on Rumah Uda Manap (RUM) in Kuang, Selangor. This research aim to digitalized the documents of RUM as part of conservation effort of traditional houses. The onsite-observation and virtual measurement is applied as the data collection method. This study has demonstrated that digital measured drawing has opportunities that can be explored as part of for the future conservation effort.

Keywords: Cultural Heritage ; Traditional Malay House ; Digital Drawing ; Conservation

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DOI: <https://doi.org/10.21834/ebpj.v7i21.3757>

### 1.0 Introduction

This paper intended to present a study on a traditional Malay building genre known as Rumah Uda Manap, which was chosen as an example of a conservation and preservation effort through digitalisation. In addition, this paper also will explore on how Rumah Uda Manap can be preserved and conserved by transitioning from paper-based sketches to digital drawing documentation from the beginning to the end. The conservation process is an extension of the age of the building so that the building remains functional (National Heritage Act 645, 2006). Furthermore, the uniqueness and influences of several components in Rumah Uda Manap will be analyzed and documented. According to the National Heritage Department of Malaysia (2016), the conservation process of heritage buildings practised today is divided into five workplaces: survey overview, dilapidation survey, documentation, conservation works, and maintenance plan. This paper is a part of ongoing research preparing an alternative method of documentation to conserve the traditional Malay buildings in Malaysia.

Traditional houses are a simple and straightforward constructional heritage, which resulted from the sympathy and cooperation of users, construction, and other artefacts through generations (Hui,2011). The Malay houses were also influenced by the environment and the people's way of life. According to Wen (2010), the overall design values of Malay traditional architecture show a wise adaptation of the users' livelihood, custom, natural beauty, and identity.

Nazrita and Khairul (2013) added that the architectural history of Malay houses inhabited by the Malays is unclear, as is the history of their homes. Incomplete records prove that the Malay community already has been placed in groups of villages, usually built on the banks

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of the river or the edges of the sea. A traditional Malay house is an architectural heritage that belongs to the Malays, one of the many ethnic groups residing in Malaysia.

Maintaining and conserving traditional Malay houses can be expensive; however, this issue can be solved with the advancement of digitalisation technology which can be achieved through 2D or 3D digital drawing. This study aims to represent the uniqueness and the beauty of the traditional Malay architecture of Rumah Uda Manap (RUM) that could benefit society in understanding the integration between aesthetic value and functionalism. This study also could add value to heritage and conservation works, from paper-based sketches to digitalisation reconstruction drawing documents.

### 1.1 Research Objective

This study aims to discuss how conservation and preservation efforts can be made through digital media (2d drawing). The preservation can be achieved by recreating the Rumah Uda Manap into digital media drawings (2D drawings) from paper-based sketches.

Furthermore, this paper also describes the morphology of Rumah Uda Manap for documentation and further discussion of cultural heritage to increase the younger generation's interest and appreciation of traditional Malay houses.

### 1.2 Efforts in Conservation of Heritage in Malaysia

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has established working committees and manuals to ensure that cultural heritage worldwide receives proper attention and protection. However, according to Said, S. Y (2013), conservation is merely based on the restoration and maintenance of individual buildings. For many years, the idea of protecting historic buildings through protection, preservation, adaptive reuse or restoration was not given the same importance as new development (Said, 2007).

The World Heritage Convention in 1972 acknowledges 'monuments, groups of buildings and sites as heritage. However, the conservation of architectural heritage in Malaysia is still limited, suffering challenges related to archiving and documentation (Mohd-Isa, A.F, 2011). Referring to UNESCO's definition of heritage, it can be categorized into cultural heritage, natural heritage and heritage in the event of armed conflict. The Rumah Uda Manap was chosen to be part of our efforts in the conservation of heritage, and Rumah Uda Manap falls under the "cultural heritage" category.

According to Suaib, Ismail, Sadimon and Mohd Yunos (2020), cultural heritage is diverse and further divided into tangible and intangible cultural heritage. Tangible cultural heritage generally includes all things that can be observed, such as things (movable – such as coins and paintings, and unmovable – such as sites and monuments) both on dry land and underwater. On the other hand, intangible cultural heritage deals with more subjective aspects such as tradition, dances and rituals.

Despite living in the digital era, virtual conservation is the available alternative that can be done while the building still exists. However, as stated by Suaib, Ismail, Sadimon and Mohd Yunos (2020), few efforts were made to use computer graphics and media technology to preserve cultural heritage. That included a virtual reconstruction of iconic heritage buildings, digital conservation of Malay architectural heritage (Rumah Tok Su – a traditional Malay house in Kedah), recreating the 3D model of conventional Malay house (Teratak Zaaba), virtual preservation of panoramic Kota Kuala Kedah and 3D preservation of the A Famosa Fortress in Melaka.

## 2.0 Literature Review

The Rumah Uda Manap was claimed to be a sample due to its unique design. The house was built by Chinese craftsmen from Indonesia which located on the banks of the Perak river. The study of Rumah Uda Manap discovered a Malay settlement on the banks of the Perak River near Kampung Ngior, Tanjung Blanja, which today is known as Parit. According to the research, the origins of Malay architecture were located in Perak, along the banks of Sungai Perak, where the first Malay towns were established (Sabriza, Nurfaizal, and Kartina, 2021).

### 2.1 An Overview of Rumah Uda Manap (RUM)

Heinrich (2022) stated that two (2) versions of storytellings refer to the origin of the construction of RUM. The first version suggested that RUM was built by Maharaja Lela, a Malay nationalist from Perak, in 1875. Maharaja Lela, the assassin of Birch, supposedly substituted an enslaved person to be hanged in his stead and went into exile, but later came back and built the RUM. Another version of the story that seems more plausible is that a wealthy migrant from Sumatra, Indonesia, named Uda Manap, built the house for his bride, Ngah Porbu, in the 1980s. Ngah Porbu was a rich woman who brought beautiful textiles, jewellery, and household artefacts with her.

According to the local custom or 'adat' prescribes that property is held by women, by right, the house should be known as Rumah Ngah Porbu. Ngah died in 1946 and left the house to her granddaughter, who married a descendant of Maharaja Lela. Ngah's granddaughter died in the '80s and left the house to her youngest daughter, Rohani.

### 2.2 Relocation of RUM to Rimbun Dahan, Kuang, Selangor, 1998

Traditional values and knowledge benefit practitioners, architects, academicians, and societies. The continuation of Malay traditional houses relies on preserving originality by creating current regional architecture (Iskandar, 2001). Hijjaz Kasturi, a Malaysian architect, had all the rights of ownership for RUM. Hijjaz Kasturi was in charge of relocating, renovating, and rebuilding RUM in Rimbun Dahan, Kuang, Selangor, Malaysia. Many people do not believe that the 100-year-old house was once an old-fashioned house with extensive damage based on the structure of RUM's current building structure. In 1998, the 100-year-old kampung house was demolished, transferred to Rimbun Dahan's grounds, and repaired (see Figure 1). Much of the diagonal wood panelling was decayed and cracked, and the roof and

floorboards had fallen (see Figure 2). Fortunately, the majority of the structural parts remained intact. Before dismantling, all timbers, carvings, and shutters were numbered and photographed (Heinrich, 2022).

Moreover, Heinrich (2022) stated the room area (also known as “rumah dapur”) behind the “rumah ibu” were not worth rescuing. They had been built of inferior materials and lacked of decorative detail. Thus they were measured and archived from the remains but nothing was relocated from this portion except some carvings, plain window shutters and a pair of doors.

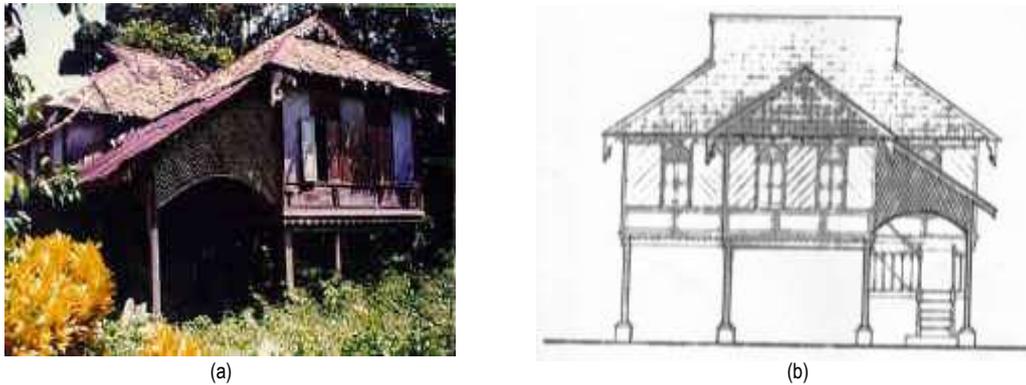


Fig. 1: (a) RUM in Kampung Ngior before relocated to Rimbum Dahan; (b) East façade of RUM paper-based sketch drawing. (Source: Rimbum Dahan Website, 2022)

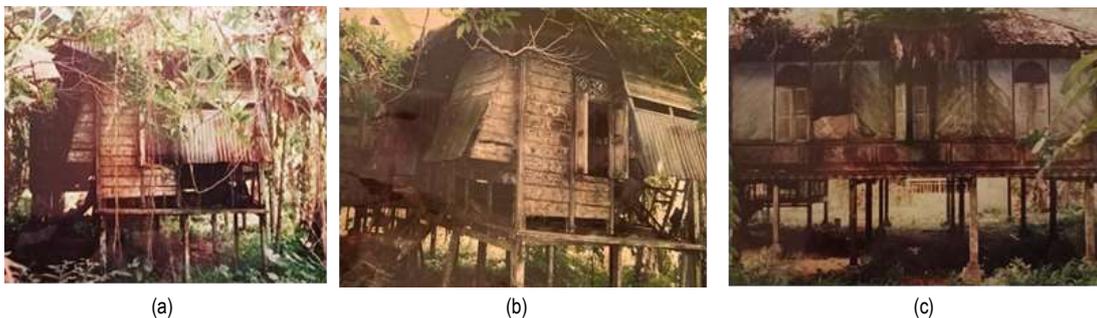


Fig. 2: (a) Existing condition of RUM at “rumah dapur” area; (b) The wall and the floors of kitchen area of RUM had partially collapsed before the relocation to Rimbum Dahan; (c) The existing condition of west elevation of RUM. (Source: Rimbum Dahan Archived, 2022)

### 2.3 Rebuilding of RUM

The current RUM layout plans follows the original with several adjustments, which involved the main entrance that being moved to the opposite side to suit the new site, the original sloped down “selang rumah” is being flat that leads to the new kitchen area, a staircase and a back bedroom. A new toilet and shower were also added below the new kitchen. Old timber was utilized amid the rebuilding stage wherever conceivable.

### 2.4 Uniqueness of RUM design and influences

According to Noorul Huda and Anuar (2018), culture and environment are essential factors in home design. RUM featured a classic Perak house in form and plan, but its decorating is distinctive because Chinese artists made the house in Indonesia. RUM has a wide range of ornaments and sculptures. The wood carving mixes two cultural aspects (Malay and Chinese) in one house. Chinese motifs, dragons, phoenixes, and calligraphy letters are blended with flowers and birds in the wood carving of the wall panels and window shutters. Chinese cultural components are underlined with themes of 'Eng Ling' (Golden Dragon sculpture), which is associated with control and protection in Chinese beliefs. The Emperor, a divine, mythical creature, the natural world, adaptation, and metamorphosis are all represented by dragon themes, according to Julien (1989). The Phoenix motif, often called "Feng" or "Fenghuang," is thought to bring good luck and prosperity.

### 2.5 Decorative Elements at RUM

Decorative elements are the non-structural components considered an additional component to the building that adds an aesthetical value (Sabrizza, Nurfaisal, and Kartina, 2021). At the roof edge, there is an “Ande-ande” and window head or “Kepala cicak” from traditional Malay elements positioned at the corners of the roof eaves (see Figure 3(b)). Mohd and Sufian (2013) mentioned that at least two types of *ande-ande* are the single-piece type with carvings on a single long timber piece and multiple pieces with carvings on multiple timber pieces arranged from one side to another. As for RUM, the *ande-ande* is under the type of carvings on a single long timber piece. Other than that, there is also a convex wall “*dinding papan kembung*” seen at RUM (see Figure 3(a)). According to Heinrich (2022), Helen Crawford, the Australian resident artist at Rimbum Dahan, has designed the new carved panels outside the gap area “*selang*” to reflect the house's unique purpose.

A study done by Sabriza, Iryani, Rohaslinda, Mohd Nur Faisal, and Kartina (2018) stated that there are two types of "Kepala tingkap" which can be identified as a rectangular panel and semi-circle panel. The said types of "Kepala tingkap" design are used in RUM. "Kepala tingkap," which means window head, is a decorative piece of timber on top of the window. The motifs of the flora and birds on the head of the door, windows, and wildlife in native Malay houses highlight the art of Chinese-style craftsmanship built in RUM. The "Kepala pintu" literally means door head. It is a decorative piece of timber on top of the door. Apart from aesthetics, its function allows sufficient cross-air ventilation to flow into the house.

The flora and bird motifs on the door head, windows, and couches that are rare in authentic Malay houses again highlight artisanship Chinese-style, permanently built at the main home. Birds in Chinese culture are associated with the freedom sun and served as a family emblem in ancient China (Jian, 2006). The entire building of RUM is painted with motifs having different colours in exterior and interior layout. It is due to the influence of Chinese architecture as the Malay traditional houses usually maintain non-painted wood colours.



Fig. 3: (a) Malay-Chinese motif elements on the convex wall "dinding papan kembang"; (b) "Ande-ande" and window head "Kepala cicak" decorative elements at the roof edge. (Source: Author, 2022)



Fig. 4: Semi-circle and rectangular panel of window head "Kepala tingkap" that can be found at RUM (Source: Author, 2022)

### 3.0 Methodology

Table 1. The framework

Stage	The process
Stage 1	Virtual research
Stage 2.1	Virtual and physical data/ observation
Stage 2.2	Verbal data
Stage 3	Digital reconstruction

(Source: Author, 2022)

The research gathered data from various methods: observation, field measurement, pictorial documentation, and computer graphic simulation. The information collected is very useful in getting in-depth knowledge and reconstructing the image of the house. The following

section presents the transformation of the house from paper-sketch-based into digital drawing using the software Autocad. Data was collected in several stages (see Table 1).

### 3.1 Virtual Research

Stage 1: Literature reviews from conference papers, journals, books, websites, and unpublished theses were analyzed. This research recognizes the Malay social context and the *Negeri Perak* Traditional House's architectural style. The analysis establishes the study's limitations using online resources, and the case study diagrams are made after the data is analyzed.

### 3.2 Virtual and physical data/ observation

Stage 2.1: The primary data is collected using cameras, measured drawings, and technical sketches. The researcher must first be able to perceive and interpret graphics and illustrations within the field of architecture education, not only in more precise ways but also in more sensorial ways, to meet a crucial requirement, namely the possession of a special detailing on proportion and measurement. Through the photo, every angle has been taken into consideration, including the front, rear, staircase view, the left side, the right side, the door, the window and the interior. The observation focuses on building structure, space planning, organization and carving detailings that reflect the Chinese influence on the house.

### 3.3 Verbal Data

Stage 2.2: The collection of verbal data is involved with questionnaires and semi-structured interviews. Through the questionnaire, this research gathered the history and background of the house; important events occur and the origin of the construction of the house. Unfortunately, it is difficult to reconstruct the real image of the RUM based on the existing sketches and research during the pandemic period; more data was gathered through the photos and interviews after Movement Control Order (MCO) ended.

### 3.4 Digital Reconstruction

Stage 3: Specifically using the Autocad and Revit software, a computer graphic simulation is one of the techniques used to simulate the image of the house in 2D and 3D. The usage of the programme allowed for a better presentation of the building's picture and understanding to audiences of various skill levels. Figure 5(a) and 5(b) shows the technique used in Autocad in determine the actual size of the house. The method is used specifically for virtual measured or the place that is not reachable to measure to determine the dimension of the building components. All information was recorded, and all captured photos were analyzed to determine potential outcomes. After extracting relevant sources and examining connections across analyses, the data was justified. Finally, technical drawings were created and included in the results.



Fig. 5: (a) Shows the aligned method (using reference line and standard window measurement as basis); (b) Tracing and re-align the paper sketch into Autocad  
(Source: Author, 2022)

## 4.0 Findings

The need for cultural heritage conservation through digital media platforms depends on the availability of reference materials. Even though there is an archived paper-based sketch for RUM, it is advisable to provide nearly accurate references of 2D drawings to be used by future generations for different purposes such as education, exhibition, 3D printing, etc. It can be seen that through digital conservation, the focus is being given to visual evidence to visualize the building either in 2D drawing or 3D drawing. In the case of the RUM building, it is under the category of "tangible" cultural heritage.

Conservation of RUM through digital media platforms can be highly achieved by referring to the existing visual reference materials such as paper-based sketch drawings and photographs and the measured drawing being done on-site. Since the traditional Malay house consisted of complex architectural detailing such as decorative elements, it is important to prioritize the site observation. Observation would be the key feature to keep all technical records of RUM whenever/ wherever needed.

This study established the existence of decorative elements that represented the uniqueness of RUM. Most of the decorative elements that could be found in RUM can be categorized under "aesthetics" value that embarked under non-structural element. Basically few decorative elements that can be highlighted due to its uniqueness in RUM namely, (1) *Ande- ande* (2) *dinding papan kambung*, (3) *Kepala tingkap* and (4) *Wood carving*. The (1) *ande- ande* at RUM are the one that being carving on a single long timber piece (see Figure 6).

RUM represented the owner's social status through its design. The (2) *dinding papan kambung* (see Figure 7) of RUM is different from the other traditional Malay houses and was found in the various motifs and philosophies. The motifs of the flora, birds, and dragons portrayed the combination of cultural elements of the Malay- Chinese style.

Furthermore, the (3) *Kepala tingkap* of RUM symbolizes living organisms such as birds due to its influence of combining cultural elements with hidden meanings. "*Kepala tingkap*" is the decorative piece located at the window. The finding shows (see Figure 8) that RUM installed "*Kepala tingkap*," which has rectangular and semi-circle panels. Both types are carved in "*tebuk tembus*" wood carving with floral and bird motifs with essential function as the ventilation opening.

The (4) *wood carving* elements' influence combines Malay and Chinese cultural elements (see Figure 9). Adaptation is evident in architectural design, components, building materials, and finishes. The uniqueness of the architecture with a combination of materials and spirituality to bring a variety of meanings has made RUM very special.

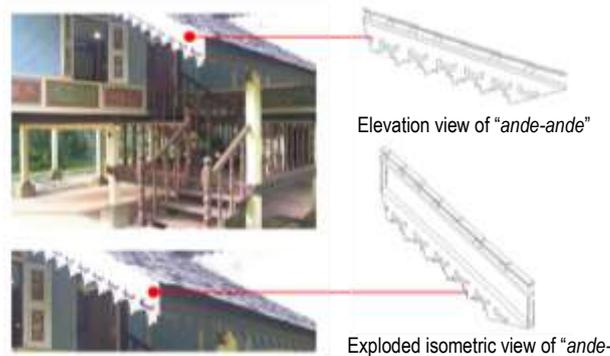


Fig. 6: 2D and 3D drawing transition of "Ande- ande" in RUM  
(Source: Author, 2022)

Figure 7 shows some examples of different decorations of wall panels on the west elevation. Both unique features are painted with various motifs, making RUM more unique, resembling Chinese architecture than Malay traditions focusing only on natural wood.

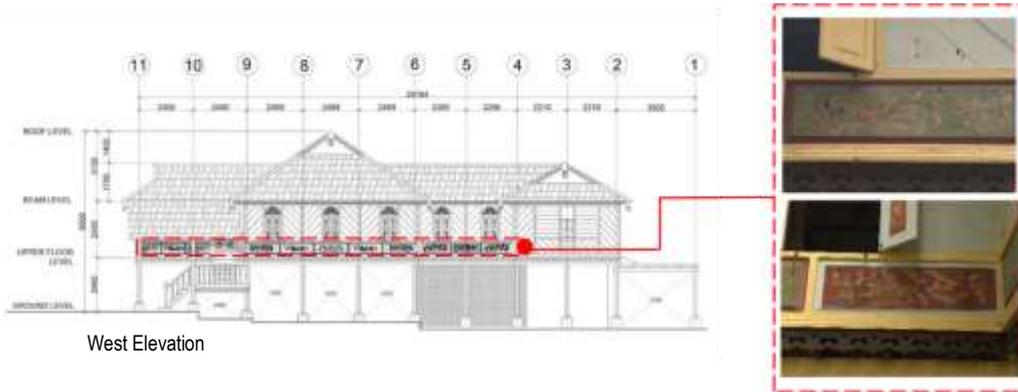


Fig. 7: Wall panel (*dinding Papan kambung*) that got various motifs and philosophies on the carved wall panels and window shutters.  
(Source: Author, 2022)

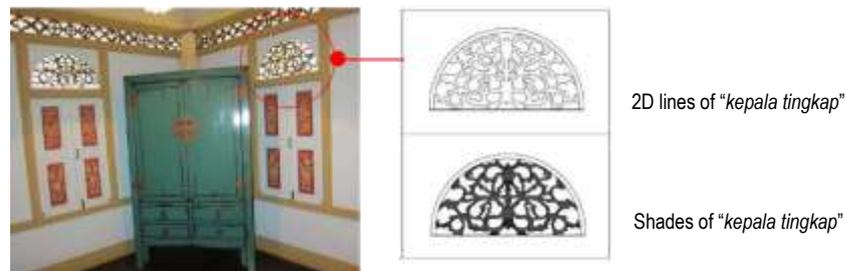


Fig. 8: "*Kepala tingkap*" of RUM comes with decorative timber representing the flora and birds on the head of the door.  
(Source: Author, 2022)

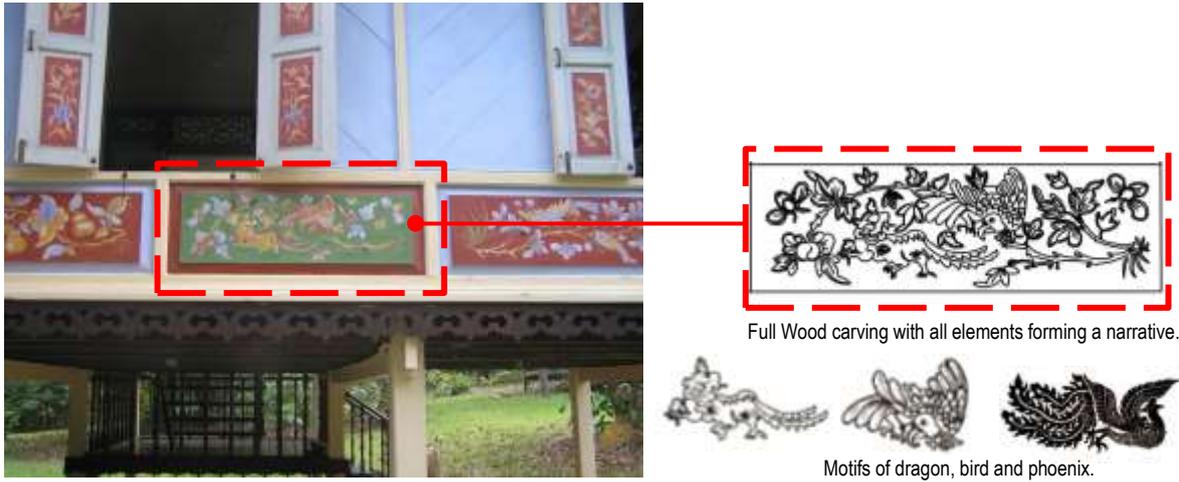


Fig. 9: Wood carving of wall panel at RUM that portrayed the combination of cultural elements of the Malay- Chinese element. (Source: Author, 2022)

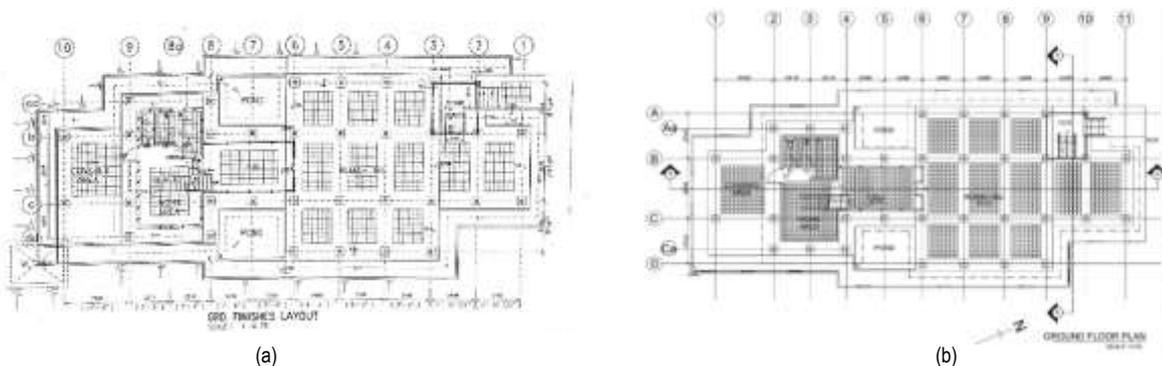


Fig. 10: (a) Paper- sketch drawing (blueprint) of RUM; (b) Recreating original drawing of ground floor plan to 2D Drawing.

Several concerns were addressed in this study due to the lacked a blueprint. The measurements were taken from a paper drawing, and photographic evidence was gathered during observation and site visits. Some hidden components, such as roof structures, were being constructed and referred to as ordinary traditional house construction. Few comparable studies have been done to reconstruct the roof structure of RUM because it is built in the *Rumah Perak* style. The whole floor plan was reconstructed, referring to the sketch drawings (as depicted in Figure 10 and Figure 11) and elevations (Figure 12 and Figure 13) of the RUM can be recreated using pictorial evidence.

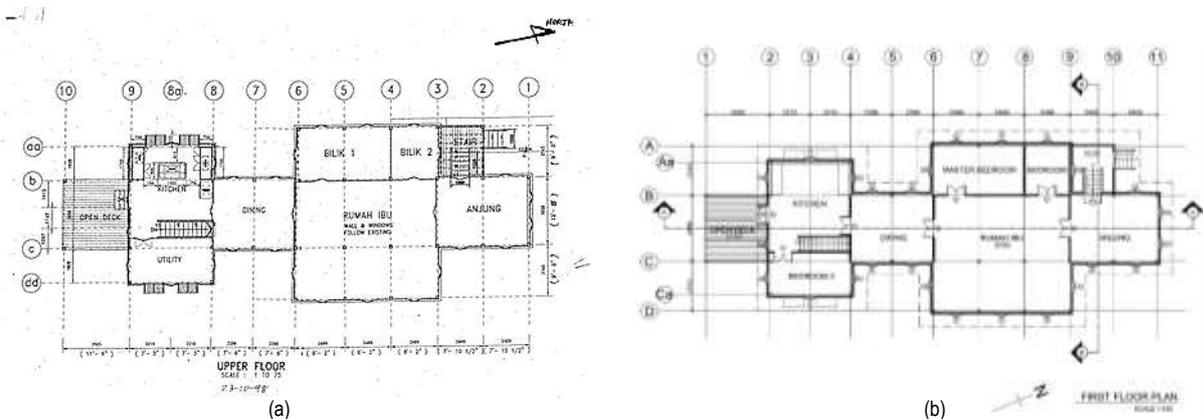


Fig. 11: (a) Paper- sketch drawing (blueprint) of RUM; (b) Recreating original picture of first floor plan to 2D Drawing.

The west elevation has the improvised version of the illustration due to different levels found during the site visit to the RUM. The differences in levelling are located in the main house (*Rumah ibu*), the gap (*selang*) and the kitchen (*rumah dapur*) area. The findings are shown in Figure 12.

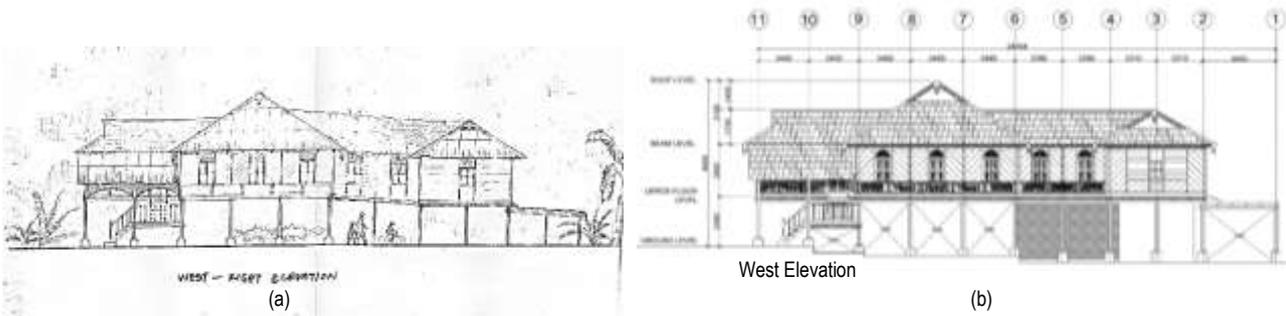


Fig. 12: (a) Paper- sketch drawing (blueprint) of RUM; (b) West elevation shows the differences in ground level.

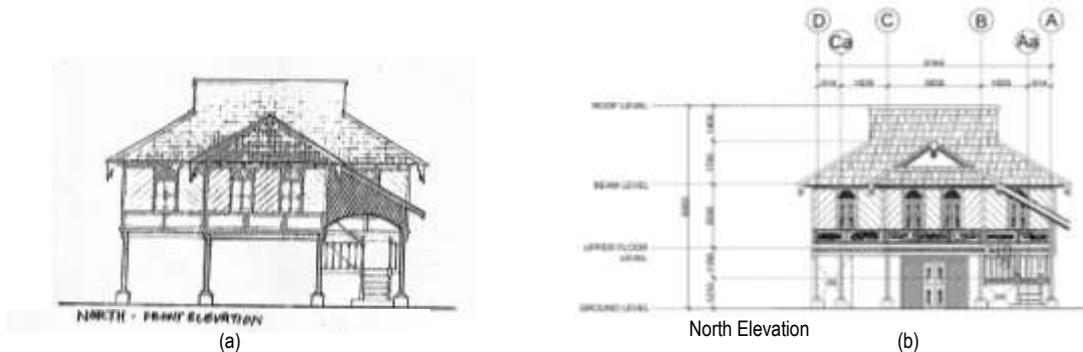


Fig. 13: (a) Paper- sketch drawing (blueprint) of RUM; (b) North elevation offers the second entry room underneath the house, accessible via the kitchen stairs after the house's relocation.

#### 4.1 Digital Drawing Media as Conservation Efforts of Rumah Uda Manap (RUM) heritage

It cannot be denied that digital media technologies have been widely used in documenting cultural heritage, especially those that embarked under the "tangible" cultural heritage category. Many research studies utilize digital drawing media as their tools to conserve, preserve and archive architectural heritage in Malaysia. The same goes for RUM, whereby through digital drawing media, it offers digital representation. However, further research needs to be done if RUM heritage is set up as an online world heritage site.

#### 4.2 Issues and Challenges

Many benefits can be achieved through digital conservation. However, two issues and challenges can be highlighted during this research. Firstly, even though there is a paper-based sketch of RUM that can be referred to, architectural evidence is still lacking. In addition, some of the measured drawings, such as roof structures, were inaccessible. Thus, comparable studies are being conducted that suit the RUM roof style characteristic of Rumah Limas Bumbung Perak.

Next, it is quite challenging to recreate the decorative carvings of RUM digitally because each wood carving has different characteristics due to the influence that mixes of two cultural aspects (Malay and Chinese).

### 5.0 Discussion

Based on the research, most conservation and preservation efforts mostly embarked on tangible cultural heritage, especially digital media technologies. Through digital media platforms, there is so much to offer, and it also creates endless possibilities for cultural conservation efforts. It can be used for documentation, reconstruction and visualization. RUM represents the integration between functionalism and aesthetics of architecture. Its ornamentations specifically reflect the uniqueness of Malay- Chinese craftsmanship that should be preserved as national heritage.

#### 5.1 Output of the Digital Drawing from paper- based sketch

The main output from this research paper on RUM would be comprehensively documented 2D digital drawings that capture all the important features, structures, joineries and the uniqueness of RUM as part of the conservation effort in the heritage of this traditional house.

#### 5.2 Documentation Strategy

It is important to compile and document every construction feature and decorative element of RUM. The measured drawing and observation are being conducted manually inside and outside the RUM. This is to get accurate and precise measurements of technical drawings besides the existing paper-based sketch drawings.

## 6.0 Conclusion & Recommendations

The preservation of architectural history is critical for future generations. As part of the endeavour in heritage conservation, this paper has shown the compilation of reconstructing paper-based sketches to recreate a 2D and 3D drawing of RUM that preserved all of its essential aspects. In addition, this study has demonstrated that architecture-measured picture offers digital learning opportunities that can be explored more for future research. While the course required a substantial portion of working on-site, the data and recreating digital work could still successfully adapt to the method, as shown in the findings.

## Acknowledgements

The financial funding under the Centre of Excellence for Research, Value Innovation and Entrepreneurship (CERVIE), Faculty of Engineering and Built Environment (FETBE), UCSI University, and owner of Rumah Uda Manap, Rimbun Dahan are gratefully acknowledged.

## Paper Contribution to Related Field of Study

This paper makes several contributions whereby the findings help to provide a better understanding of how conservation of cultural heritage can be achieved through digital media platforms.

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