

The Main Plaza Design For Al-Amin Living Lab And Industrial Park In Sampe Cita Village

Fariz Harindra Syam¹, Dara Wisdianti², Melly Andriana³, Syahna Dwi Ardianti⁴
^{1,2,3,4}Universitas Pembangunan Panca Budi, Indonesia

Email corresponding: darawisdianti@dosen.pancabudi.ac.id

Abstract. This research was conducted to design Plaza Utama Al-Amin Living Lab and Industrial Park in Sampe Cita Village, Kutalimbaru District to fulfill the space needs and requirements. The design of Al-Amin Main Plaza Living Lab and Industrial Park in Sampe Cita Village, Kutalimbaru District can create the flexibility of the desired space and shape. Plaza is a word derived from Spanish which has a meaning related to "field". Plaza can be described as an open space for the public (public space) that can be found in urban areas or a region. Sustainable architecture, also known as green architecture, is an architectural concept that seeks to minimize the negative impact of the building environment with efficiency and moderation in the use of materials, energy, and development space and ecosystem at large. The development of Al-Amin Living Lab and Industrial Park is adjusted to the plans and concepts that have been made. The detailed design of the area to be created must follow the rules of the concept of sustainability and local wisdom. Every building that will be built in this area must have an environmentally friendly and energy-efficient concept. The design of the Main Plaza of Al-Amin Living Lab and Industrial Park follows the rules of sustainable architectural design. This is shown by the use of environmentally friendly materials and designs that are in harmony with the environment. The design concept of the Main Plaza of Al-Amin Living Lab and Industrial Park also refers to the masterplan of the area that has been made before.

Keywords Outdoor Plaza; Sustainable Architecture; Architectural Design

INTRODUCTION

Kutalimbaru Subdistrict is included in the Deli Serdang Regency, North Sumatra Province. The natural conditions of Kutalimbaru Subdistrict generally have 2 (Two) Climate seasons, namely the dry season and the rainy season, where both climates are influenced by sea breezes and mountain breezes. Administratively Kutalimbaru District is bordered by several areas, namely: the north is bordered by Sunggal and Pancur Batu Districts, the south is bordered by Sibolangit District, the east is bordered by Pancur Batu District, the west is bordered by Langkat Regency (BPS Deli Serdang, 2021).

Universitas Pembangunan Panca Budi will create an area that is projected to become a center for field laboratories and workshops that accommodate all study programs at UNPAB. In addition, this area is also planned to be an Ecoedutourism location based on agriculture and processing of agricultural products. This area will be named Al Amin Science and Industrial Park (Living Lab). Eco-tourism in this area is

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*Corresponding author. darawisdianti@dosen.pancabudi.ac.id

expected to attract visitors to enjoy the Al Amin Science and Industrial Park (Living Lab) location. with attractions based on field activities from existing study programs at UNPAB such as horticultural gardens, nurseries, animal husbandry, waste management for renewable energy utilization to packaging processing of garden and livestock products Al Amin Science and Industrial Park (Living Lab).

According to the master plan of Al-Amin Living Lab and Industrial Park, one of the complete facilities that will be presented by Al-Amin Living Lab and Industrial Park is the Main Plaza area. The Main Plaza area is located in the center of the Al-Amin Living Lab and Industrial Park area. The Main Plaza is expected to be the center of various events or outdoor events in the area. Therefore, it is necessary to design a main plaza in the Al-Amin Living Lab and Industrial Park Glugur Rimbun area.

LITERATURE REVIEW

1. Outdoor Plaza

Plaza is a Spanish word that has a meaning related to “field”. Plaza can be described as an open space for the public (public space) that can be found in cities or an area. An example of a plaza is a field or square.

2. Sustainable Architecture

Sustainable architecture, also known as green architecture, is an architectural concept that seeks to minimize the negative environmental impact of buildings with efficiency and moderation in the use of materials, energy, and development space and ecosystems at large. Sustainable architecture uses a conscious approach to energy and ecological conservation in the design of the built environment or the theory, science and style of buildings designed and constructed according to environmentally friendly principles. Sustainable architecture has many definitions from various parties. Some of them are the definition quoted from James Steele's book, sustainable architecture is.

“Architecture that meets the needs of the present, without jeopardizing the ability of future generations to meet their own needs. Those needs differ from society to society, from region to region and are best determined by the people concerned.” According to James Stevens Curl and Susan Wilson (Authors of the Oxford Dictionary of Architecture), “Sustainable Architecture is architecture that does not waste energy, does

not require expensive maintenance, and is not a building that has poor insulation or too much glass”.

3. Principles of Sustainable Architecture

Principles of Sustainable Architecture According to the Brundtland Commission, chaired by Harlem Brundland, the Brundland Commission is the name for the World Commission on Environment and Development, which uses 5 principles of sustainable architecture, namely:

1. Energy efficiency Utilize sunlight for maximum natural lighting during the day, to reduce the use of electrical energy. Utilize natural ventilation instead of artificial air conditioning. Using ventilation and openings, daylighting, and other innovative ways. Utilizing rainwater in innovative ways to collect and treat rainwater for domestic use. Energy-use efficiency concepts such as natural lighting and ventilation are specific to tropical climates such as Indonesia.
2. Land use efficiency Utilizing as much land as possible, not all land should be used as buildings, or covered with buildings, because then there is not enough green space and gardens. Using land efficiently, compactly and integratedly, the green potential of plants in the land can be replaced or maximized with various innovations, such as making roofs above buildings (roof gardens), hanging gardens (by hanging plant pots around buildings), hedges or which can be filled with plants, walls with gardens, on walls and so on. Appreciate the presence of existing plants on the land, by not easily cutting down trees, so that existing plants can be part of sharing with buildings. Open design with spaces that are open to the garden (in accordance with greater flexibility of space).
3. Efficient use of materials Utilizing leftover materials to be used also in the construction, so as not to waste materials, for example leftover wood can be used for other parts of the building. Utilize used materials for the building, old components that can still be used, for example the remaining demolition of old buildings. Use materials that are still abundant or rarely found as well as possible, especially for materials such as wood. . Utilize new technologies and materials Harness the potential of renewable energy such as wind, solar and water energy to independently generate domestic electricity for homes and other buildings. Utilize new materials through new discoveries that can globally open up opportunities to use renewable materials that are fast to produce, cheap and open to innovation, such as bamboo.
5. Waste management Create a domestic waste treatment system such as black water, gray water that is self-sufficient and does not burden the city's water flow system.

4. Architectural Design

Design activities in architecture basically concern three main things that should be done/implemented/given both in the academic world by students of the Department of Architecture in the campus environment, as well as in the practical world by professional architects in the field of work. Udjianto Pawitro in the journal “Understanding the Relationship between Architectural Theory-Design Activities and Criticism of Works” (2009) suggests that in Architecture, the three main things (which normatively) should be done/provided in the activity of 'architectural design' are: Steps or stages or procedures of activities that should be carried out in architectural design, so as to obtain good preparation, process and design results. Basic and advanced knowledge about the rules/principles/references of how “good” and “correct” design activities are carried out in the field of architecture, and advanced insights/knowledge in giving style/color to the architectural design activities carried out so that the design results can provide “added value”. Stages in the design process according to the Indonesian Institute of Architects in the book “Guidelines for Work Relations Between Architects and Service Users” Article 36 (IAI, 2007, p.24).

5. Amphitheater

Amphitheater is a type of building used to hold performances. From theater, sports, to other types of performances. The term is taken from the Greek amphitheatron.

Amphitheater styles

a. Greek

The Greeks in the 4th century BC managed to create a theater construction that had a high acoustic filter. One building that stands out with this aspect is the Epidaurus in Athens, which can still be visited by the public today.

b. Roman



Figure 1. Roman Building

The Roman Empire is estimated to have built around 230 amphitheatres during its reign. What characterizes these buildings, among others, is that they are circular or oval in shape.

Meanwhile, around the main performance area was built seating for the masses. There are two Roman amphitheatres based on their function, form and name. These types include:

- Stadia: small in size, used to host sporting events or competitions.
- Hippodrome: large in size and in its main area. Usually used as a place to hold horse races and gladiatorial events.

By far the largest Roman amphitheatres could hold up to 40,000 to 60,000 spectators. Some of these buildings still stand today. One of them is the Colosseum, Rome.

c. Modern



Figure 2. Roman Amphitheater Buildings

In modern times, Amphitheater has several shapes, namely circle, semicircle and oval. Not limited to buildings with open spaces only, the modern era also applies roofs to Amphitheater buildings. So, Amphitheater is no longer limited to buildings with open spaces only. One of the things that is a mandatory element in Amphitheater buildings in the modern era is the acoustic side. Almost all modern Amphitheatres are built so that they can echo the sound from the stage well into the audience seats. This style of amphitheater is divided into two according to its size. The first is a large amphitheater. It functions as a large-scale performance area. The second is the amphitheater with small dimensions. In contrast, the amphitheater that is not too large in size is mostly used as a performance area for local entertainment.

METHODS

This study is a descriptive qualitative study with a literature study method through literature studies sourced from journals of previous research results related to the title, also through access to data obtained from the website as an information publication. Descriptive qualitative study can be interpreted that the author is the key instrument where data collection techniques are carried out by combining and analyzing data inductively (Sugiyono, 2012) so as to produce and process descriptive data such as narrating the results of interviews and or observations.

RESULTS

1. Project Description

a. Al Amin Living Lab and Industrial Park

The development of the land which is the object of research is to meet the needs of learning, practicum, research and innovation center of UNPAB which can be an income generator. Therefore, PSE-GR has rooms and activities that are mutually sustainable internally and externally. This is aligned with the understanding of UNPAB Living Lab which adheres to the concept of circular economy education based on Islamic and humanitarian values. PSE-GR Development Opportunities Areas with the concept of EcoTech-Edu Tourism that have an understanding of circular economy education (CED) are still very minimal in North Sumatra, PSE-GR can be a pioneer in spreading this understanding of CED where there is an integration of economic and educational activities which at the same time helps preserve nature. Encouraged by the development of the Merdeka Belajar Curriculum (KMB), it is hoped that PSE-GR can become a field of research, service and practicum for the UNPAB academic community which increases awareness of the need for nature conservation. Because Green Technology from across disciplines is still minimally discussed and is still often researched partially, UNPAB can be an example of integration of disciplines that become practical, dynamic, educational and economically valuable innovations.

b. Problem Analysis

Some of the important points that underlie the need to design the Main Plaza in the Al Amin Living Lab and Industrial Park area are:

1. There is a master plan for the Al-Amin Living Lab and Industrial Park area which requires a Plaza in the center of the area.
2. The Main Plaza of the Al Amin Living Lab and Industrial Park Area will be the main gathering point in the area.
3. The Plaza is the center of activities and the implementation of certain events in the Academic, Production, and Educational Tourism activities carried out in the Al Amin Living Lab and Industrial Park Master Plan.

c. Physical Analysis

The master plan for the Al Amin Living Lab and Industrial Park stipulates that the main plaza is planned to be located in the center of the area. In addition, the footprint of this main plaza is on an area of 2,900 m² which will consist of an amphitheater and a multipurpose plaza court. Currently, the main plaza land is still an existing oil palm plantation. According to the Al-Amin Living Lab and Industrial Park Masterplan, the main plaza is included in the Main Plaza zone and the Area Management Office Building.



Figure 3. Location of the Main Plaza in the Al Amin Living Lab and Industrial Park Area

The current land formation condition is on a relatively flat contour. This is very supportive for the construction of the plaza because indeed a plaza requires a flat place. In addition, the location of this plaza site in the Glugur Rimbun Living Lab Area is at the highest elevation in the area so that it has the potential to become a vantage point.



Figure 4. Location of the Main Plaza in the Al Amin Living Lab and Industrial Park Area

2. Concept

a. Basic Concept of Design

The basic concept of designing the Main Plaza in the Al-Amin Living Lab and Industrial Park area follows the design rules that have been planned in the master plan of the area. The design rules listed in the master plan are environmentally friendly design rules by prioritizing the environmental sustainability of the area with the concept of Sustainable Architecture.

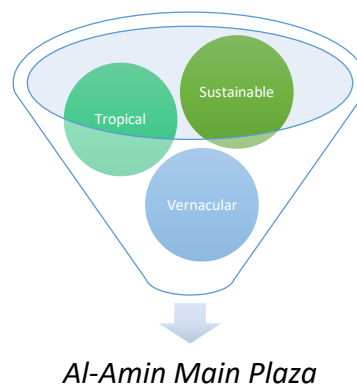


Figure 5. Basic Concept Diagram of Al-Amin Living Lab and Industrial Park Main Plaza

The concept of sustainable architecture that will be reflected in the design of this plaza is an ecological and environmentally friendly design. This can be realized by the

use of more ecological materials, pavement that can pass water to the ground, and the use of vegetation in the design. In addition, the hardscape design and landscape buildings used are expected to be in harmony with the environment so that it is disguised that there are hard buildings in the design. The floor pavement material can be a grassblock arrangement that can still pass water into the ground.

b. Concept Development

Activity, Facility, and Zoning Concept of Plaza Site

The zoning of Al-Amin Living lab and Industrial Park uses a single entrance access for users. The main gate access will go directly to the reception area (welcome area) and facilitated with vehicle parking pockets centered in the area. The reception area is also equipped with an area information center that will provide information about the entire area to visitors and users of the area. The reception area is connected to all other areas, namely the agro-tourism area, education, production area, residential area, and service area with a ring road and transportation facilities in an environmentally friendly area. The main plaza desired in the master plan of the Al-Amin Living Lab and Industrial Park area is a place that can accommodate the activities of gathering visitors, sitting resting, and organizing academic events. Based on this, the facilities that will be provided in the plaza are in the form of a plaza court, amphitheater, and sitting area for a short break. The placement of the plaza court and sitting area will be on the south side, while the amphitheater will be placed on the north side of the plaza.

Table 1. Matrix of Zones, Activities, and Facilities

Zone	Activities	Facilities
Plaza Courtyard and Sitting Area	Sit, gather and take a break	Benches, courtyards, parks
Amphitheatre	Outdoor seminars and outdoor events	Amphitheater and outdoor stage

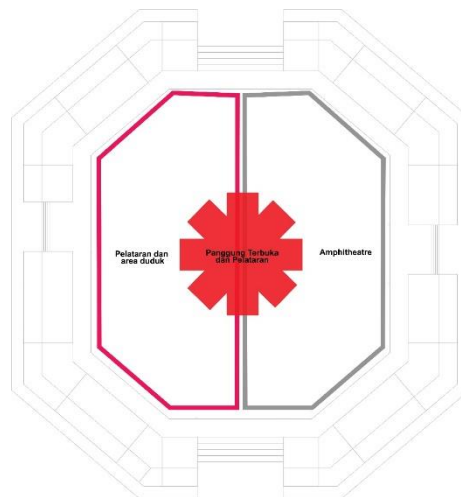


Figure 6. Conceptual Diagram of Site Zoning

Circulation Concept

Circulation of the Al Amin Living Lab and Industrial Park area uses a single main gate that can be used for general users. The main gate is located on the side of Glugur Rimbun Kutalimbaru cross road. In addition, there is a secondary entrance on the side of the neighborhood road in the southern part of the site. The secondary gate is only used for area management purposes. The circulation concept in this area uses an area ring road system that connects the main gate, parking lot, and all areas in the area. This is intended to facilitate the movement of visitors and managers to access all areas in the area. In addition, there is a smaller circulation in each area, which is intended to facilitate the production process and visitor activities to enjoy the facilities in each area. Circulation facilities in the area will be equipped with bicycle lanes and pedestrian paths on the ring road to maintain user safety and comfort. Roads in each area are considered for production, and certain parts are equipped with pedestrian paths for tourism purposes.

Circulation in the Al Amin Living Lab and Industrial Park area will also be equipped with electric shuttle cars to be more environmentally friendly. Visitors' vehicles must be parked in the parking lot at the reception area. The parking area is directly integrated with two large shuttle car shelters that will take visitors around the area. If visitors do not want to use the shuttle car, they can choose to use the bicycles that have been provided at each shelter. There are six shelters located around the ring road of the area to reach the entire area in the area. The first and sixth shelters are directly integrated with the parking lot. The second shelter is located in the service area. The third shelter is located in the cottage and ecotourism area. The fourth shelter is on the side of the forest

restaurant. The fifth shelter is in the agriculture and livestock management area. All shelters will be equipped with electric buggy cars and bicycles that can be used by visitors.

Circulation in the plaza is planned to circle the courtyard and open stage on the inner side and circle the entire plaza site on the outer side. In addition, four entrances and exits will be placed in the four corners of the site. However, the main entrance of the site is on the east and west sides of the site, this is because the east-west side is the central axis line and axis of the Al Amin living lab and industrial park area.

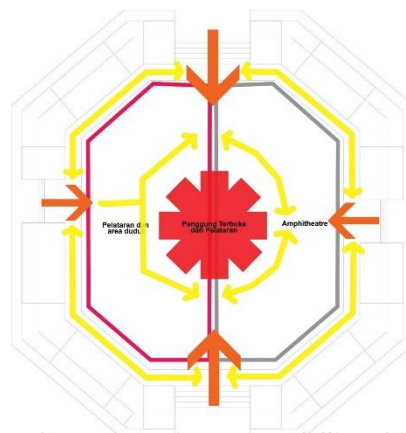


Figure 7. Concept Diagram of Site Circulation

Softscape and Vegetation Concepts

Softscape and vegetation are soft materials used in the landscape. The soft material is in the form of plants that can be used according to their function in the site. The function of plants used in the site is in the form of shade, barrier, screen, and aesthetics. Shade plants are usually trees with varying heights of at least 2 meters. Shade tree plants can have round, spreading or columnar crown characters.

Plants as a barrier can be in the form of shrubs with a minimum height of 50 cm. Bordering shrubs are usually planted in rows dividing the space into two or several parts. Screen plants are plants with the purpose of becoming a backdrop or view barrier. Screen plants can be in the form of trees or shrubs with a minimum branching height of 2 meters. In addition, screen plants must also have relatively dense branching. Aesthetic plants are usually plants that have appeal in terms of color, texture, or branching.

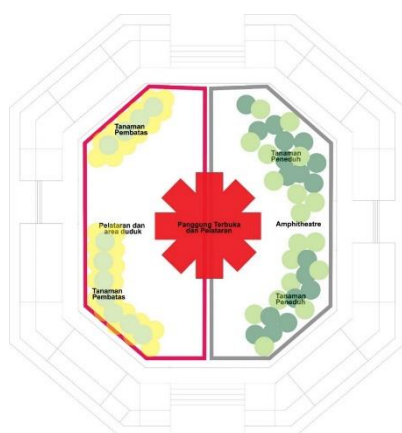







Figure 8. Concept Diagram of Vegetation Laying on Site

Table 2. Types And Functions Of Plants Used In Design

No.	Plant Name	Type	Function	Figure
1	African Fern (<i>Schizolobium parahyba</i>)	Tree	Shade, Aesthetics	
2	Waxy Cypress (<i>Cupressus sempervirens</i>)	Tree	Screen, Aesthetics	
3	Calatea (<i>Calathea lutea</i>)	Bush	Screen, Border, Aesthetics	
4	Purple Ruelia (<i>Ruellia tuberosa</i>)	Groundcover	Aesthetics, Border	

5	Paetan Grass (<i>Axonopus compressus</i>)	Grass	Pedestal	
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Hardscape Concept and Landscape Furniture

Hardscape is the hard element of the landscape. These hard elements can be in the form of ground cover pavement or buildings on the site. Landscape furniture is outdoor furniture that has been adapted to the conditions of the outdoor space and the functions required. Hardscape and furniture used in the design are in the form of pavement, amphitheater, open stage, stage canopy, park benches, and park lights.

Table 3. Types and Materials of Hardscape

No	Hardscape Name	Materials	Description
1	Open Stage	Reinforced concrete pavement, surface finish Stamped concrete	Retaining wall using reinforced concrete, then backfilled and filled with solid soil. The stage surface is covered with reinforced concrete and finished with stamped concrete.
2	Amphitheatre	Reinforced Concrete	The structural parts of the walls and stairs use reinforced concrete and masonry. Then filled with backfill soil. The surface is left for planting media filled with topsoil so that it can be planted. Then the footrest is finished with grassblock.
3	Stage Canopy	Iron pipe frame, membrane roof covering	Frame using iron pipe then fitted with membrane roof covering
4	Park Bench	Composite	Custom design composite materials
5	Lampu taman	Composite	Custom design composite material

6	Plaza Courtyard	Grass block	Grassblock manufacturer size 30cm x 45cm x 6cm
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The concept of the canopy is designed in such a way as to follow the shape of the African Fern tree which is shaped like an umbrella. The shape is then adopted to become the shape of the Open Stage Canopy. The canopy frame uses iron pipes and is covered with a membrane roof.

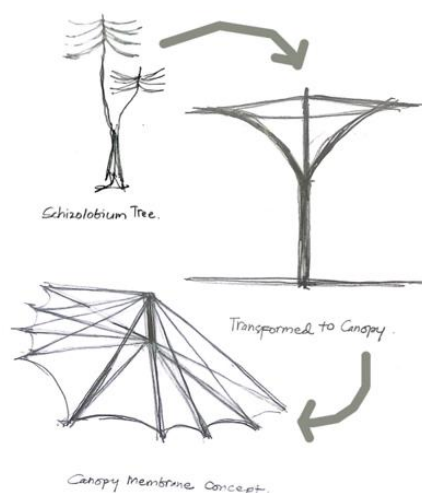


Figure 9. Concept Diagram of the Open Stage Canopy Form

DISCUSSION

The development of Al-Amin Living Lab and Industrial Park area design is adjusted to the plans and concepts that have been made. The detailed design of the area to be created must follow the rules of the concept of sustainability and local wisdom. Every building that will be built in this area must have an environmentally friendly and energy-efficient concept. The development of the Al Amin Living Lab and Industrial Park area will be carried out in stages starting with productive zones. The first zone to be built is the livestock zone and followed by the agriculture and plantation zone. The minimum facilities and infrastructure of the Al-Amin Living Lab and Industrial Park Site Plan will be developed in this zone are the Management Building and Laboratory, Animal Feed Warehouse and Processing, Slaughterhouse, Goat Cage, Cattle Cage, Chicken and Rabbit Cage, Biodigester, Grazing Area, and Animal Feed Planting Field. Once established with the livestock and agriculture zones, the other zones will be built at a later stage. The

product processing zone and marketplace will be the next zone to be built, because the products from the livestock zone and agricultural zone will be processed and marketed in this zone. Along with the product processing zone, the reception zone, sports center and Al-Amin Mosque can also be built to accommodate the comfort of the area users. Building design development in this area is only allowed to use 1-2 storey buildings. This is based on the local spatial direction which only allows buildings up to 2 floors. In addition, the building concept used must be tropical and sustainable/environmentally friendly, and have local cultural values. The design of animal cages and supporting facility buildings is adjusted to certain standards or those that apply nationally in Indonesia. Landscape design development in this area is adjusted to the functions required by the area. The planting of tree buffers and the creation of a monitor road around the area are needed for security reasons and to maintain the ecological functions around. In addition, the plants used in the landscape are also adapted to the functions and aesthetics needed in each zone in the area. The types of plants used are plants that are suitable for the tropical climate and microclimate of the area. Local plant species and rare plant species collections are also possible in this area, adjusted to the existing microclimate of the location. The landscape plant arrangement used is transition planting and stratification planting which allows a combination of tree, shrub/shrub, and groundcover plant types to be used and combined. This is to create the impression of the tropical concept to be achieved.

The plaza design follows the concepts that have been made in the previous stage. The concept of sustainable architecture that will be reflected in this plaza design is an ecological and environmentally friendly design. This can be realized by the use of more ecological materials, pavement that can pass water to the ground, and the use of vegetation in the design. In addition, the hardscape design and landscape buildings used are expected to be in harmony with the environment so that it is disguised that there are hard buildings in the design. Floor pavement material can be a grassblock arrangement that can still pass water into the ground.

The Tropical Concept that will be applied to this plaza design is the use of plants that are in accordance with the tropical climate in Indonesia. One type of plant that will be used is the African Fern tree (*Schizolobium parahyba*) as a shade tree on the

amphitheater. In addition, as a reinforcement of the tropical impression on the site, Kalatea plants (*Calathea lutea*) will be used as shrubs dividing the outer space. The application of the tropical concept can also be realized from the design response to the climate.

The climate in Indonesia is Wet Tropical, so the climate conditions will be hot (high temperature) and humid (high rainfall). Thus, design technology in shading arrangements and utilization of rainwater harvesting can be applied in this design. The gardens in the amphitheater and plaza courtyard are designed with technology that can channel water quickly into the ground. Thus, underground water tanks can also be applied to collect rainwater absorbed by the soil.

a. Main Plaza Site Plan

In accordance with the zoning concept that has been produced in the previous stage, the main plaza site plan consists of a sitting area, plaza court, open stage and amphitheater. Entrances to the plaza are in the four corners of the plaza, with the main accesses being to the east and west of the plaza.

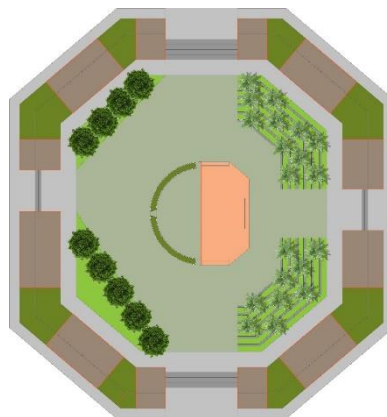


Figure 10. Main Plaza Site Plan

b. Design Illustration

The design of the main plaza of Al-amin Living Lab and Industrial Park is made by completing the needs for gathering, namely sitting areas and plaza courts. It is intended that visitors and users of the area can take a break after traveling around the area. In addition, the plaza court can also be used as a place to organize academic or non-academic events such as harvest bazaars, exhibitions, group discussions, etc.



Figure 11. Illustration of Seating Area and Plaza Court

The main plaza design of Al-amin Living Lab and Industrial Park is also equipped with an open stage and amphitheater. This is intended so that visitors and users of the area can take a short break after traveling around the area. In addition, the plaza can also be used as a place to organize academic or non-academic events such as harvest bazaars, exhibitions, group discussions, etc.

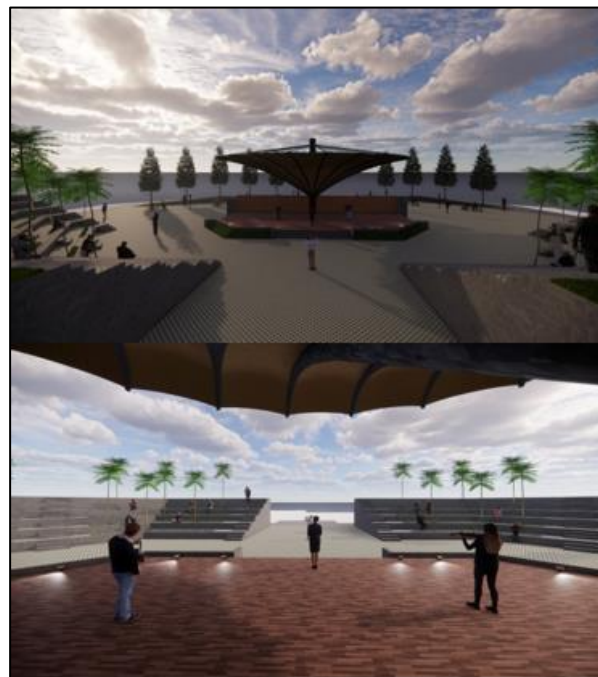


Figure 12. Illustration of Seating Area and Plaza Court

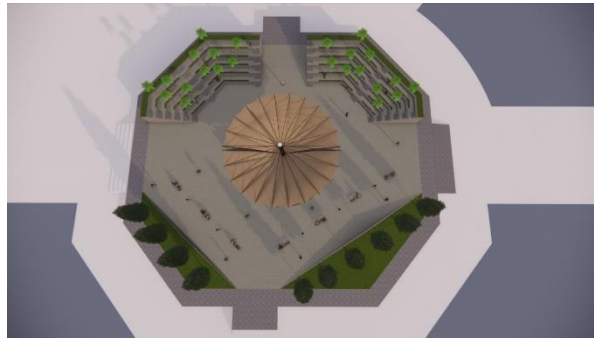


Figure 13. Plaza Top View Illustration

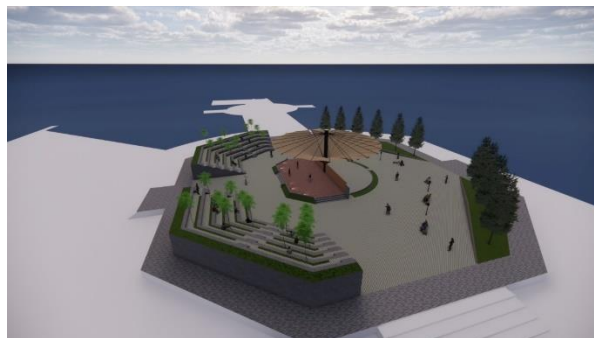


Figure 14. Bird's Eye Perspective Illustration

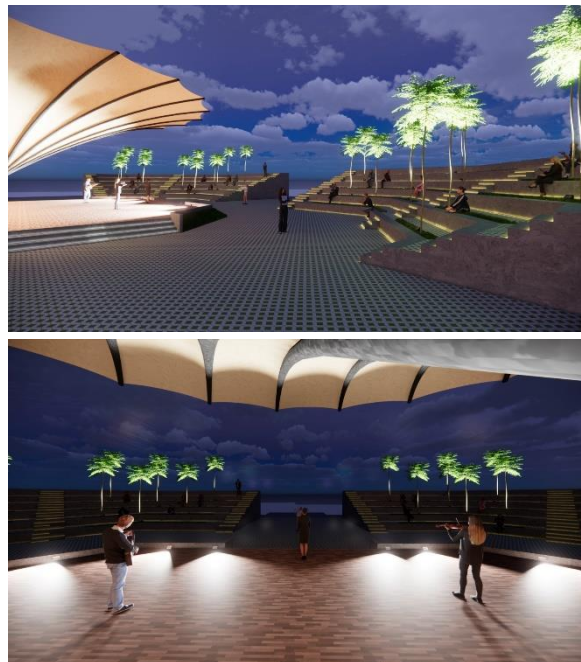


Figure 15. Illustration Of Open Stage And Amphitheater Night Situation



Figure 16. Illustration Of Plaza Court At Night

CONCLUSION

The design of the Main Plaza of Al-Amin Living Lab and Industrial Park follows the principles of sustainable architectural design. This is shown by the use of environmentally friendly materials and designs that are in harmony with the environment. In addition, design technology to respond to the climate is also used in the design of this main plaza, namely by capturing rainwater and changing shapes that are in harmony with the surrounding environment. The use of plants in this design is also in accordance with the tropical climate in Indonesia.

The design concept of the Main Plaza of Al-Amin Living Lab and Industrial Park also refers to the masterplan of the area that has been made previously. The design direction of the area master plan is the main reference in the preparation of this design. Therefore, this design can be integrated with the big concept of the Al-Amin Living Lab and Industrial Park Master Plan.

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