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E-PROCEEDING OF

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“Sustaining the
Resilient, Beautiful and Safe Cities
for a Better Quality of Life”

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AQUA-PUNCTURE: A WATERFRONT REJUVENATION STRATEGY FOR JABON, SIDOARJO, INDONESIA

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Abstract

Indonesian urban planning and design haven't prioritized coastline development. On the other hand, many Indonesian cities started as riverfront villages. Jabon, Sidoarjo's waterfront development uses road transit currently, instead of their history as waterways, the urban development relationship was then disregarded. On the other hand, the term aqua-puncture is being used in many regions to restore rivers. In the meantime, an approach known as aqua-puncture has been tested and put into practice in a number of places throughout the world as a method to reinvigorate the interaction between waterways and their potential. The state of the Jabon District is then intriguing and merits further study. As a result, the purpose of this study is to determine the morphology of the waterfront region in the Jabon area and investigate the possibility of applying aqua-puncture to the environmental conditions of the area. This qualitative study employs tissue analysis to identify where an aqua-puncture procedure is needed to restore Jabon's waterfront as a tourist destination. The results show that aqua-puncture could restore the river in various areas. On the eastern bank, cultural-historical values should be restored and utilized. To strengthen spatial cognition, building distinctive sea activities and adapting inland waterways to aquapuncture will lessen global influence.

Keywords: *Aqua-Puncture, Revitalization, River City, Sidoarjo, Typo-Morphology.*

INTRODUCTION

The Coastal Tourist Destination of Jabon District

In Indonesia, urban planning and design have not yet been given the emphasis that the government has given to the development of waterfront areas. In point of fact, many of Indonesia's towns originated as riverside settlements, one of them is Sidoarjo city, known as delta city. Sidoarjo is located between the Surabaya River and the Porong River. The Jabon sub-district itself is located on the east coast of Sidoarjo, which is divided by the vast Porong River. Due to these geographic features, the terrain and spatial layout of the city are distinct from those of other cities, especially when compared to Surabaya and Pasuruan. One is situated in the Jabon district of Sidoarjo, one of several southernmost subdistricts directly adjacent to the river. Jabon had a famous tourist destination called Tlocor. A natural tourist destination, Tlocor Marine Tourism offers views of the river's right and left sides' swaths of mangrove trees. The pier has a number of boats and speedboats leaning against it, ready to ferry tourists up the river to Lusi Island.

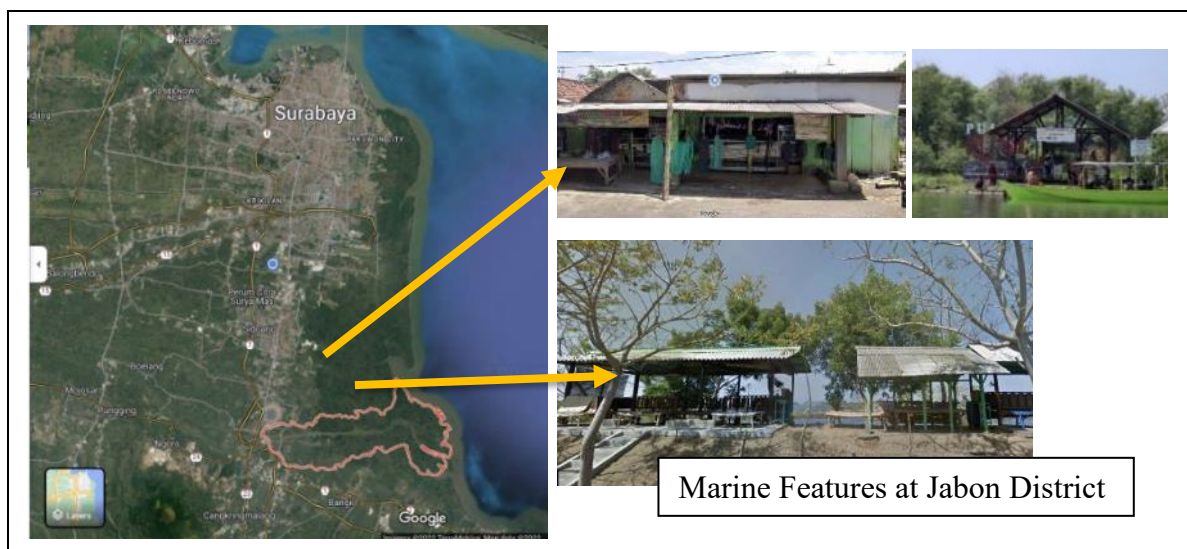
On the other side, this section of the city was renowned as a marine-focused tourist destination. For instance, the waterfront development in Jabon, which is located in Sidoarjo,

East Java, is dependent on road access transit like many other regions. The most important mode of transportation is now land transport, which has supplanted marine transport. The spatial link between urban growth and waterways was not taken into consideration at that time. This one-of-a-kind link that exists between waterways and the urban and rural areas that surround them is beginning to come into focus. This has an impact on how the urban configuration in the area is organized, with building clustering into the road access. Previous research also indicated that there is low integration of road network in Jabon, meaning that every establishment in tourism towards Tlocor (Mutia & Avenzoar, 2022).

Study that has been conducted by the researcher (Mutia et al., 2022) demonstrates a connection between the layout of urban space and the area's growth as a tourist destination. Accessibility in the region can be improved by analyzing the current road network to improve connectivity and people's transportation to tourism destinations. In the meantime, an approach known as aqua-puncture has been tested and put into practice in a number of places throughout the world as a method to reinvigorate the interaction between waterways and their potential. The name Aquapuncture has become synonymous with the rediscovery and revitalization of this canal network. As a result, the purpose of this study is to determine the morphology of the waterfront region in the Jabon area and investigate the possibility of applying aqua-puncture to the environmental conditions of the area.

Figure 1

Map of Jabon District and it's Coastal Features



LITERATURE REVIEW

There is, however, a crucial and complementary characteristic of cities: the urban's nature as a creative-cultural crucible (Ryan, 2013; Ujang & Zakariya, 2015). Here, in this very human aspect of urban life, there are diverging and opposing forces that will be just as crucial in determining how future difficulties are addressed. The physical shape of cities is not only built, it is more meaningfully 'planned'; it is the outcome of deliberate and foreseen human agency, such that much of cultural, social, and political history is entrenched in 'the material'. Our designed urban environment is rich in semiotic content, symbolising and reproducing ideas of survival and progress, of human history and social order, of the power of capital, and of our technological relationship to natural capital and ecosystem services, which we have allegedly been able to "mould to human ends."

There is, however, a crucial and complementary characteristic of cities: the urban's nature as a creative-cultural crucible (Alias et al., 2011). Here, in this very human aspect of urban life, there are diverging and opposing forces that will be just as crucial in determining how future difficulties are addressed. The physical shape of cities is not only built, it is more meaningfully 'planned'; it is the outcome of deliberate and foreseen human agency, such that much of cultural, social, and political history is entrenched in 'the material' Simply put, our understanding of nature and our role in it is mediated by the lived experience of our created urban condition. The following investigation (van den Bogerd et al., 2021) presents outcomes from one such 'urban blue acupuncture' intervention involving a neglected urban beach park.

According to traditional Chinese medical theory (Tsui, 2013), the "Acupuncture" system is a medical technique in which small needles are placed into the skin at specific places on the body, which are regarded to be energy lines. According to the theory, the body is considered as a vast system in which every aspect is interconnected. By simplifying this approach, needles are implanted at certain bodily locations in order to cure a variety of conditions by activating nerve pulses. After this is completed, the needles are removed, but the effect persists. Now, apply this principle to the City.

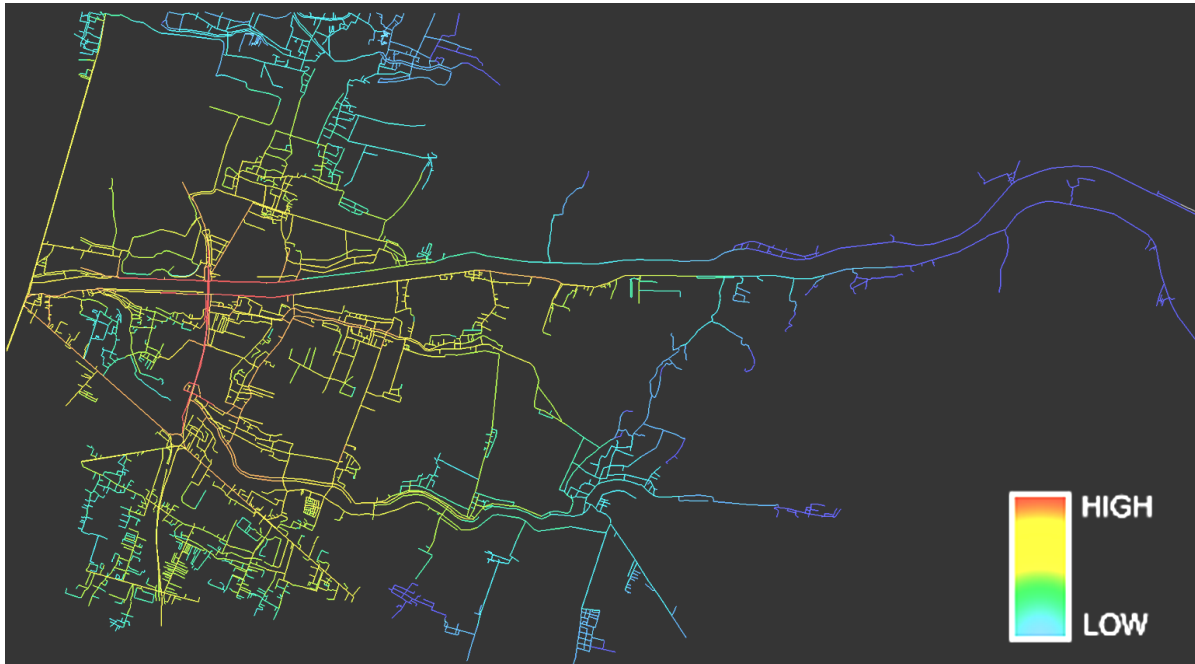
The city consists mostly of the built environment and the movement of its inhabitants. This is regarded a vast system, similar to the human body, a living environment in which the physical components are the energy lines that need to be stimulated. Small-scale interventions on the urban, architectural, and street levels can have a catalytic influence on the system as a whole in the future (Tang et al., 2015). Waterfronts are a broad notion that encompasses several types of environments, including riverbanks, lakeshores, coastal regions, and wetlands (Niu et al., 2021). This research focused on urban waterfront spaces, which are "a broad word for a certain area connected by land and water in a city" and are often created by water areas, water boundaries, and land areas (Ghareeb et al., 2022). Urban planners working in city-scale projects or initiatives that potentially decrease the population's access to the waterfront are strongly advised to prioritise waterfront accessibility (Othman et al., 2021).

METHODOLOGY

This is qualitative research (Groat, L. N., & Wang, 2013) that uses a phenomenological approach (Creswell et al., 2007). The purpose of qualitative research is to explain a variable phenomenon as deeply as possible and as it is following the conditions at the research location. To examining the urban configuration, tissue analysis technique (Stojanovski & Axelsson, 2019; Ye & Van Nes, 2014) was used not only as a measurement technique but also as a heuristic for discussing the fundamental concepts of spatial relations in urban space (Hagbert et al., 2019). The concept of urban acupuncture assessed the streetscape and riverscape to determine its urban tissue and make recommendations for its application. In order to identify the urban-aquapuncture point, this research was carried out along the river's edge in the Jabon District area. The streetscape and riverscape patterns were observed.

RESULTS

The reading of the urban spatial layout refers to the results of earlier studies on the status of the city network (Mutia et al., 2022). The following are the outcomes of this integration analysis as displayed by the DepthmapX software:

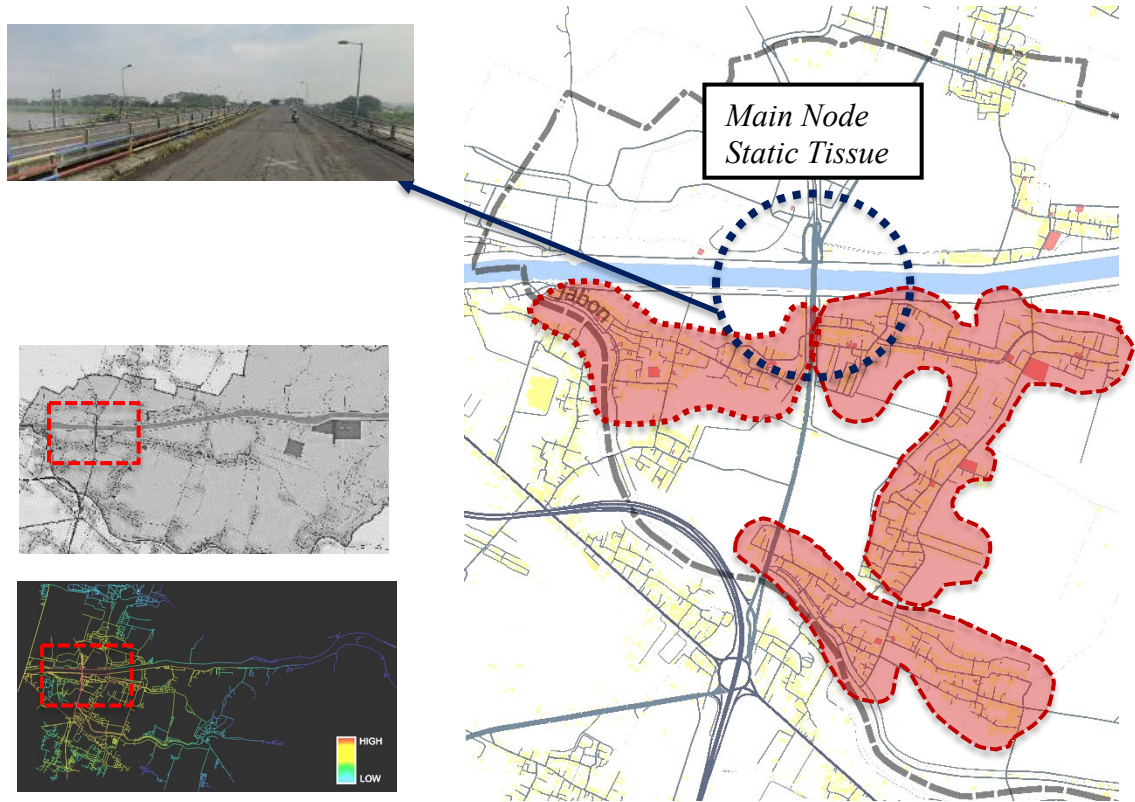
Figure 2*Integration Value of Vehicle in Jabon District (Mutia et al., 2022)*

In urban acupuncture, it is crucial to identify the vital spots for revitalising the neighbourhood. In this study's analysis, additional mapping was performed using advanced analysis, specifically tissue analysis, because the density, activity and physical characteristics are known, measurable, and can even be visited, there is a degree of certainty about the feasibility and effects of different configurations of development. A technique that overlays a known and understood scale plan or aerial photograph of existing buildings, lots, blocks and street patterns onto a vacant site as a rapid means of generating design options. These plans, aerial photographs or maps are often referred to as an 'urban tissue'.

Due to the Lapindo mudflow disaster, the circumstances for activities do not exist in the meeting node area between urban tissue in segment 1, either. This is a former toll road that is no longer used. Consequently, in regions with static urban tissue conditions and ignored nodes, this region becomes stagnant and void. In order to revitalise the neighbourhood, a rejuvenation node is judged necessary based on the findings of segment 1's examination of stagnant urban tissues.

Table 1
Tissue Analysis of Segment 1

Assessment of Urban Tissue (Static Tissue)

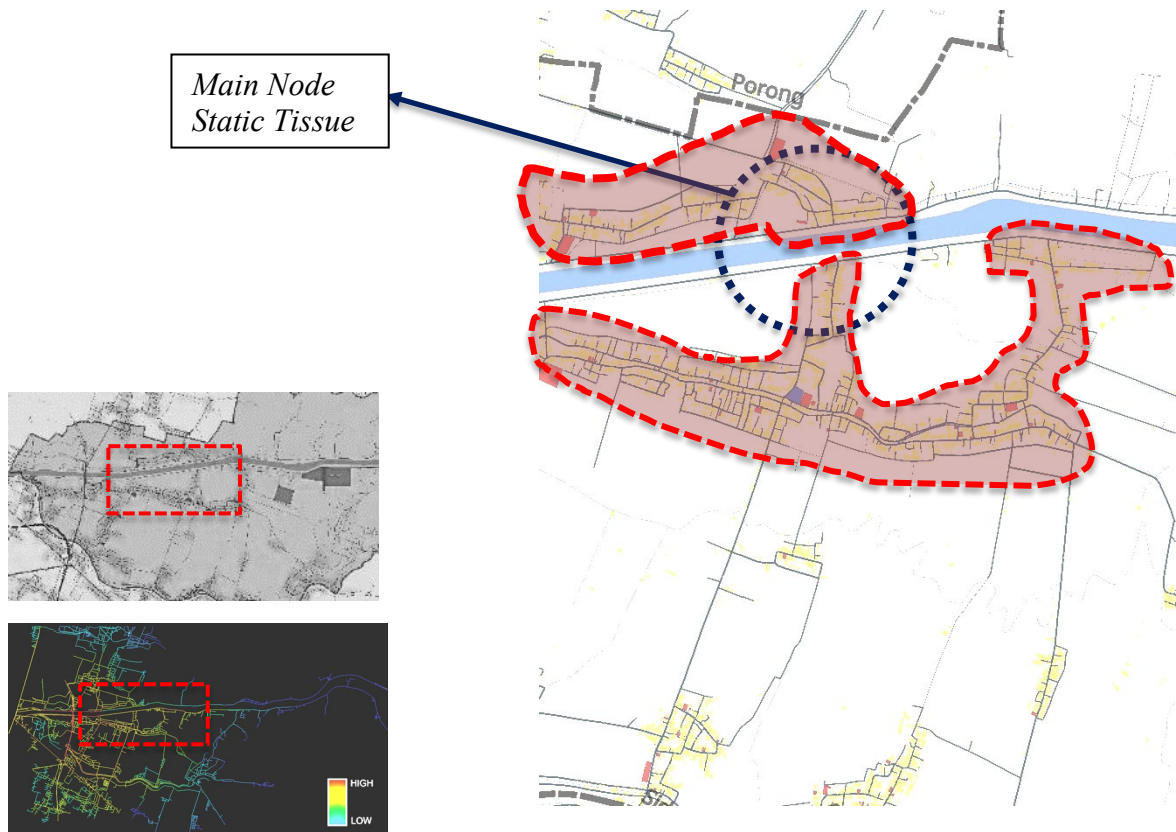


Even though it has an organic appearance, the area covered by segment 1 is primarily composed of inorganic urban tissue. This is demonstrated by the consistency with which the number of lots is distributed over the road network. In addition, the road structure is quite obviously visible along the primary arterial road. Rivers are largely utilised as transit hubs and do not contribute in any way to the growth or development of the city.

Because there is a river in that area, the current one gives the impression of being separated from the urban tissue that is on the north and south sides. It is essential for there to be a relationship that is both visual and spatial between these nodes in the area in order to keep the life of the zone intact, especially taking into consideration the fact that this is the primary entrance to the Tlocor tourist area in the east and the end of the road.

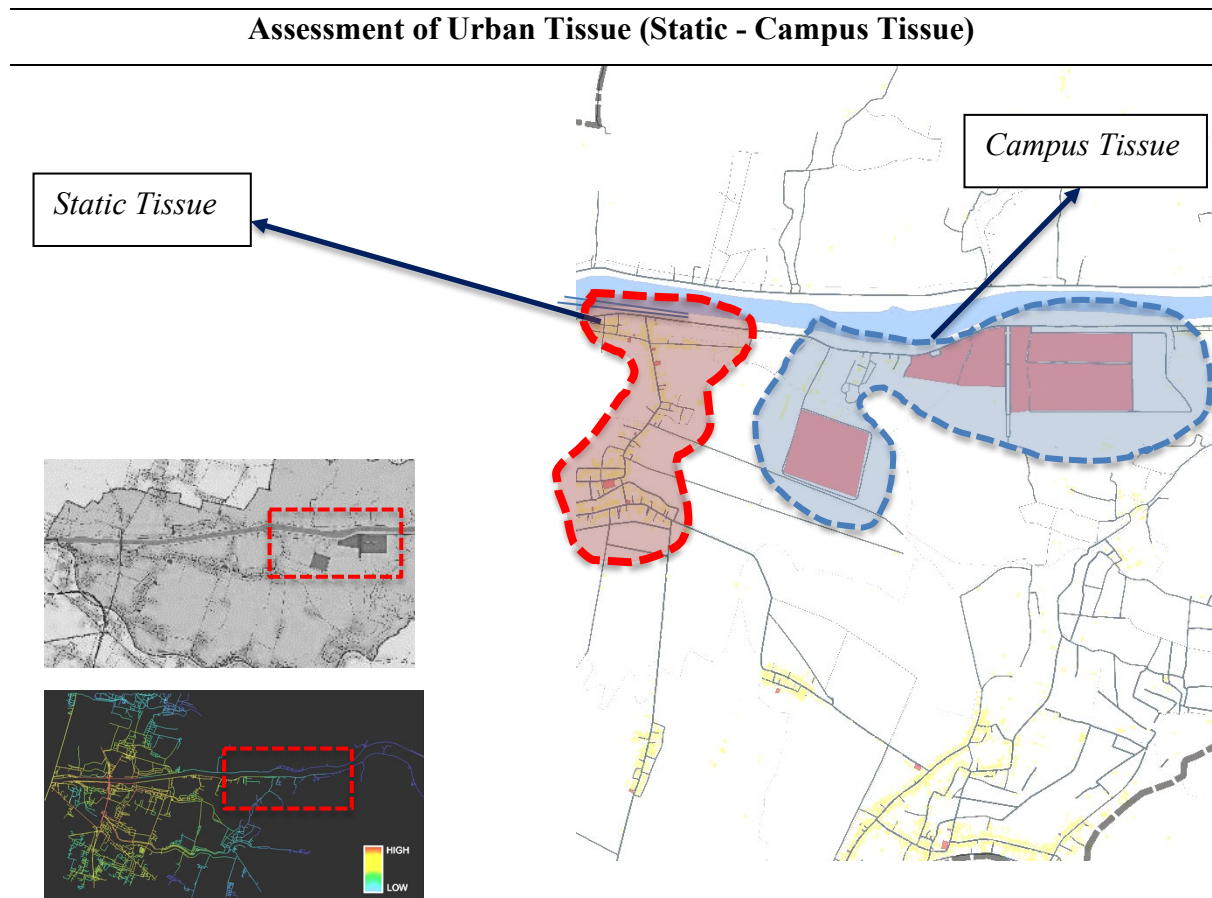
Table 2
Tissue Analysis of Segment 2

Assessment of Urban Tissue (Static Tissue)



Despite being an organic form, the area in segment 2 is predominately composed of urban tissue that is considerably static. All of that is proven by the consistency of how the proportion of lots is distributed over the road network. In addition, the road structure is quite obviously apparent along the primary arterial road. The current one appears to be cut off from the urban tissue on the north and south sides because there is a river there. Because of this, the river is no longer a unifying force in the urban area; contrary, the city is becoming more divided, and the river no longer serves as an active point in promoting river tourism.

Table 3
Tissue Analysis of Segment 3



Lots that are utilised by a variety of construction companies dominate the campus tissue region that is located on the east side of the school. There is a suitable amount of transition between a static area that is dominated by residential neighbourhoods and a tissue area that is occupied by a factory campus.

DISCUSSION

Therefore, it is essential for the city to preserve both the practical and aesthetic qualities of its waterfront. Once user conflicts are kept to a minimum through people's participation in the management of common space along the water's edge, this promotes sustainable principles for urban waterfronts (Chen, 2022; Shah & Roy, 2017). The results of the study indicate that there are several points that need to be rejuvenated so as to maximize the potential of the area as a tourist area. The acupuncture should be composed of elements that blend in with the environment. The places should provide a peaceful retreat from the harsh concrete and asphalt of urban areas. The necessity of conserving or repairing a place's or community's cultural identity is a characteristic shared by all effective urban acupuncture. So many cities now require acupuncture because their cultural identities have been ignored. However, designing a city around the automobile provides an additional challenge. The tourist area on the outskirts of the city urges us to forego exercise and avoid walking around the metropolis. Separating the functions of urban life—living here, working there, and enjoying leisure elsewhere—is a waste of time, resource, and stress. The usage of the automobile in moderation is equivalent to having healthy cholesterol levels (Lerner, 2014). And effective acupuncture is putting down the keys for a few hours. According to the principles of Good Acupuncture (M. Lloyd, 2012), there are

5 main principles of good acupuncture, namely: features unique architecture, entertainment hotspots, historical emphasis, transportation making it accessible, districts of character. These five techniques are then mapped to a number of existing urban tissue meeting nodes to provide alternative acupuncture sites, thereby revitalising the neighbourhood. Aqua-puncture strategy that accounts for urban blue space (S. D. Lloyd et al., 2002; van den Bogerd et al., 2021) chosen to maximise the possibilities of the area's riverscape, which has potential as a waterfront area but is not perfect at present.

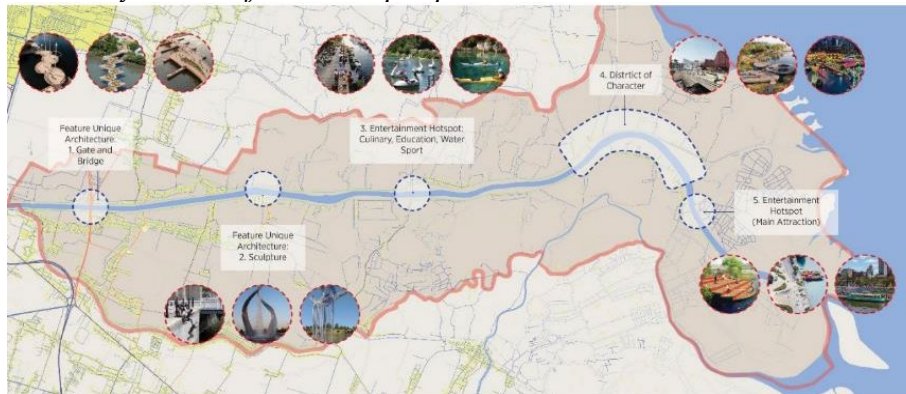
Figure 3
Waterways Point of Urban Aqua-puncture



Note. Image referencing by pinterest

Several rejuvenation point nodes that can be employed and treated with "acupuncture" have been identified in the investigated region. This is mostly driven by the repurposing of river transportation regions that were rendered obsolete by the construction of land roadways into tourism river transportation. In a general sense, Figure 3 depicts the macro-scale river use path; however, in Figure 4, the pinpoint of urban aqua-puncture is held.

Figure 4
Waterways Point of Urban Aqua-puncture



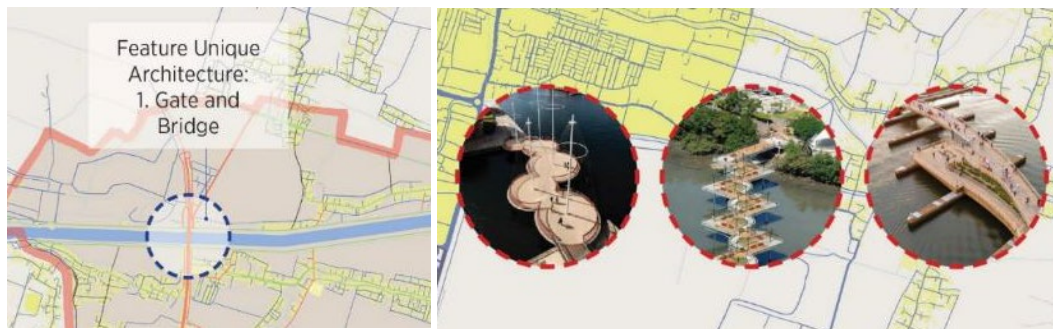
Note. Image referencing by pinterest

Feature Unique Architecture: Gate and Bridge

The first step in revitalizing segment #1's node is to feature distinctive and unique architecture. As a primary connector and entryway to Tlocor River Tourism, this segment requires an iconic and memorable design to capture the attention of passersby and potential tourists. Unique architecture in the form of a gate and bridge with a specialized concept could be a landmark and both a welcoming area for Tlocor River Tourism. This spot has potential as a starting point to access waterway transportation such as a ferry or shuttle boat to explore Tlocor via waterway.

Figure 5

Rejuvenation Point of Urban Aqua-puncture: Nodes 1



Note. Image referencing by <https://www.phaidon.com/>

Feature Unique Architecture: Sculpture and Focal Point

The second development node is located along the river and is enhanced by the placement of an unusual sculpture. The sculpture acts as a visual connector to the next stop, creating a sequence of spatial identity along the riverfront. Hence, the sculpture should be designed with a strong concept such as water themed, genius loci, grandiose scale, etc.

Figure 6

Rejuvenation Point of Urban Aqua-puncture: Nodes 2

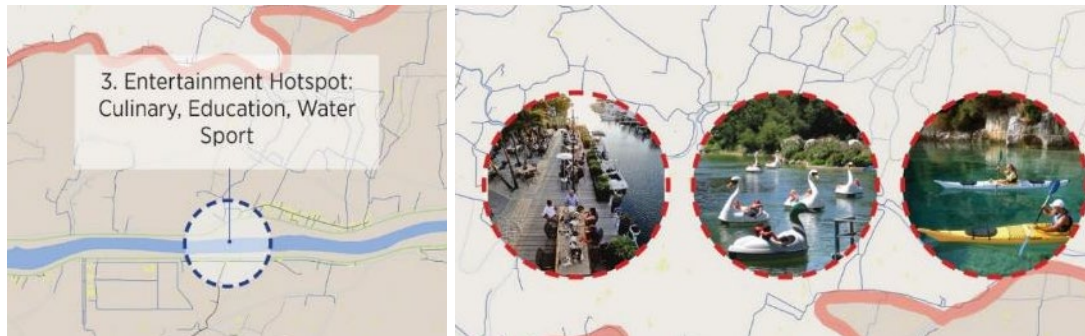


Note. Image referencing by <https://www.theartist.me/>

Entertainment Hotspot: Education, Culinary, and Water Sport

The third node holds a critical position as this one is located in the middle of the route. The scarce residential area around this spot might become a setback for the development. This spot requires a revitalising concept to create a vibrant atmosphere, which can be accomplished by providing several functions, such as educational activities, culinary areas that stretch along the riverside, or water sports activity.

Figure 7
Rejuvenation Point of Urban Aqua-puncture: Nodes 3

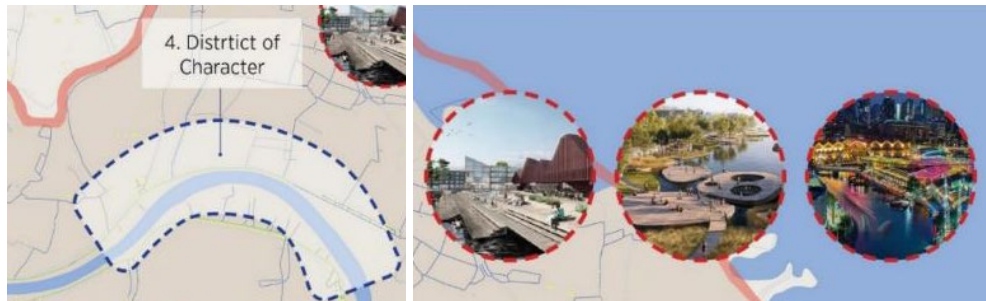


Note. Image referencing by <https://www.blucrabhouse.com/>

District of Character

The fourth node is taking shape in a curved promenade alongside the river next to the Porong River estuary. The design of this area should bring forth a unique character to unite the sequence from previous spots before entering the main attraction that is located in the fifth node. There is an ongoing debate regarding methods for implementing sustainable urban restoration scenarios. This does not imply seeing cultural heritage buildings and urban fabric in isolation, but rather focusing on their inherent interrelationships, which may be sensed through mobility and flows. (Ismaeel et al., 2022).

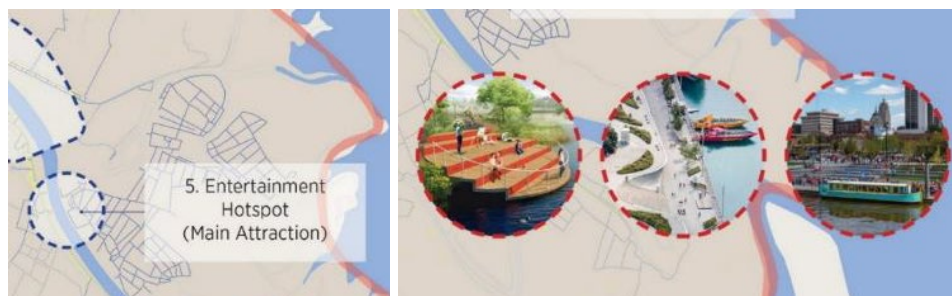
Figure 8
Rejuvenation Point of Urban Aqua-puncture: District of Character



Note. Image referencing by <https://entropic.es/thefloatinggardens>

Entertainment Hotspot: Main Attraction

The fifth node is the final destination for Tlocor River Tourism, where there are already existing attractions. The existing attractions require revitalization to further attract tourists and rejuvenation for the development of identity. Additional tourist attractions such as a riverside amphitheater, floating platform, and boat/ferry pier may increase tourist visits to the development.

Figure 9*Rejuvenation Point of Urban Aqua-puncture: Main Attractions*

Note. Image referencing by <https://landscapearchitecturemagazine.org/>

CONCLUSION

According to the findings of the study, aqua-puncture could be utilised to revitalise the river in multiple locations. With the application of urban aquapuncture, riverfront tourist spots can be rejuvenated and continuously improved. On the western side, water level management is being done through the use of sluices, pumping stations, and weirs. On the other hand, concerns regarding the restoration and utilisation of cultural and historical resources within and along the river should be raised on the eastern bank. In order to improve people's ability to think spatially, novel maritime activities, such as sailing, nyadran floating flower exhibits, historic ship regattas, water concerts, and so on, should be developed. The adaptation of aquapuncture to inland waterways will continue to be an essential component in the reduction of global impact.

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Prof. Madya Dr. Nur Hisham Ibrahim
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SITI BASRIYAH SHAIK BAHARUDIN
Timbalan Ketua Pustakawan

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Setuju.

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