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THE GEMS OF JOHOR BAHRU: REVITALISING SUNGAI SEGGET AS A VIBRANT HERITAGE AND CULTURAL RIVERFRONT

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ABSTRACT

This project proposes the revitalisation of Sungai Segget as a vibrant heritage and cultural riverfront. Presently, the issues include the river condition in Class III and IV and less appreciation of the site's heritage values. The name Segget came from the English word "sea gate", a structure prevalent in Johor in the 1900s. This 4,280-meter river has been labelled the second most polluted river in Malaysia. The awful stench emitted by the river was due to uncontrolled sewage management by business activities along the Segget River. The methods employed in this project are site inventory, analysis and synthesis for data collection, and design process for ideation and strategies. This project proposed strategies to revitalise Sungai Segget and the surrounding area through the concept of 'The Living Museum' and activating the site through the Blue Trails, Green Trails, Heritage Trails and improved accessibility.

Keywords: Culture, heritage, riverfront, urban revitalisation

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INTRODUCTION

Sungai Segget has an excellent potential to be revitalised as a vibrant heritage and cultural riverfront as an urban river (Figure 1). This project aims to improve the river condition of Sungai Segget and maintain the river ecosystem to enhance water quality by creating a flood mitigation system, phytoremediation, and reviving heritage activities. These issues concern the river condition in Class III and IV, which is highly polluted and risks flash floods. The lack of appreciation of heritage values affects the local image, identity and sense of belonging. Therefore, the objectives of this project are:

1. To propose strategies to improve the water quality of Sungai Segget and overcome the flood issues.
2. To identify and propose elements that are significant to the characteristics of Johor Bahru, thus contributing to the new economic activities, especially for urban heritage tourism.
3. To propose design strategies and ideas to preserve, enhance and promote the cultural aspects of Johor Bahru.

LITERATURE REVIEW

The urban river corridor has always served an important role to a city throughout history. In the context of Johor back in 1860, the river functioned as a shipping channel for a number of produce such as gambier, rubber, pepper and tea (TEDx, 2021). From this activity, the Johor market was established in the 1900s to accommodate the trading activities in the area. As Johor Bahru's economic activities further flourished, the city began to develop with more commercial buildings, better road networks, and diverse urban activities.

The history of a river corridor also makes it part of cultural heritage landscape for the city. Cultural heritage landscape combines natural and cultural heritage, that brings the essence of people, history, beliefs and culture (Kryder-Reid, 2014; Paz, 2015). Historical rivers also have great potentials to become a tourism attraction and public space for the people. Moreover, the river corridor can also provide potential green spaces for the people's well-being and for environmental benefits.

Based on the literature review, this study examined Sungai Segget from the aspects of physical, environmental and socio-cultural.

SITE CONTEXT



URBAN MORPHOLOGY OF JOHOR BAHRU

Urban Morphology of Johor Bahru how the urban development growth from 18th Century until now- the modernization period. The development growth rapidly and become one of the biggest population in Malaysia (Emmanuel, 2019).

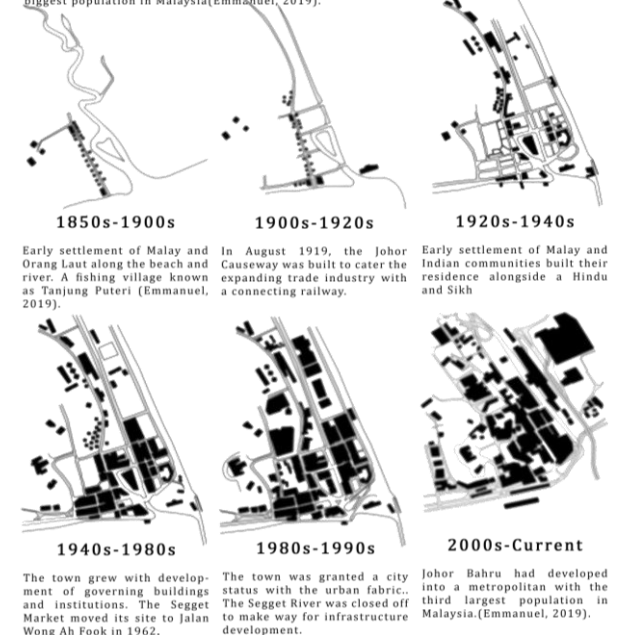


Figure 1: Site context and urban morphology

METHODS AND FINDINGS

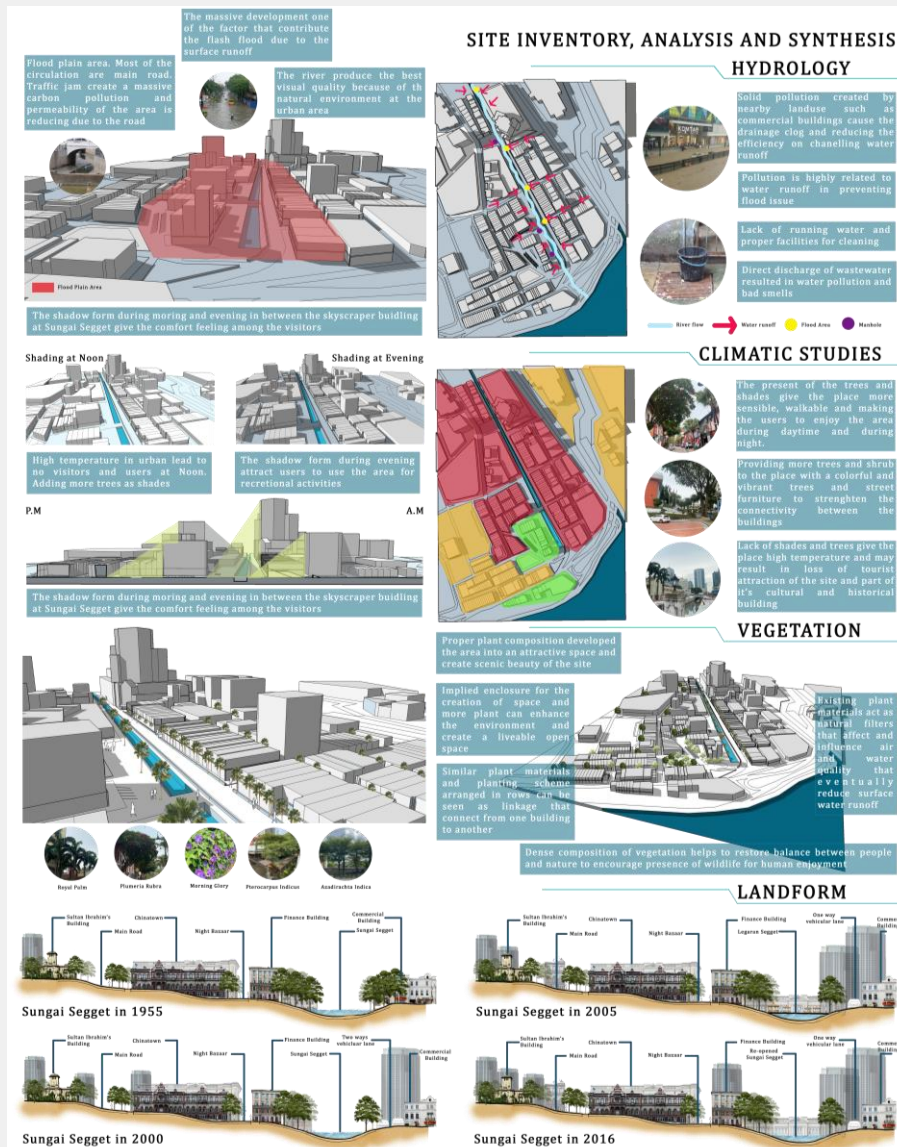


Figure 2: Analysis on hydrology, climatic studies, vegetation and landform

MICRO LANDUSE, CULTURAL HERITAGE, SOLID & VOID AND LANDMARKS & ARCHITECTURAL FEATURES

1. The site is located in the middle of the commercial hub with eateries crowded with people during the day, creating a community that comes to fulfil their needs then leaves.
2. Chinatown can be connected by a heritage trail, as it is rich with culture, history and heritage.
3. High and dense developments cause a less permeable area to cater to the surface run-off issue and increase flash floods.
4. The existence of architectural features on the site will attract users to explore the heritage of Sungai Segget (Figure 3).

HYDROLOGY, CLIMATIC STUDIES, VEGETATION AND LANDFORM

1. Solid wastes pollution from nearby land use, such as commercial buildings, cause the drains to clog and reduce the efficiency of channelling water run-off.
2. Lack of shades and trees gave the place high temperature and caused the lack of comfort for visitors to visit the site.
3. The planting composition needs to be improved to develop the area into an attractive space and improve the site's visual quality.
4. More trees and shrubs with colourful foliage and street furniture can strengthen the connectivity between the buildings and the riverfront.
5. The changes in the landform of Sungai Segget shows that the river can give an engaging visual experience to the users (Figure 2).

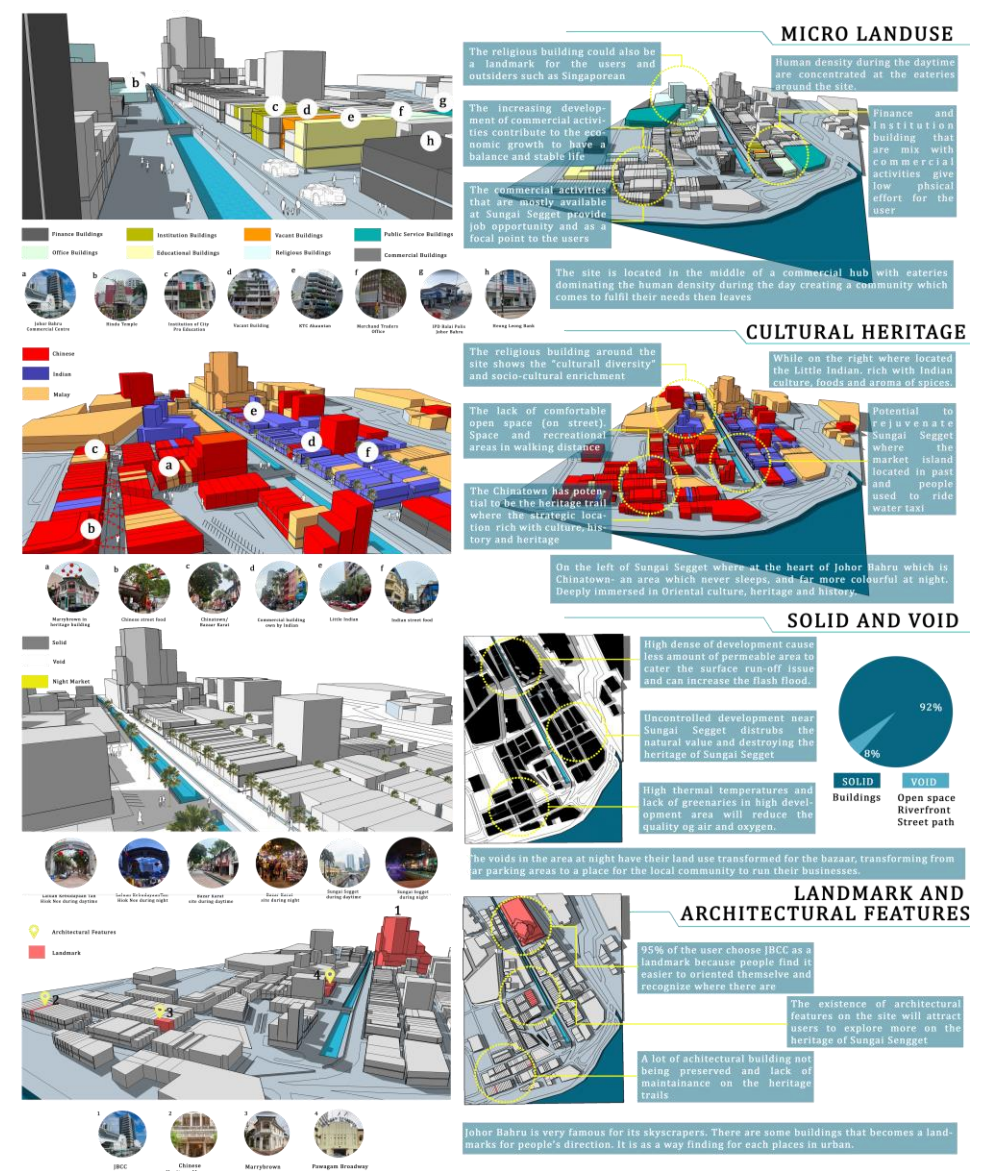


Figure 3: Analysis on landuse, cultural heritage, solid and void, landmarks and architectural features

NODES, ACCESSIBILITY, USER ACTIVITIES AND VISUAL STUDIES

1. Lack of nodes will cause the disappearance of the old identity of the site and can cause disintegration of the spaces and main attractions.
2. The issues of parking jockeys and double parking have caused a one-lane circulation in the town, driving traffic congestion.
3. The four-way intersection at the major road is more congested due to the night bazaar and car parks along the shop lots.
4. Cycling activities are minimal since there is no proper bicycle lane and may be dangerous for cyclists.
5. Certain areas provide good views that contribute to the high scenic beauty of the riverfront as visitors can appreciate Sungai Segget and its heritage (Figure 4).

CROSS ANALYSIS

	HYDROLOGY	CLIMATE	CIRCULATION	VEGETATION	LANDFORM	LAND USE	VISUAL SENSES
HYDROLOGY	Heavy rainfall will cause carbon pollution and permeability of the area is reducing	Flood plain area will create a massive traffic jam	Native vegetation can stabilize eroded system river bank from excessive water runoff	Flash flood will cause soil eroded and soil erosion	The massive development one of the factor that contribute the flash flood due to the surface runoff and drainage clog	The river produce the best visual quality because of its natural environment at the urban area	
CLIMATE	Heavy rainfall will risk of flooding will cause small pollution from the river	The present of shades make the place sensible and walkable to the users to enjoy the area	Providing more trees and shrub to reduce the urban heat island	Building skyline helps to give some shades to the users to the evening compared at Noon where the area is high temperature	The sky scraper give the good view and scenic beauty to the area		
CIRCULATION	A massive traffic jam will occurred due to flash flood at the flood prone area	Traffic congestion will lead to air polluted and less people will stopped by the area	Designing street planning with more trees and green areas to provide shades for the pedestrians	Ability to create good urban furniture and strengthening small town in Johor Bahru	The existing building gives the low physical effort for the users since it is walkable	Decreasing the level of consistency to the users due to inconsistent walkability	
VEGETATION	Existing plant materials act as natural filters that affect the influence air and water quality that eventually reduce surface water runoff	Proper plant composition developed the area into an attractive space	Similar plant materials and planting scheme arranged in rows can be seen as linkages that connect from one building to another	Dense composition of vegetation helps to restore balance between people and nature	The massive development reduce the present of green spaces	Implied enclosure for the creation of the space and more plant can enhance the environment and create a	
LANDFORM	The level of water will give the river, flow faster water the speed	The changes of landform due to construction building will increase the urban heat island	Accessibility and connectivity created the place more vibrant and be the users focal point	The changes of the landform make the trees arrangement inconsistent	Unstrategic place with a gradual landform to build the mix development cause it will destroy the nature and	Bad smell occurred due to the river	
LAND USE	High dense development cause less amount of permeable area to enter the surface run-off	High thermal temperature and lack of greenery in high development area will reduce the quality of the air and oxygen	The land use transformed for the night market will cause traffic congested along the main road with double park	The green space are very limited due to solid building and it will increase the high temperature	Planning according to the city's old texture and planning organization	The view of the skyline of the building give the panoramic view and scenic beauty to the users	
VISUAL SENSES	A good view contributed to the high scenic beauty as it can appreciate the river and it's heritage	Highly dependent on the existing programmes within respective buildings	The linear arrangement of the trees will always a way finder to the users	Construction and noise will reduce with the natural barriers as a buffer	The changes of level will give extra scenic beauty will the vista as a landmark	The religious building could also be a landmark for the users and outsiders such as Singaporean	

SITE SYNTHESIS

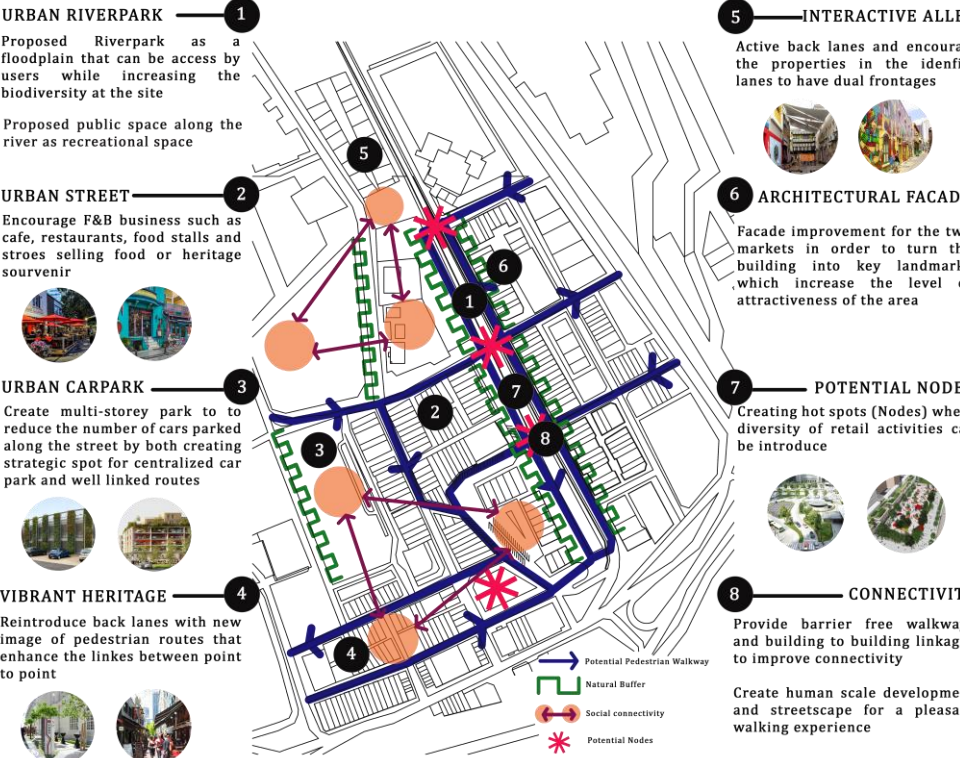


Figure 5: Site synthesis

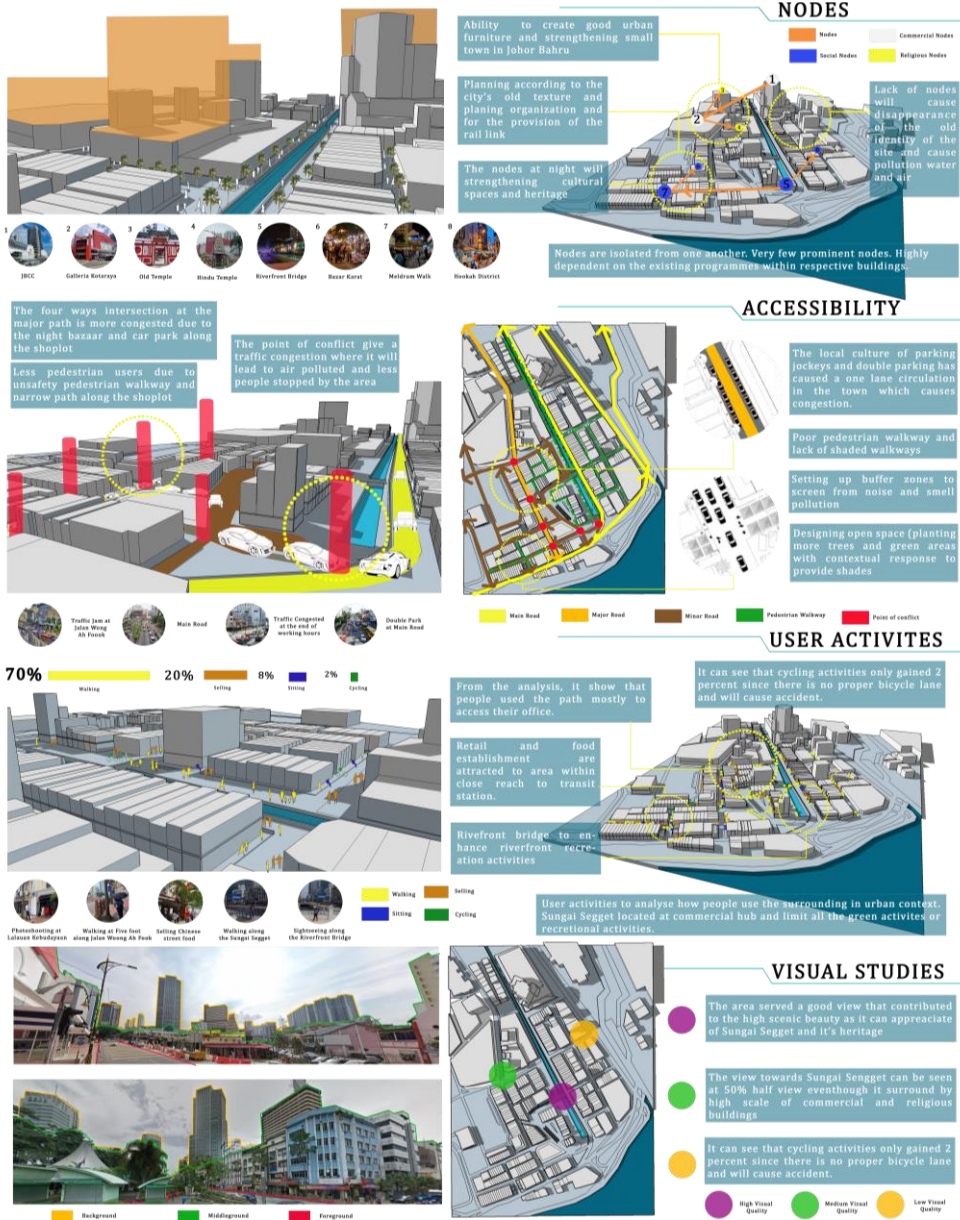
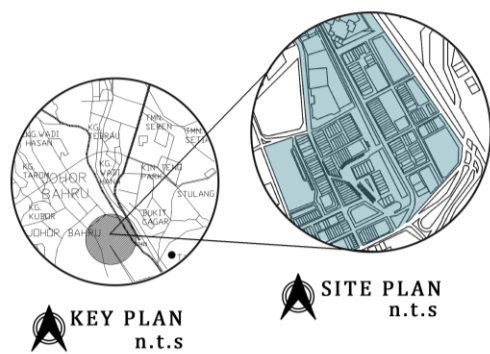


Figure 4: Analysis on nodes, accessibility, user activities and visual studies

SITE SYNTHESIS

1. Propose a river park that can function as a floodplain and be accessed by users while increasing the biodiversity at the site (Figure 5).
2. Create a multi-storey car park to reduce the number of cars parked along the street by creating strategic spots for centralised parking and well-linked routes.
3. Reintroduce back lanes with a new image of pedestrian routes that enhance the linkages between points.
4. Façade improvement for the two markets to enhance the buildings into key landmarks that can increase the level of attractiveness of the area.
5. Provide barrier-free walkways and building linkages to improve connectivity.



AIM & OBJECTIVES

To revitalize Sungai Segget into a vibrant heritage, cultural and liveable riverfront

- 01 To propose landscape approach for flood management
- 02 To transform the open spaces along Sungai Segget to encourage more activity
- 03 To enhance Sungai Segget that connects the community and natural environment through the heritage and cultural aspect

DESIGN CONCEPT



To provide visitors with a practical interpretation of the past. It bring history to life by imitating the conditions of a natural environment, historical period, or culture to the fullest

INTRODUCTION

A river that cover 360 hectares or catchment area and 3.5 km long located at Jalan Wong Ah Fook. This area basically one of the hot spot or 'must-visit-place' in Johor Bahru either for local or tourist user (The Mole, 2021)

Based on Iskandar Regional Development Authority (2021), there will be major changes to Johor Bahru City Centre as an attractive place to visit, live and conduct business

SITE ISSUES

- 01 **RIVER CONDITION**
River Quality Class III & IV
Flash Flood
- 02 **HERITAGE VALUE**
Unappreciate of cultural values
Loss of the sense of belonging

The use of the existing Sungai Segget to construct flood resilience systems. The system used to improves the local ability to cope with floods and promotes the development of society, economy, and ecological environment (Trueman,2021)

Therefore, the living museum concept is reflected in three aspects the resilience environment, the vibrant heritage and culture and the sustainable development for local community. Mutually beneficial relationship between different elements

DESIGN STRATEGIES

BLUE TRAILS

An approach for river revitalization to construct flood resilience system and public realm along the river

- 01 Flood Management
- 02 Stormwater management
- 03 River corridor

GREEN TRAILS

An approach for the creation of public and open spaces to encourage more activity for the urban dwellers

- 01 Public space
- 02 Urban street
- 03 Riverfront

HERITAGE TRAILS

Enhancement and to promote cultural heritage of Sungai Segget while increasing the economy of the place

- 01 Urban Plaza
- 02 Traditional living street
- 03 Preservation of heritage building

ACCESSIBILITY

An approach for walkable and safe city. Convert existing streets into limited vehicular access

- 01 Primary road
- 02 Heritage trails
- 03 Urban Carpark

SPACE PROGRAMMING

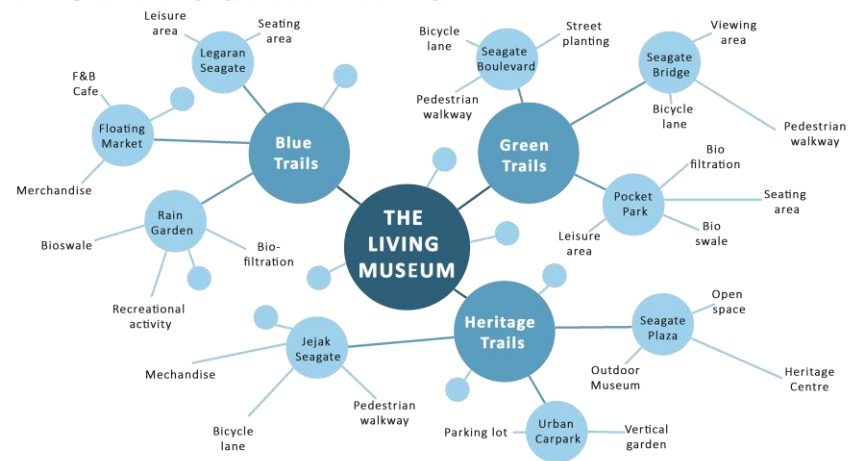


Figure 7: Design strategies and space programming

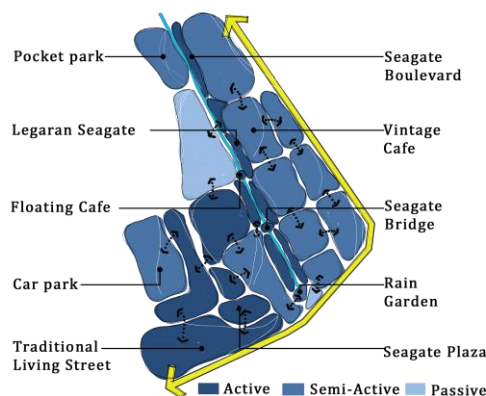
DESIGN PROPOSAL

The existing features of Sungai Segget can be optimised and improved to construct flood-resilient systems. The system can improve the site's ability to cope with floods and promote the society, economy, and ecological environment (Kim, 2016).

The 'Living Museum' concept is reflected in three aspects: the resilient environment, vibrant heritage and culture, and sustainable development for the local community (Figure 6). The design strategies enhance the mutually beneficial relationship between different elements (Figure 7).

According to Kim (2016), this concept also reconnects the visitors with a practical interpretation of the past heritage. The riverfront experience aims to bring history to life by imitating the conditions of a natural environment, historical period or culture in contemporary forms (Figure 8).

CONCEPTUAL PLAN



PLANTING CONCEPT

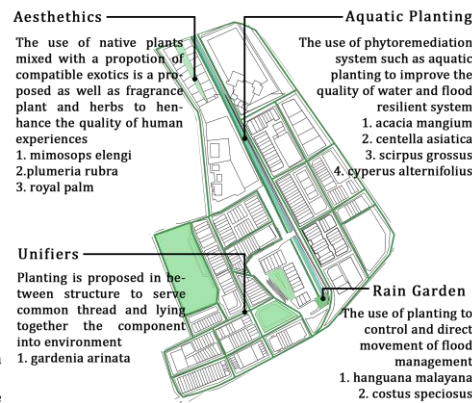
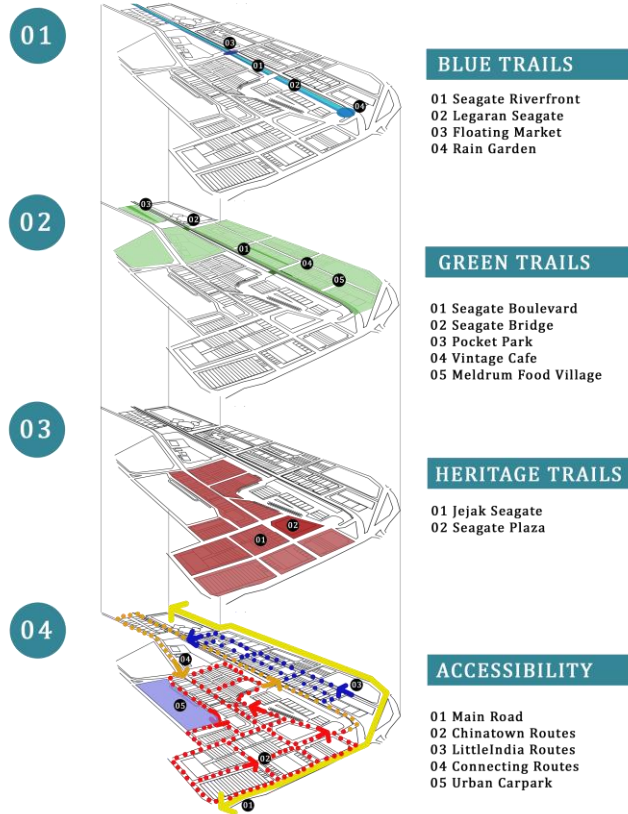


Figure 8: Conceptual plan and planting concept

FUNCTIONAL DIAGRAM



SCHEMATIC PLAN

Figure 9 shows the 12 spaces proposed for the various activities. The descriptions show the detailed ideas to revitalise the site's heritage assets and improve the water quality of Sungai Segget and its surrounding areas.

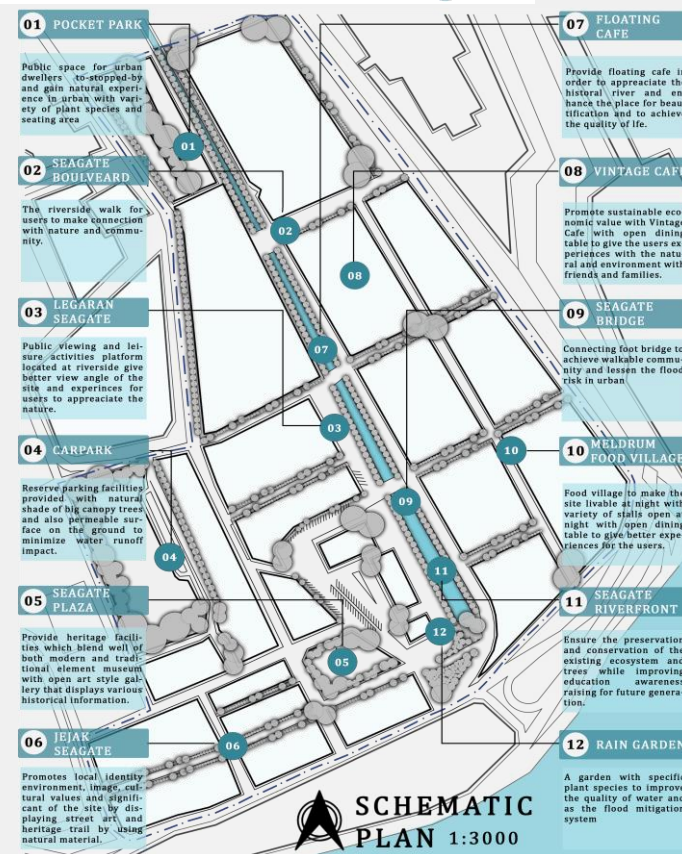


Figure 9: Functional diagram and schematic plan

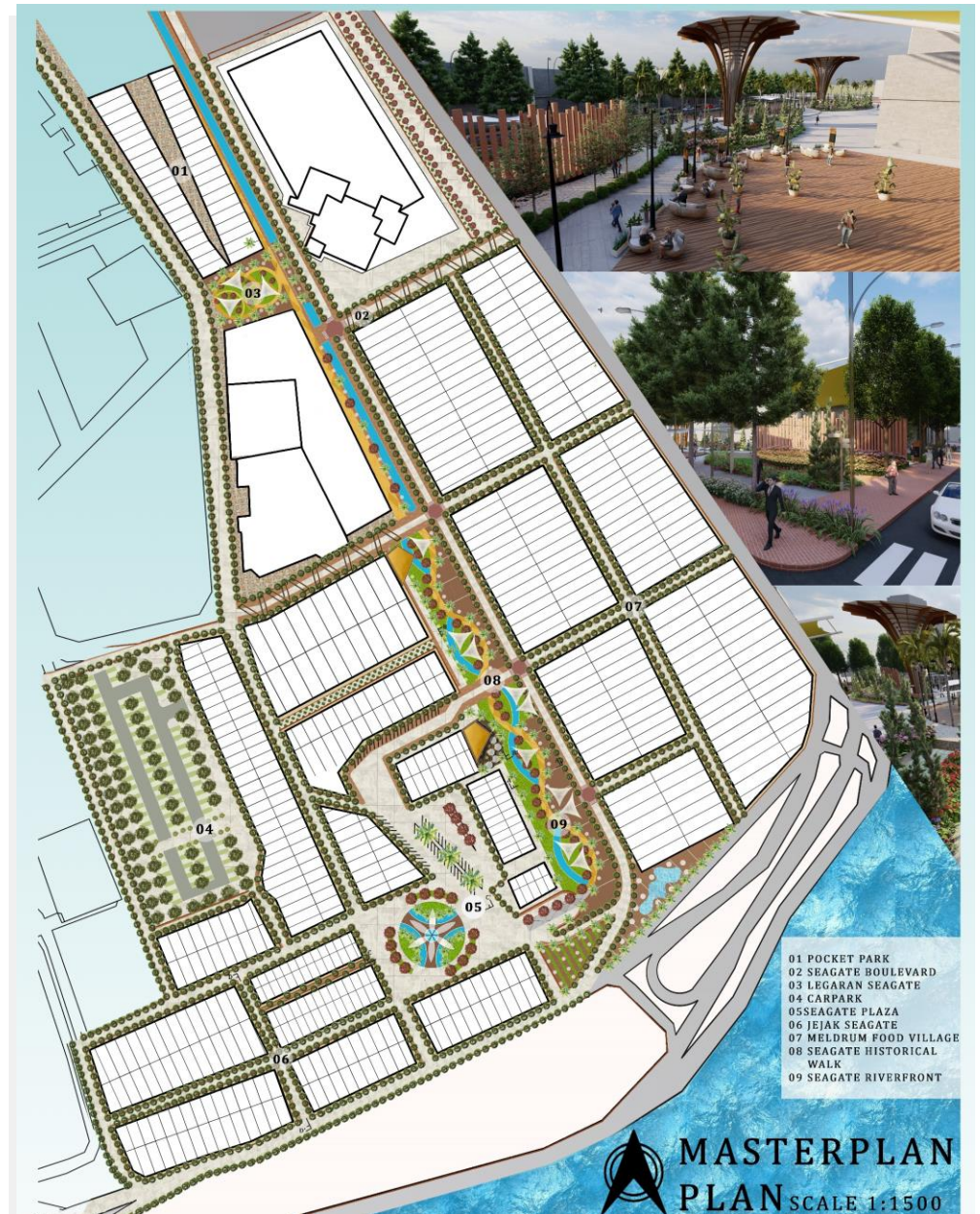


Figure 10: Proposed masterplan

MASTER PLAN

Figure 10 shows nine main spaces of the proposed Sungai Segget riverfront. The river form is redesigned from a linear river into a more natural river to reduce the water speed when the flash flood occurs, and permeable pavers installed on the surfaces of the surrounding area can ease the surface water run-off.

DETAILED DEVELOPMENT PLAN

The detailed development plan illustrates the spaces, softscape and hardscape elements (Figure 11). Tensile structures act as shading devices where people can sit and rest underneath. Walkways all along the riverfront can allow people to walk and jog as part of their leisure and sightseeing activities.



Figure 11: Detail development plan

RAINWATER HARVESTING SYSTEMS

The rainwater harvesting systems shall become an additional method to reduce the excess water in the area and be used for irrigation of the riverfront (Figure 12).

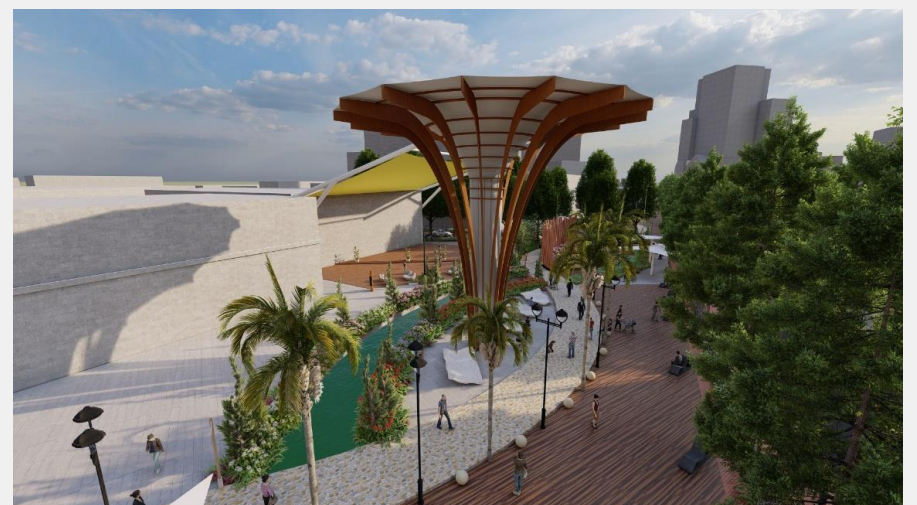


Figure 12: Rainwater harvesting systems

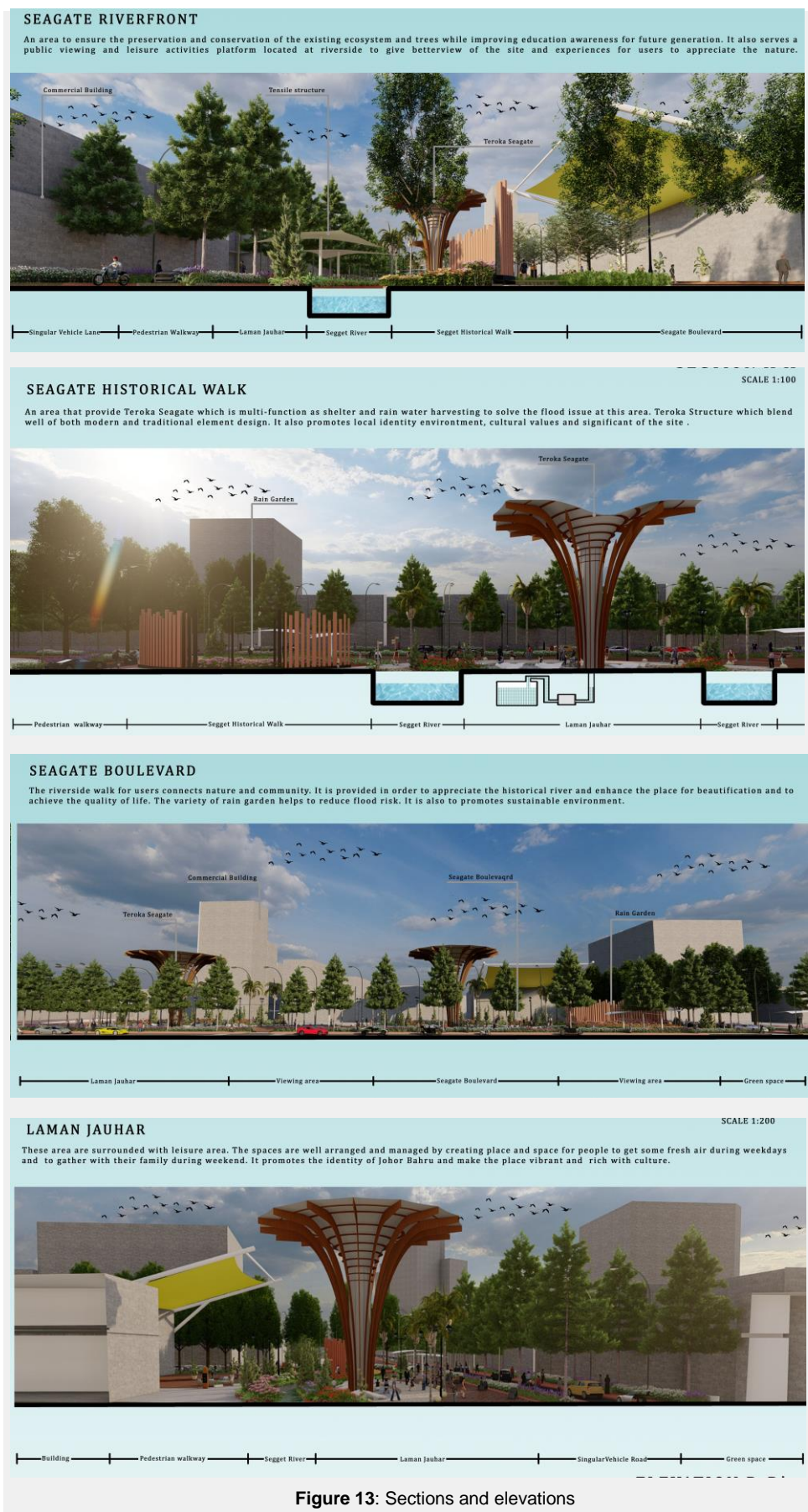


Figure 13: Sections and elevations

SECTIONS AND ELEVATIONS

Figure 13 shows the profile of the riverfront and the effects created by the proposed vegetation and hardscape elements.



Figure 14: Perspective views

PERSPECTIVE VIEWS

Figure 14 and Figures 18-20 shows the images of the Seagate Riverfront, Seagate Historical Walk, Laman Jauhar and Teroka Seagate. The proposed design intends to make the area greener, more comfortable, and better contrast to the densely built environment.

INNOVATIVE DESIGN ELEMENT

Teroka Seagate is a rainwater harvesting system and provides shelter for urban dwellers.

Teroka Seagate functions as a rainwater collector at Sungai Segget and Jalan Wong Ah Fook to overcome the site's main issue, which is a flash flood.

According to Sivanappan (2006), the rainwater harvesting system comprises wooden roof structures with integrated gutters and scuppers to direct water into the system (Figure 15).

Rainwater is collected when it falls on the structure, stored and utilised later. It can be purified using a filtered pump and used for a landscape irrigation system for the vegetation along the waterfront (Sivanappan, 2006) (Figure 16).

In an urban setting like Sungai Segget, a rainwater harvesting system can function as a storage tank. A catchment area for the water links the cisterns, tanks, and reservoirs in the tank.

Other than that, Teroka Seagate provides shelter for urban dwellers to sit, relax and appreciate the history and views of Sungai Segget and as a focal point for people to gather with their friends and family members.

When seen from afar, Teroka Seagate becomes an iconic landmark for people to identify the area as a node and an attraction (Figure 17). It gives a refreshing scenery to the once polluted river, which has high potential to transform into an attractive and more ecologically-friendly riverfront.

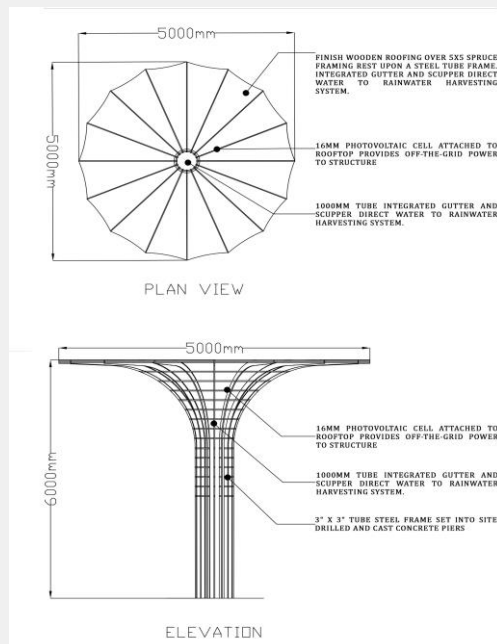


Figure 15: Rainwater harvesting system structure

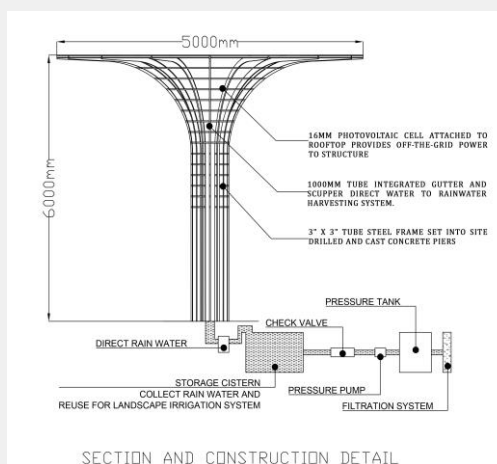


Figure 16: Construction detail of rainwater harvesting system structure



TEROKA SEAGATE PERSPECTIVE

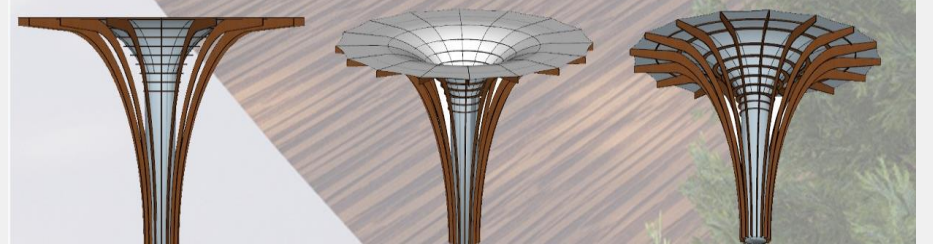


Figure 17: View towards Teroka Seagate

PLANTING CONCEPT

1. Aquatic Planting

The use of phytoremediation system such as aquatic planting to improve the quality of water and flood resilient system
2. Aesthetics

The use of native plants mixed with a proportion of compatible exotics is a proposed as well as fragrance plant and herbs to enhance the quality of human experiences



3. Rain Garden

The use of planting to control and direct movement of flood management
4. Unifiers

Planting is proposed in between structure to serve common thread and lying together the component into environment.



FEATURE SOFTSCAPE AND HARDSCAPE ELEMENTS



Dillenia suffruticosa



Hopea odorata



Costus speciosus



Hanguana malayana



Roystonea regia



Athyrium filix



Thypha latifolia



Bucida molineti



Muraya paniculata



Figure 18: Hardscape plan



Figure 19: Softscape plan

SPACES, ELEMENTS AND ACTIVITIES



SEAGATE HISTORICAL WALK



SEATING AND VIEWING AREA



SEAGATE BOULEVARD

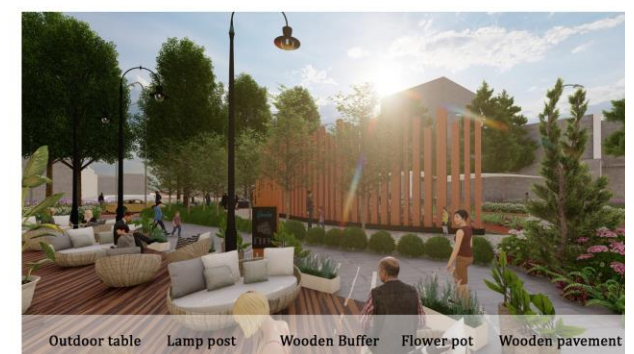
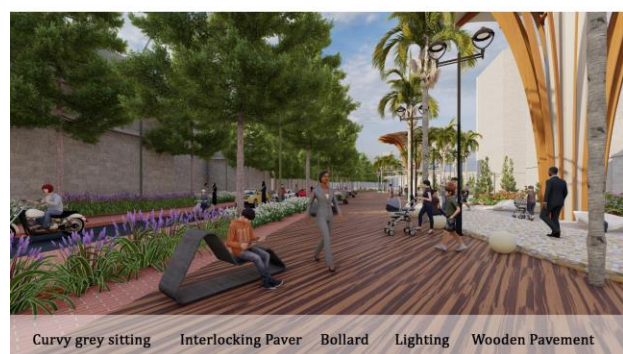


Figure 20: Spaces, elements and activities

CONCLUSION

Sungai Segget is a valuable urban resource for Johor Bahru. Not only is it an urban river system that forms a strong spine for the city, but it is also a river that links the various heritage areas of the city. This project has proposed four core strategies to revitalise Sungai Segget into a vibrant heritage and cultural riverfront, which are using, (i) Blue Trail - the improved river system and the rainwater harvesting system, (ii) the Green Trail - the green spaces for vegetation, plaza, nodes and activities, (iii) the Heritage Trails - interpretive elements to display history and narratives of the site, and (iv) Accessibility - to transform the riverfront into a more pedestrian-friendly space. The design strategies and ideas demonstrate a balance between built and natural features, crucial to urban public spaces with limited green areas. Sungai Segget is one of the gems of Johor Bahru, and the revitalisation of the riverfront can contribute to the city's vibrancy socially, economically and environmentally.

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