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A STUDY OF URBAN DESIGN ELEMENTS IN STRUCTURED VILLAGE AT GELUGOR, PENANG

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ABSTRACT

This paper analyses the town image and the mental mapping of the structured village at Gelugor, Penang, on five urban design elements, which are the path, edge, district, node, and landmark. Observation, data collection and fieldwork survey are the methods applied in the study. The study finds that Taman Tun Sardon and structural village in Gelugor have a masterplan with gridiron design, which makes the site systematically arranged. The gridiron concept forms primary road networks and linkages with vehicular paths, which make the site well connected. The path becomes the most dominant element in this study. This study shows that structured village at Gelugor has an urban design with regular gridiron urban layout, which provides good circulation in the area. The gridiron pattern then becomes distortion at Taman Tun Sardon area due to the hilly topography of the site. The paths formed by the gridiron layout have enabled a clear definition of the district in the structured village at Gelugor. The path is the most dominant element in the study area. Besides, the study shows that there is a lack of quality nodes and landmarks available in the study area.

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1. INTRODUCTION

This paper analyses and identifies the five major design elements and principles namely paths, edges, districts, nodes and landmarks which are implemented in the case study area, structured village at Gelugor, Penang based on understanding on urban design elements within of the local traditional built environment in Malaysia (Khashim et al., 2017) referring to the theories of Kevin Lynch (1962).

Penang is one of the states in Peninsular Malaysia. It is situated in northwest coast, comprising of Penang Island, and also Seberang Perai. George Town (Figure 1) is the capital city of Penang, with Gelugor (Figure 2) as a suburb in its southern part. The urbanisation of Gelugor (Figure 2) started by

residential development since early of the 1960s. Sumatra fishermen populates Gelugor (Figure 2) since the late 18th century. The land use in Gelugor then was transformed into agricultural use to plant rubber and nutmeg by Captain Francis Light's partner, named David Brown.

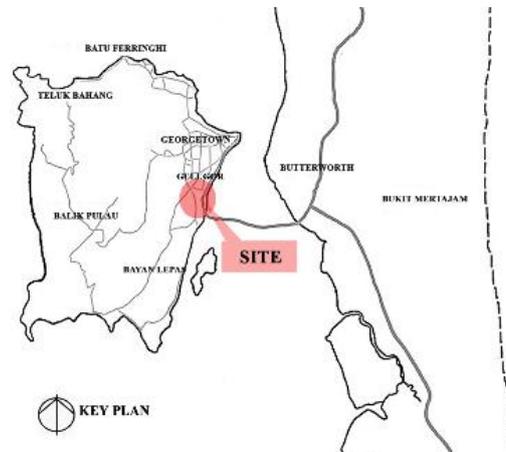


Figure 1: Key plan of the study

The urban study area (Figure 3) is structured villages at Gelugor (Figure 2) which comprise of Taman Tun Sardon and Kampung Sungai Gelugor. The area is situated 7.7km from George Town, linked by Jalan Sultan Azlan Shah from Batu Uban to Batu Dumbar. It is consisting of residential area, with some mixture of commercial, governmental, religious and educational zones. Kampung Sungai Gelugor still maintain its traditional Malay village structure and elements although it is surrounded by the drastically high rise residential development. It is 68 acres with 5 acres of government land, located near to the Penang Bridge which is gateway of Penang. The study also covers 5.5 acres of low cost landed residential neighbourhood of Taman Tun Sardon with a garden city concept from England (Khashim et al., 2017). Taman Tun Sardon is located 5.7km from Georgetown. The main road which linked Taman Tun Sardon is Jalan Hilir Pemandar.

2. LITERATURE REVIEW

2.1 IRREGULAR GRIDIRON URBAN LAYOUT

The study area covers two parts of Gelugor town, Kampung Sungai Gelugor, and Taman Tun Sardon. The most significant characteristic is the urban layout of the area. The building blocks are neatly in a grid formation (Zakaria, 2018). This urban layout design is a basic planning masterplan embraced by the British colonial administration (Hassan, 2009). During the British's colonial era, divide and rule concept has been implemented into the formation of urban pattern to allocate different ethnic groups into separated settlements (Hassan, 2017). This concept has indirectly affected the urban circulation and town image of the study area. The urban gridiron layout is designed in the irregular pattern due to the alignment with the topography of the study area.

2.2 STRUCTURED VILLAGE

Part of the study area, Kampung Sungai Gelugor is formed by the structured village concept. The structured village is to accommodate Bumiputera (indigenous) people. The urban design is based on a concept of high-density low-rise type residential development (Hassan, 1999; Hassan & Ku Hassan, 2001). It is a planned village that focuses on providing socio-economic livelihood and benefit of villagers in the urban area, equipped with basic infrastructures and services as one of the decent examples (Bentley et al., 1985).

2.3 URBAN DESIGN ELEMENTS

Lynch (1960) discusses urban design by observing the visual and physical form of a city at an urban scale. The principle composes five urban design elements, which are the path, edge, district, node, and landmark. With this approach, the urban design elements are to analyse the impact of urban design of a city to its function, history, name or the meaning (Larice & Macdonald, 2013).

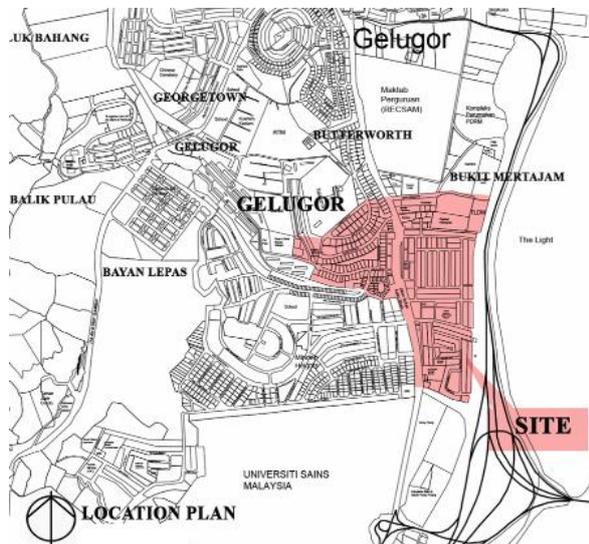


Figure 2: Location plan



Figure 3: Layout plan of the study area.

2.4 BACKGROUND OF CASE STUDY

This study site (Figure 3) consists of two neighborhood areas, Kampung Sungai Gelugor, and Taman Tun Sardon. The total of 73.5 acres of site comprises the elements of the structured village as its traditional arrangement approach (Elmagalta et al., 2010). There are many public facilities and institutions located in the site, including Taman Tun Sardon Pavilion, Market place dan Gelugor Community Hall, GIATMARA, Sungai Gelugor Jamek Mosque, State Fishery Department, Sungai Gelugor Primary School, Sungai Gelugor Hall, Hindu temple, post office, and banks. From 68 acres of Kampung Sungai Gelugor, 5 acres is government land, while 63 acres of it is originally owned by Malay citizen, which then sold to a foreigner named Brown, a businessman which manage both plantations of rubber and nutmeg in Gelugor (Figure 2). The land is being used for agricultural by Brown when he owns the land, but then he returns the land to the Malay citizens when he decided to go back to his own country, England (Jawatankuasa, 2007). Relocation of the people from another place to this residential area name Kampung Sungai Gelugor was developed by the government once the land use is being converted again to residential after Brown left the place. According to the 2016 local resident interview, Refurbishment Program of Poor People House is being proposed and carried out by the Penang government to refurbish the house of poor residents in Kampung Sungai Gelugor. Currently, the land is populated by almost 1020 families, mostly Malay people (Jawatankuasa, 2007). In 1826, a primary school of Sekolah Rendah Sungai Gelugor was built in Kampung Sungai Gelugor and becoming the oldest Malay school in Malaysia. Taman Tun Sardon is a low-cost housing neighbourhood scheme being developed by the Penang government to solve the issues of housing affordability by the poor people located at Lot 482 in Penang (Pejabat Rancangan Perumahan Taman Tun Sardon, 1982). The Lot 482 land was owned by 92 Temporary Occupation License (TOL)

holders but then sold to the government by relocated 88 of the 92 TOL holder in Taman Tun Sardon, while another four holders to longhouse in Paya Terubong (Pejabat Rancangan Perumahan Taman Tun Sardon, 1982). This development starts in early 1977 and completed in the year 1982. The site includes in the study only consists the landed housing development which 139 units of double storeys residential houses are built on the 5.5 acres of land from March 1977 to May 1978 with a cost of RM 4 million (Pejabat Rancangan Perumahan Taman Tun Sardon, 1982). Information from the interview of the local resident in 2018 notes that currently, most residents had renovated their houses.

3. METHODOLOGY

This research design approach identifies the mental mapping of the selected site by utilising five urban design elements (Yasin et al., 2017) according to the theory of Kevin Lynch. The urban design elements are district, path, edge, node, and landmark. Figure-ground plan of the area involved is drawn in AutoCAD to gain an initial understanding of the case study. Preliminary study on history and background of the site is conducted to obtain fundamental information of the site. A site survey is later carried out to gain a more accurate understanding of the site. Detailed information is then obtained through a visit to Majlis Perbandaran Pulau Penang (MBPP) and Taman Tun Sardon Housing Planning Office. The quality of the key urban design elements is identified during the site survey. The data collected from the site is analyzed based on Kevin Lynch's urban mapping theory. The scale of measurement of the urban design elements are as follow:

- Paths

The width and length of the paths are under the study to analyse its relation to the function, importance, accessibility of the paths at the site.

- Edges

The edges are determined based on the physical features and function of the edges that could become boundary at the site.

- Districts

The background and history, age, size, land use, and dominance are analysed for the district elements.

- Nodes

The function, attraction, and placemaking of the nodes are studied to analyse the importance of the nodes at the site.

- Landmark

The popularity, scale, and attraction of the landmarks are observed to study their effects onto the site.

4. RESULTS AND ANALYSIS

4.1 PATHS

4.1.1 VEHICULAR PATH

Figure 5, Jalan Sultan Azlan Shah is the Sultan Azlan Shah Boulevard. In Taman Tun Sardon, Pintasan Pemancar 1 refers to Pemancar Shortcut 1, Lengkok Pemancar refers to Pemancar Arc. Hilir Pemancar refers to Pemancar Downstream, Tingkat Pemancar refers to Pemancar Level while Jalan Molek refers to Molek Road. In Kampung Sungai Gelugor, Jalan Akuarium refers to Akuarium Road, Tingkat Sungai Gelugor is the Sungai Gelugor Level, Persiaran Sungai Gelugor refers to Sungai

Gelugor Sight, Jalan Ismail Nagore is Ismail Nagore road while Lengkok Sungai Gelugor refers to Sungai Gelugor Arc. There are five main entrances on the site. Two entrances linked to Taman Tun Sardon while the other three linked to Kampung Sungai Gelugor. All the entrances are double way entrances accepting the flow of traffic from both inlet and outlet.

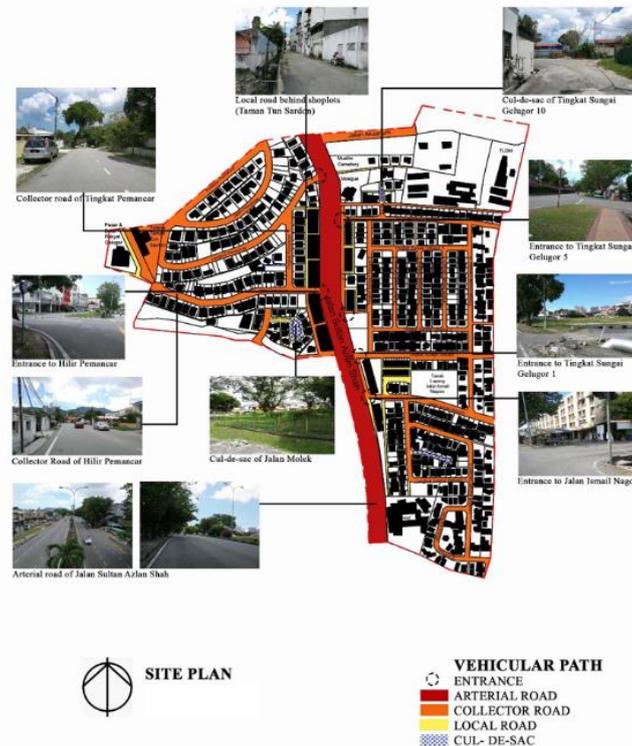


Figure 5: Vehicular Path plan of the study area.

Traffic lights are spotted at the entrance linking to Jalan Ismail Nagore, which act as a guide of traffic flow and divert the traffic load for the vehicles that enter or exit the site. There is only one arterial road in the site, which is Jalan Sultan Azlan Shah. It is a 20 meters' double way vehicular path consists of three lanes each side, connecting the site to Batu Urban from the north and also Jelutong from the south. The road is aligned in between commercial area, separated from the residential area by the collector roads. Jalan Sultan Azlan Shah is being linked to many collector roads such as Lengkok Pemancar and Hilir Pemancar from its west, Jalan Aquarium and Jalan Ismail Nagore from its east. From the vehicular statistics, Figure 6, Jalan Sultan Azlan Shah can be considered as a good arterial pathway as it serves no traffic jam even at the peak period of 7.00 pm as the traffic flow is smooth. Thirty collector roads are spotted in the study area, mainly 6 meters in length, with double way traffic flow one lane each side. In Taman Tun Sardon, collector of Lengkok Pemancar is linked to another collector road, Jalan Pemancar and interconnected with Hilir Pemancar, while Hilir Pemancar is connected with Jalan Molek. Most of the collector roads in the site of Kampung Sungai Gelugor line between the residential units such as Tingkat Sungai Gelugor 1 until Tingkat Sungai Gelugor 10, Lengkok Sungai Gelugor 1 and Lengkok Sungai Gelugor 2. The local roads are the 4-meter vehicular path which serves the private community. There are 18 local roads on the site. One of the local roads from Lengkok Pemancar separates Pasar Rakyat Gelugor and Astaka Taman Tun Sardon, by allowing only one lane traffic flow along the road. The local road from Tingkat Sungai

Gelugor 5 to dead-end covered by residential units, creating a cul-de-sac, while another local road acts as a back lane of the commercial shophouse units. The local road which linked from Jalan Molek poses a small loop circulation of a cul-de-sac along with the residential units.



Figure 6: Arterial road of Jalan Sultan Azlan Shah (*left*) and collector road of Tingkat Sungai Gelugor 6 (*right*)

4.1.2 PEDESTRIAN PATH

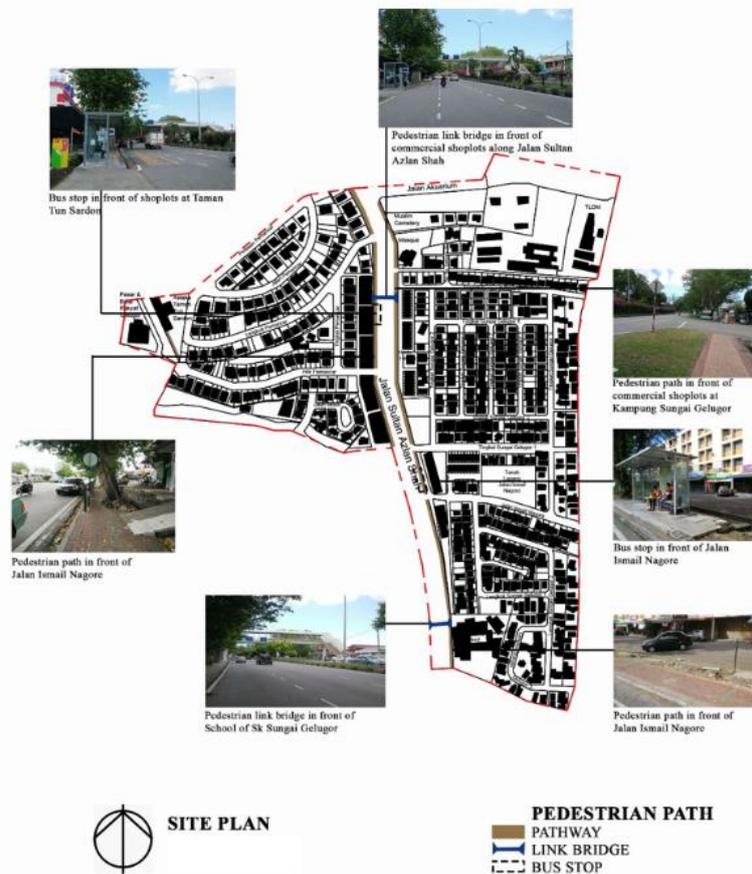


Figure 7: Pedestrian Path Plan of the study area.

The pedestrian pathways are only found along both of the side of Jalan Sultan Azlan Shah, mainly interlocking pathway, Figure 7. There are no pedestrian pathways spotted in the residential area and this leads to less pedestrian in the residential areas. Figure 8, the pathways along Jalan Sultan Azlan Shah connect two pedestrian link bridge serving across the road, one is linked to the commercial shop lots from Taman Tun Sardon and Kampung Sungai Gelugor, while another pedestrian link bridge is used to connect the residential areas from Taman Tun Sardon and School of

SK Sungai Gelugor. Two bus stops are situated at site serving two ways of a public transportation route, one in front of Taman Tun Sardon, another at Kampung Sungai Gelugor.



Figure 8: Pathway along Jalan Sultan Azlan Shah (left) Linkbridge connecting Taman Tun Sardon and Kampung Sungai Gelugor (right).

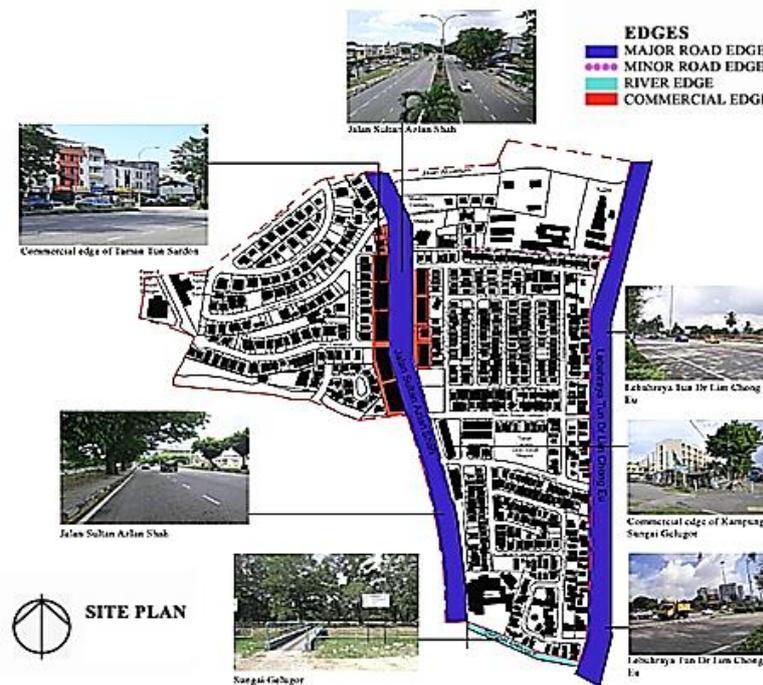


Figure 9: Edges of the study area.

4.2 EDGES

The dominant edge uniting the site is the main road edge by the arterial road of Jalan Sultan Azlan Shah, it set a barrier in between of two main residential districts of Kampung Sungai Gelugor and also Taman Tun Sardon which is in the different urban sprawl, Figure 9. Kampung Sungai Gelugor is a gridiron arrangement of the settlements while Taman Tun Sardon utilizes the Garden City concept. Another major road edge is Lebuhraya Tun Dr Lim Chong Eu (Tun Dr. Lim Chong Eu Highway), separating the residential district of Kampung Sungai Gelugor to the reclaimed land residential

development of The Light. A minor road edge at the side of Tingkat Sungai Gelugor 10 sets a boundary between residential units in Kampung Sungai Gelugor and the government quarters.

The commercial edges are being separated from the residential area by the collector road of Tingkat Pemancar for Taman Tun Sardon and Tingkat Sungai Gelugor 2 for Kampung Sungai Gelugor; it is defined as an edge because of its façade style which is different from the residential units. There is a natural edge which is the river edge that set up by Sungai Gelugor. It distinguishes the boundary of Kampung Sungai Gelugor.

4.3 DISTRICTS

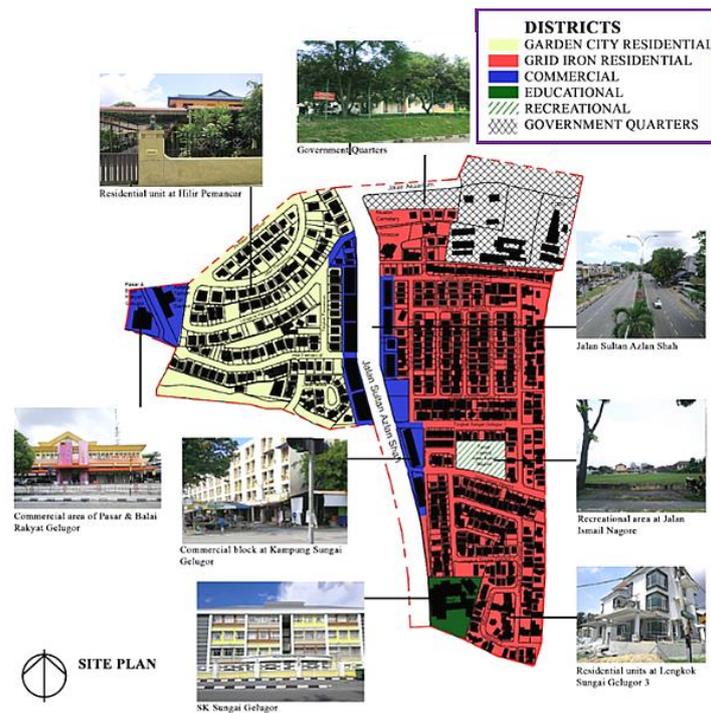


Figure 10: Districts of the study area.

The most dominant district of the site is residential areas, followed by the commercial area, then government quarters, educational area and lastly the recreational area, Figure 10. Residential area all belongs to the landed property including terrace house, semi-detached house, bungalow with different hierarchy from the single storey until three storeys residential units. Taman Tun Sardon belongs to Garden City residential district as the housing layout is being organically arranged according to the different contour of the slope while Kampung Sungai Gelugor is gridiron residential district as it is developed according to gridiron arrangement. Most of them are relocated under the housing program for low-cost housing. Some of the houses have been renovated into a modern style of architecture while some remain their traditional style. There are two main commercial districts, separated by Jalan Sultan Azlan Shah. One of the commercial districts situated at Taman Tun Sardon, while another at Kampung Sungai Gelugor, separating the residential district from the arterial road, setting up the boundaries between private zones and public zones. Both of the commercial districts comprise of shop lots selling a variety of services or items such as laundry, hotel, restaurants and mini markets. The government quarters are basically used for the residential and office for members in the Royal Malaysian Navy (TLDM). Quarters of single-storey terrace units are built on this district for the occupants. Educational districts are identified in the site of study. The school of SK Sungai

Gelugor is situated at the south region of Kampung Sungai Gelugor, serving not only primary education but also pre-primary school education. Recreational area includes empty land for multipurpose use such as any sports activities or meeting point. There is a big empty land along Jalan Ismail Nagore, while a court is situated along Persiaran Sungai Gelugor 2.



Figure 11: Residential District of the study area

4.4 NODES

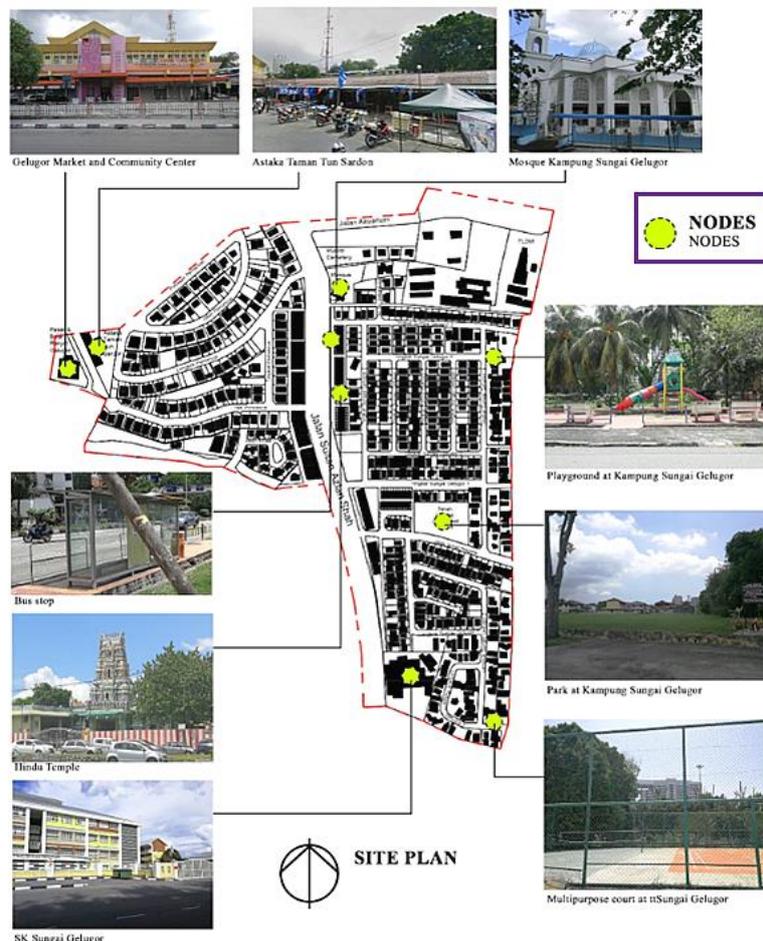


Figure 12: Nodes of the study area.

The nodes (Figure 12) that can be found on the site are mainly activity areas or amenities provided in the neighbourhood because there are two residential areas at the site, which are Taman Tun Sardon and Kampung Sungai Gelugor. Besides, stop of public transport has also become one of the nodes at the site. The bus stop naturally becomes a node when people are waiting at the bus stop, especially during peak hour. These nodes are introverted nodes as they give little directional sense.

The principle of the direction is only toward or away from the node itself due to unclear connections and general directions. SK Sungai Gelugor, Gelugor market and community centre, and Astaka Taman Tun Sardon are some of the public amenities that can be found at the site. The nodes that are determined are functional nodes that serve the community of the site. Tanah Lapang Jalan Ismail Nagore is considered as the dominant node at the site due to its largest land size among the identified nodes. Gelugor Market and community centre is the second dominant node due to its important function that is part of the need of the locals' daily life. The religion nodes that can be found at the site are the mosque and Hindu temple. All of these nodes are temporal nodes because the activities that create nodes only happen at a certain period.

4.5 LANDMARKS

Landmarks are usually identified due to its distinctive identity, form, height or usage at the site. The landmarks (Figure 13) identified are mostly parts of the amenities around that area. They act as points of references and can be used to identify one's location. The landmarks recognised are a mosque, Hindu temple, post office, Gelugor market, Gelugor community centre and school. The mosque and Hindu temple become distant landmarks due to the uniqueness and distinctive architectural styles that are different from other buildings. The architectural styles make the landmarks easy to be spotted from afar. On the other hand, post office, market, community centre and school are identified as landmarks with their significant and distinctive usage at the site. There are only one post office and one school at the site, which makes visitors easy to identify their location when they see these buildings. The mosque and Hindu temple are the dominant landmarks at the site due to their height and size that could be recognised from far. These landmarks also represent part of the culture of the site.

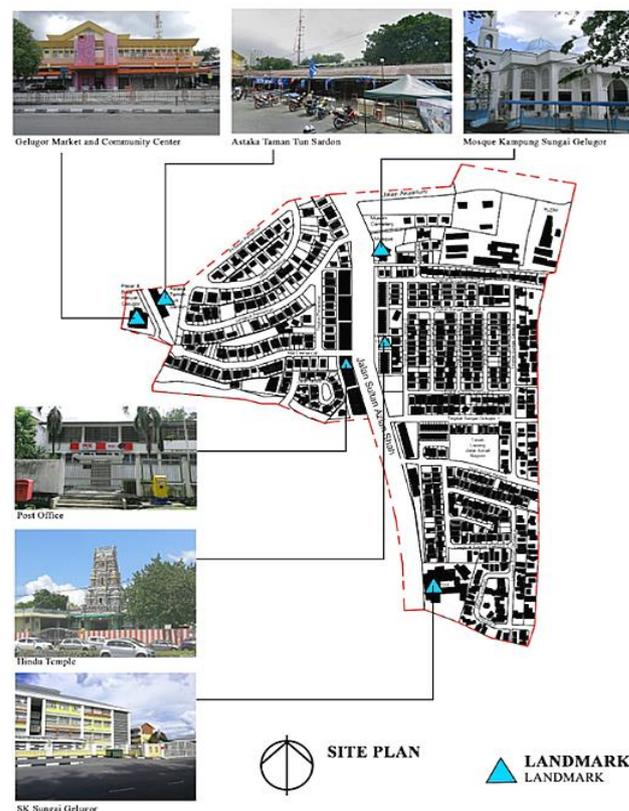


Figure 13: Landmarks of the study area.

5. DISCUSSION

5.1 PATHS

The path is the most dominant urban design element in the site of the study area. Paths in the site are interconnecting with each other according to its hierarchy, separating the zoning of the site by its function and privacy (Ewing & Handy, 2009). Vehicular pathway poses high accessibility as the arterial road is interconnected to the local roads by the collector roads, slowing down and reducing the traffic loads at the residential area from the commercial area. The relation between the pathways smoothen the traffic flow and reduce the traffic load at the main arterial road by providing a few entrances to each of the residential areas. Traffic lights are spotted on-site for controlling the traffic flow of the main arterial road of Jalan Sultan Azlan Shah. Several cul-de-sacs are spotted in the residential area, providing loop circulation or dead-end of the local roads to increase the privacy of the residential units aligned with them. For pedestrian pathway, it poses low accessibility as the paths are only provided along the main arterial road of Jalan Sultan Azlan Shah, aligned with the commercial shop lots in front of Taman Tun Sardon and Kampung Sungai Gelugor, but not linked to the residential area. The pedestrian pathways are linked by the pedestrian link bridges, providing access across the main arterial road of Jalan Sultan Azlan Shah without stopping the traffic. Bus stops are provided at both sides of the arterial road for accessibility of public transportation.

5.2 EDGES

The main edge linking the whole site is the road edge of Jalan Sultan Azlan Shah, connecting the two main residential districts of Taman Tun Sardon and Kampung Sungai Gelugor. Another road edge of Lebuhraya Tun Dr Lim Chong Eu defines the boundary of Kampung Sungai Gelugor, separating it with another residential district from the east, and provides privacy between the residential units. There is a river edge of Sungai Gelugor which also separates Kampung Sungai Gelugor from Markas Rejimen 2 KOR Polis Tentera Diraja situated at its southern region. While commercial edges are found aligned with the main arterial road of Jalan Sultan Azlan Shah, separating the road from residential areas, creating a buffer to the private zone from the sound pollution of traffic at the road.

5.3 DISTRICTS

The district is another dominant urban element in the site of study. There are mainly residential areas, one at Taman Tun Sardon while another at Kampung Sungai Gelugor, each of the districts is being separated from the main arterial road of Jalan Sultan Azlan Shah by commercial districts. The commercial districts are located along the arterial road, setting up at the centre region where most pedestrian and traffic will pass by to attract the flow of customers. There is a government quarters at the northern region of Kampung Sungai Gelugor which serves as both residential and official management areas of the government for members in Royal Malaysian Navy (TLDM). The recreational district is being set on an empty land along Jalan Ismail Nagore for assembly spot and also some of the recreational activities.

5.4 NODES

Node is one of the less dominant elements in the study area. Nodes at the site are mostly open spaces formed by thematic concentration and breakpoints of public transportation. The nodes (Figure

12) found at the site are facilities of the housing area. We can see that the scale of the land used as activity areas are larger compared to the surrounding residential lots. With this characteristic, it becomes a node and able to accommodate people and acts as a gathering point of the locals. These nodes that formed by the amenities encourage social interaction among the locals. However, the nodes only form at certain period due to the activities; for example, the religion nodes will form only at prayer period. Permanent nodes are lacking at the site. There are no nodes at the junction of roads. This situation is due to fast moving traffic at the site and poor pedestrian connectivity at the site. Besides, the identified nodes are not vibrant. This situation could be caused by the improper planning of the activity area. Most of the nodes at the site are introverted nodes because it is difficult to recognise from far. These nodes can hardly be used as a directional reference to other locations.

5.5 LANDMARKS

Landmark is one of the less dominant elements in the study area. Landmark (Figure 13) is very limited at the site. The landmarks that can be found are mainly neighbourhood facilities due to its location in the housing area. The site is a lack of directional landmarks that could help in determining or spotting location. Visual landmarks that are spotted at the site are both religion landmarks. The mosque and Hindu temple can stand out from the surrounding building due to the architectural styles that are affected by religion. The styles form a strong contrast with the surrounding building. The other landmarks are distinctive due to their functions or usage, which are different from housings at the site. The most dominant landmark in the study area is Mosque due to its unique architectural style and size at the site, followed by Gelugor Market because it is the daily necessity of the locals.

6. CONCLUSION

The site of the case study is a housing area that involves Taman Tun Sardon and a structural village in Gelugor, which is Kampung Sungai Gelugor. Most dominant element at the study area is a path that forms the urban pattern, then follow by district and edge. The landmark and node contribute less in building up the town image of the study area. The urban planning and layout of the site is a distorted gridiron layout. This type of urban layout design provides a systematical structure to the housing area. The layout provides effective circulation of vehicular pathways, which are good for wayfinding. Efficient coordination of hierarchical paths is formed by the gridiron layout of the circulation. The edges created by the highway and river have formed a distinctive boundary around the site. The dominant district at the site is residential district supported by the commercial district, which is part of the facilities of the housing area. However, landmarks and nodes are limited which causes lack of point of reference at the site. The site is less community-friendly due to limited potential space and place that could become landmark and node. These two elements are the main elements that act as the meeting or gathering point for the community. More nodes should be introduced to the site to strengthen the sense of community at the site. The site is very unique due to it has the background of a traditional village. It transformed to suit the current need. With its background as a traditional village, the Malay culture and identity could easily be observed through the architectural style and facilities provided at the housing area.

7. DATA AVAILABILITY STATEMENT

The used or generated data and the result of this study are available upon request to the corresponding author.

8. ACKNOWLEDGEMENT

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