



BRIMA ATTOUGA STADIUM
Freetown , Sierre leone

Reinventing Cities

a C40 cities contest • Universidad de América

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INTRODUCTION

In response to the requirements established by C40 cities, an immediate improvement proposal will be presented based on the existing socio-demographic diagnosis of the city of Freetown, capital of Sierra Leone. This proposal contemplates the restoration of the Brima Attouga mini-stadium, restructuring its morphology and interpreting it as a social and urban cohesion device, taking into account the cultural potential of the inhabitants, their attachment to the place and the development projection of Freetown.

Social interaction strategies will be established with the objective of facing climate challenges and applying sustainability as a tool to transform the city's medium-term future, understanding the behavioral patterns and social dynamics of the inhabitants of the capital of Freetown.

The deficit of spaces for interaction and recreation results in the low adoption of public space on the Bai Bureh Road axis and sense of belonging in the city of Freetown, in view of the current situation in the African continent, it is normal to understand that the population increase in their countries makes the development indexes and/or projection minuscule, as a consequence of this population increase; the city reflects a diffuse order that frustrates the ideal functioning systems in the city.

PROBLEM

"Inclusive growth comprises elements related to income growth and growth of a multidimensional nature. As illustrated by the growth incidence curves, across all segments of the population, growth has been inclusive relative to income" (UN, 2022). This gives a partial perception of what is happening in Sierra Leone, which, not far from the reality of its continent, its city generates a low development that also attracts new changes due to modernity. This organic growth does not take into account how to seek a sustainable development that goes hand in hand with the social, economic and environmental aspects, giving way to a deficit of common physical spaces that lend themselves to citizen interaction as a result of the negative impact on the socio-economic aspect and against its urban development and preventing the city of Freetown to achieve an equitable development in its extension. The Brima Attouga stadium is a sports and cultural landmark in the organic growth of this eastern part of the city, considering that it was limited to the projection of a modernization of the same, with limitations not only physical as the main road Bai Bureh Road, which connects to the port, but the presence of three environmental elements (cemeteries) that really begin to be understood as small ecosystems that form the environmental structure adjacent to the stadium limiting its physical intervention and allowing the design of public spaces that lend themselves to the large agglomerations that the project seeks to solve.

While it is true; these structures are fundamental. However, the reality is that in the city they become elements that impede its transition to sustainability, the transformation of space to massiveness and manage to delay the evolution of the city; in addition to this, the cultural character is an aspect that, although it limits this development mentioned, it becomes a variable that, if it is not used in the right way, the negative impact it can have on the social aspect of sustainability is enormous.

JUSTIFICATION

The city of Freetown is looking for sustainability strategies under an activation and revitalization plan, to remedy the priorities of the context by becoming aware of it. The project is based on an urban development focused on a sustainable future, from the generatrix in the diffuse order of the urban structure adjacent to the avenue "Bai bureh Road" that prevents social interaction between the human scale, frustrating the basic recreation process in the place. It is also important to understand that the restoration of the Brimma Attouga stadium is the opportunity to enhance the impact of a space with an important urban legibility and scope, this is currently used for public meetings and sporting events but is projected as a device of urban articulation around a bidirectional benefit with its surrounding environment, with the aim of unifying the network of facilities and spaces for interaction, so we come to understand a stretch of city as a whole part of a whole from the concept of symbiosis.

"Since the beginning of time, human beings have solved the difficulties they encountered in their interaction with the environment thanks to the development and application of the knowledge they acquired, accumulated and transmitted from generation to generation" (Hernández, 2011).

GENERAL OBJECTIVE

To establish, based on the centrality criteria, a proposal for immediate improvement around the Brima Attouga Stadium, understanding it as a nucleus of urban development, which recognizes, transforms and adopts the social deficiencies through strategies for the user of Freetown, becoming an urban element of articulation, providing a sustainable physical infrastructure based on today's challenges; taking as a priority the environmental and social aspects.

SPECIFIC OBJECTIVES



1. To conduct a rigorous inventory of the contextual need in Freetown, its condition and subsequent, how the user acts in response to it and its adoption to the public space in the Bai bureh Road axis as a meeting, gathering and interaction point.



2. To evaluate the location and the nearby environment of Brima Attouga Stadium is strategic, to feel out the legibility of it and conclude itself as a common meeting point.



3. To understand how the Brima Attouga stadium converges with respect to the context, its importance in order to establish a bidirectional and mutually beneficial relationship.



4. To make the space accessible, with emphasis on inclusion as an instrument that enhances the scope of the urban proposal on the Bai bureh Road axis, making the city a space for all that forgets the condition of the individual.



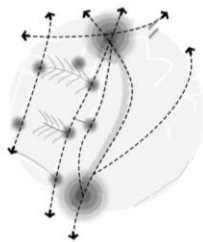
5. Propose measures of vehicular regulation on the secondary road, making an access that improves the space and approach to the Brima Attouga stadium and reduces congestion and enhances the permeability of the project.



6. Introduce multi-purpose, flexible and adaptable indoor spaces for recreational activities, adding temporary activities suitable for the changing needs of the community and its cultural strength, understanding that culture is a vital aspect of the Freetown population.

PHASES OF THE URBAN PROJECT

AXIS INTERVENTION



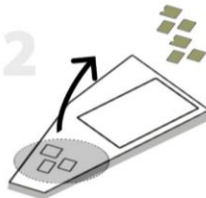
INTERVENTION CRITERIA

1



EXISTING ITEMS

2



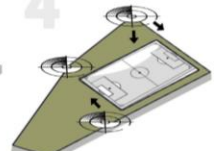
RELOCATION

3



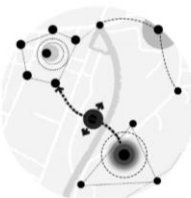
PROPOSED USES

4



APPROACH TO THE PLACE

SITE ANALYSIS



ACTIVITIES AND USES



A SPACE FOR INTERACTION AND ZONES ADAPTABLE TO ANY SOCIAL CONDITION IS PROPOSED



NEW SPACES OF TRANSITION AND PERMANENCE ARE GENERATED INTEGRATING NATURE

PROBLEMS

Vehicular congestion due to the particular massiveness and the irregular urban fabric.

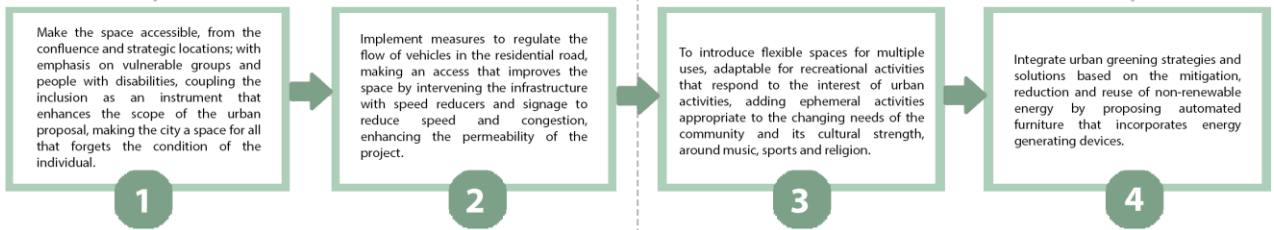
Minimal cultural and urban activity around the Brimma Attouga stadium and its immediate context; it is a space without social interactions.

Lack of environmental structure in the public space, feeding the heat island effect of Freetown and disrupting the ecosystemic network.

ALTERNATIVES

- 1 Spontaneous creation of alternate routes without planning, generating roads formed by the passage of unregulated vehicles.
- 2 Installation of permanence zones without urban furniture that recognizes the tendencies and needs of the inhabitant.
- 3 Creation of green zones in areas of environmental risk, ignoring the urban furniture and landscaping strips.

SOLUTIONS



CUSTOMER SEGMENT

- Children between 8 and 15 affected by extreme poverty. Motivated by sports and recreation.
- Young artists influenced by urban culture.
- Entrepreneurs interested in the axes of commercial use.
- Population with reduced mobility that does not have spaces suitable for their right to the city.

SOURCES OF INCOME

- Complementary activities inside and outside the stadium
- Commercial activity strip positioned on the Bai Bureh road axis.
- The service provided in the different recreational areas within the facility.

CHANNELS

Adaptation of Bai Bureh road in the approach to the stadium, by means of transition zones conditioned to all types of transportation and its integration of complementary activities.
Billboards in the proposed bays on the approach to the stadium as a visual resource in its surroundings.

KEY RESOURCES

VARIABLES
Commercial activity surrounding the stadium

FIXED EXPENDITURE
Stadium maintenance
Surrounding
Public space

METRIC
By means of a satisfaction survey
Flow studies before and after the architectural intervention
Project profitability
Number of complementary activities associated with the cultural activity carried out on an annual average.

PROPOSAL

We propose a service that promotes local culture, through the organization of sporting, cultural and artistic events. Establishing the Brimma Attouga stadium as a permeable civic nucleus, supported by complementary activities based on the interest of Freetown residents in sports, music and dance, responding to their demand for recreational spaces and providing the sector with an automated common meeting space based on passive sustainability strategies.

COMPETITIVE ADVANTAGE

The confluence in small squares are common, therefore the incorporation of energy generating devices is proposed; by means of sound, movement and physical activity, transforming acoustic signals into electrical energy, the vibration of the ground into kinetic energy, taking advantage of the agglomerations generated by the urban activity implicit in the space, understanding the potential around the urban dynamics.

THEORETICAL FRAMEWORK

The proposal is based on understanding the need to generate an urban symbiosis between the existing elements within the city. The Brima Attouga stadium is intended to articulate with the city and its immediate landmarks, based on the criteria of centrality and proximity. However, the excessive population growth in Freetown makes the city less legible due to the deficit of space that changes the location tendencies of the population.

Several architects and urban planners have stated their stance on the impact of sprawl on cities and its consequences on the environment, Rem Koolhaas, has written about rapid urbanization and the challenges this poses for architecture and urban planning.

"Mass urbanization and urban sprawl are leading to the homogenization of architecture and culture, which reduces the diversity and quality of life of city dwellers, leading to environmental degradation and loss of biodiversity" (Koolhass, 1995).

This reflection of Koolhass expresses how urbanization without measuring the scope and capacity of the city ends up collapsing because of the accumulation of consequences it brings, among these problems is the loss of social interaction that leads to a floating population all the time unconcerned about establishing relationships with other human scales, the response of the context is to obviate that its population no longer relates, only transits to spaces where they establish specific characters in question of its function, eliminating spatial flexibility of the architecture itself eliminates the perception of how a place is suitable for activities of the civic common and that it adopts the cultural customs of its immediate context.

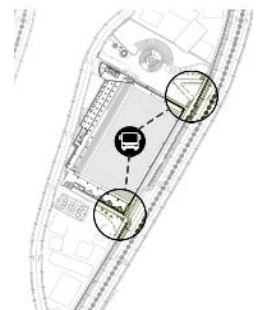
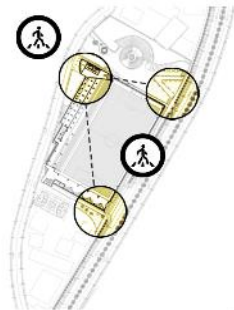
the generic city is thought of as a model to be replicated having the maximum possible resilience, forgetting that the city is a response to the needs of the population, implying that all inhabitants lack a distinct profile. "Cities should be designed to meet the needs of their inhabitants, rather than to accommodate traffic and building construction" (Gehl, 1971)

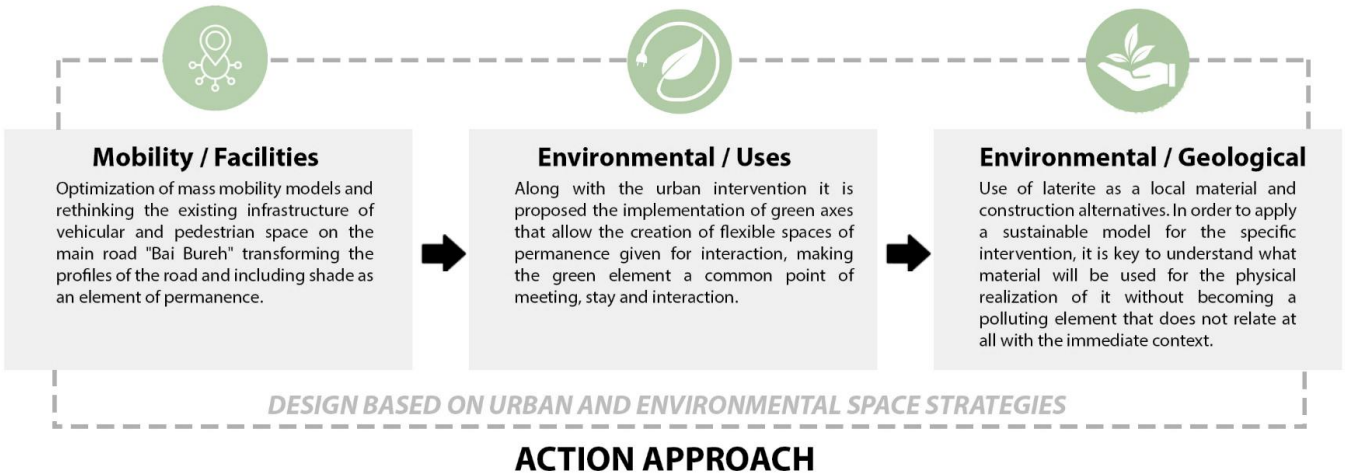


PROJECT APPROACH

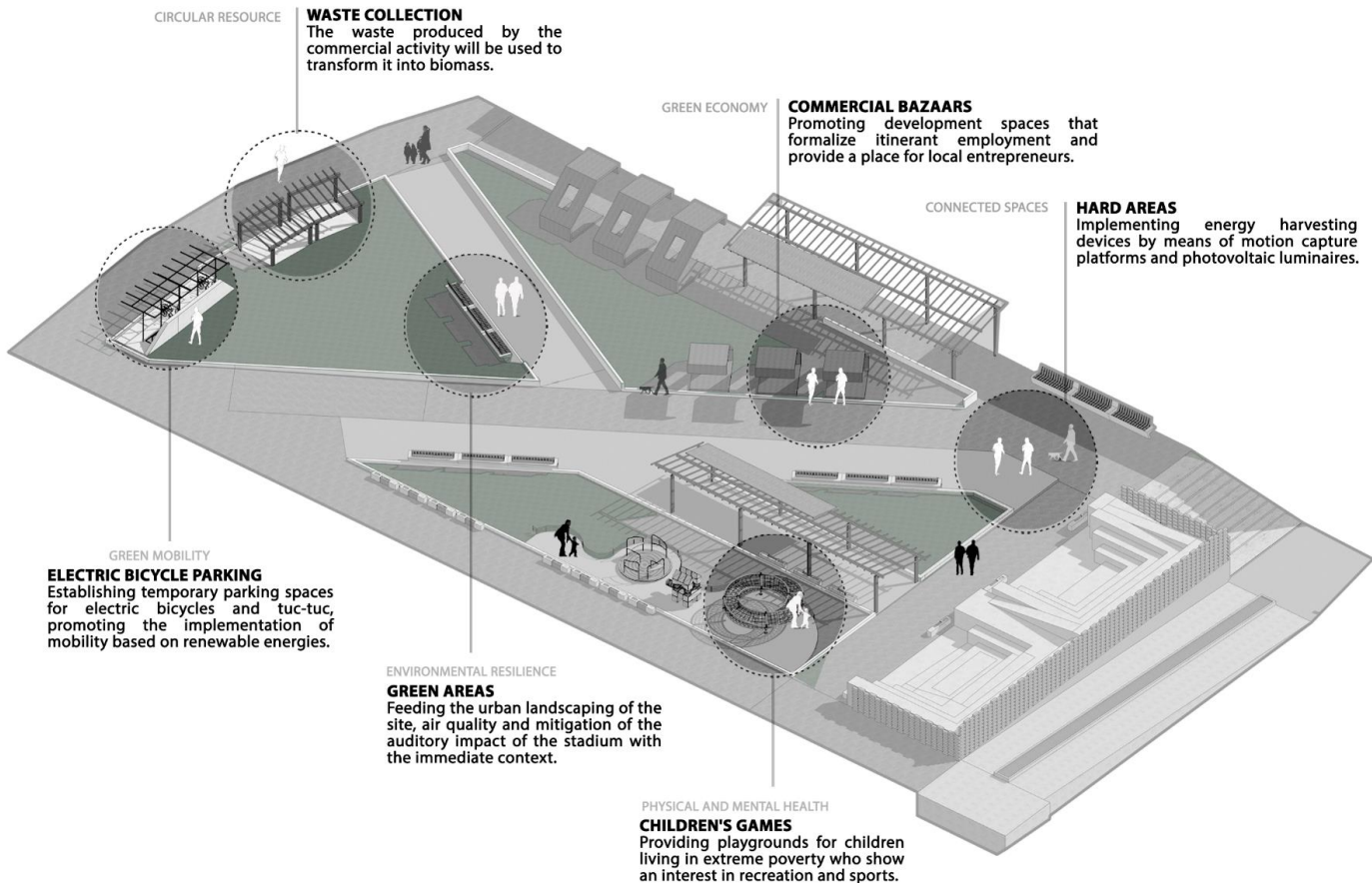
It emerges as a priority to understand the following aspects as important focuses in the project approach and direction. Environmental resilience; by ensuring the ability of communities and ecosystems to adopt to environmental impacts and future changes, in addition to understanding the population increase of the specific sector on the Bai Bureh Road axis through a phyto-tectonic approach that is related to the species detected in this area of Freetown; Urban development spaces; for the formalization of social dynamics and the population in vulnerable conditions, transforming these spaces and increasing their scope with the location of open and permeable spaces of the Brima Attouga stadium; Improve health through recreational activities at the time of the renovation of the stadium and its surroundings, through the urban proposal of the Bai bureh Road axis and its surroundings, impacting the development of minor inhabitants of Freetown; Redesign urban mobility for the mitigation of environmental impact and direct the population to adopt new ways of transiting and perceiving the place, increasing the trees and the urban landscape within the environment of the proposed Bai bureh Road axis and the city.

In the first instance, strategic locations that facilitate mass accessibility and points of interest between the Bai Bureh Road axis and other secondary roads are identified and the use of green spaces and the use of nature are proposed as a solution to address the thermal sensation in the Bai Bureh Road axis, thus generating an improvement in existing spaces approaching the Brima Attouga stadium to provide other complementary activities in reference to the needs of the surrounding environment and respond to the environmental resilience requested by the nearby environment; These spaces take advantage of local resources, which, when reused for the sustainability of the project, generate sustainable sources and energies for the urban environment. Thus, 3 project strategies are proposed that link the main needs of the context with the benefits implemented for the realization of the Brima Attouga stadium project.



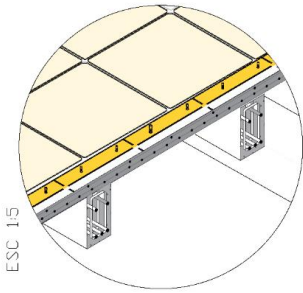


SUSTAINABLE ASPECTS AND IMPLEMENTATION
URBAN PROPOSAL FOR THE STADIUM SURROUNDINGS

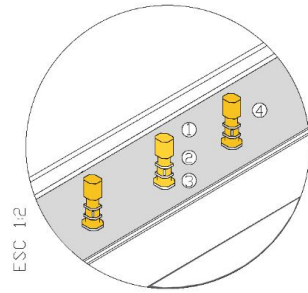


FUNCTION OF THE PIEZOELECTRIC TRANSDUCERS FOR ELECTRICAL POWER GENERATION

PIEZOELECTRIC TRANSDUCER

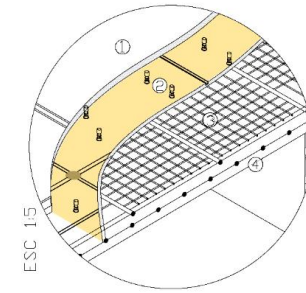


PART DETAIL



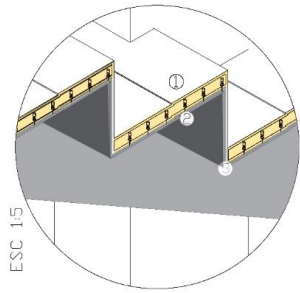
1. Electrode receiver
2. ceramic crystal transmitter
3. integrated electronic base
4. conductive wiring

TECHNICAL FLOOR



1. 60x60 laminated ceramic tile finish.
2. technical floor framing
3. electrowelded mesh
4. reinforced concrete mezzanine slab

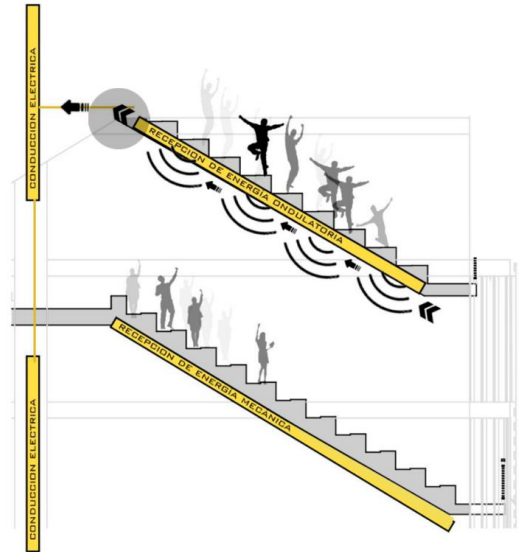
GRADES



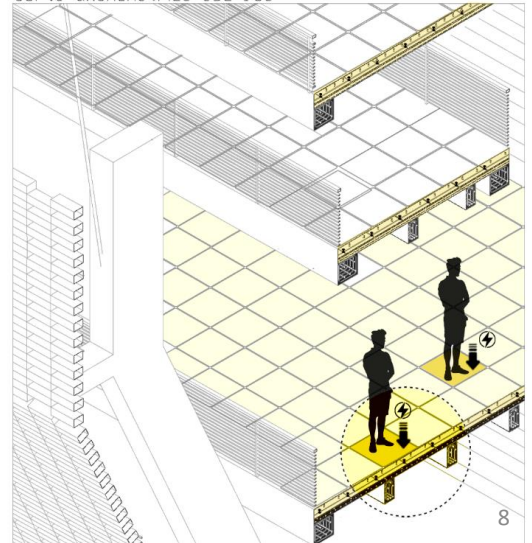
1. floating access floor
2. transducers
3. conductor cable to power plant

APPLICATION OF PIEZOELECTRIC TRANSDUCERS IN THE ARCHITECTURAL OBJECT

They work to convert mechanical motion into electrical energy produced using quartz and/or ceramics by generating a mechanical deformation in response to the physical stimulus causing the energy to expand and then be stored and reused



Corte axonométrico esc 1:35

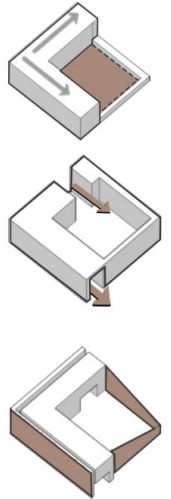


CONCEPT

PERMEABILITY / POROSITY.

A permeable architecture establishes connections between the public and private in order to transcend in the connectivity and physical, visual and sound confluence, coming from the urban development, allowing pedestrian permeabilization, so that it responds with the communication of the place acting on the perception of the reduced space eliminating the physical limit through permeable and continuous routes that distribute the functions of the volume defining key points such as access, acting on the pedestrian flow; the configuration of space with respect to the conditioned transformation of external parameters to their visual, lighting and noise within these spaces and their confluence of the urban fabric to the point.

"Subtle transition between the exterior and interior... imperceptible spaces of transition between the interior and exterior, an ineffable sense of place, sustained by space... a game between the individual and the public, between the spheres of the private and the public, architecture works with it" (Zumthor, 2005).



IMPLANTATION AND DESING CRITERIA

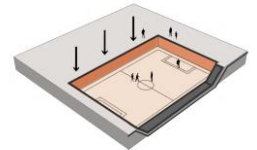
Taking into account the relationship of different factors that condition the architectural and/or spatial development, the volume is developed in a methodical way, starting with the location of the main volume and the facade at the longest ends of the court, in order to protect the development of internal activities during the hours of greatest solar incidence on the court (being 9:00 am and 3:00 pm).

SOLAR SUNSHINE COMPARED TO THE SEASONS OF THE YEAR

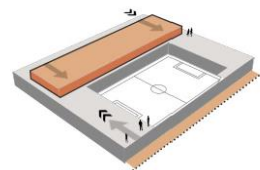


JUNE 15 9AM – 12M -3P

DECEMBER 15 9AM – 12M

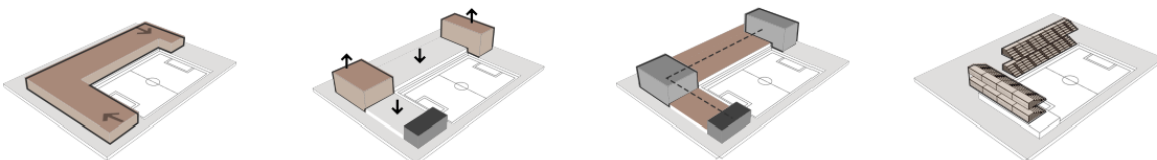
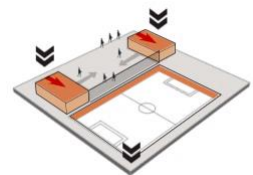


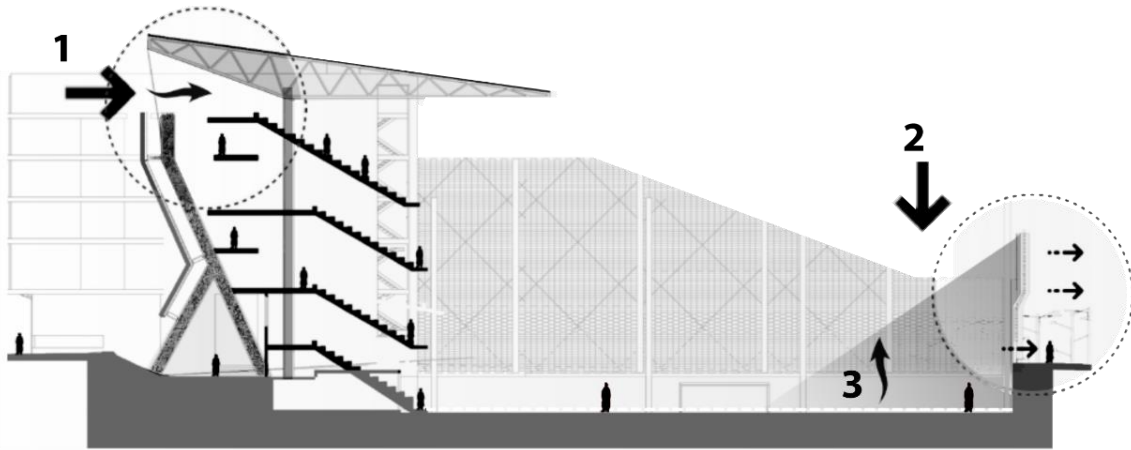
Continuing with the decisions that favor comfort in the development of activities on the site, the decision was made to bury the court at a distance of 3 meters to avoid the phenomenon of heat island and create a microenvironment different from the average temperature of the city; not being indifferent to the use of in situ resources and green buildings, it is proposed that the use of the extracted material (laterite) be used for the development of the main envelope of the project on its four sides, giving this connection with Freetown and the use of vernacular material.



The development of activities will be arranged with respect to horizontal relations contrary to the main road avoiding congestion on it, however for not having a relationship outside the Bahi Bureh road, an access is extended to allow the permeability of space adapting 3 strategic volumes in each of the points to enter and arranged to the equidistant distribution of the spectator on the bleachers and complementary activities.

How can the capacity of 10,000 spectators be solved? This is achieved by finding different heights between each of the bleachers without affecting the visual field of the spectator at the back of the building. On the other hand, the development of activities is supported by





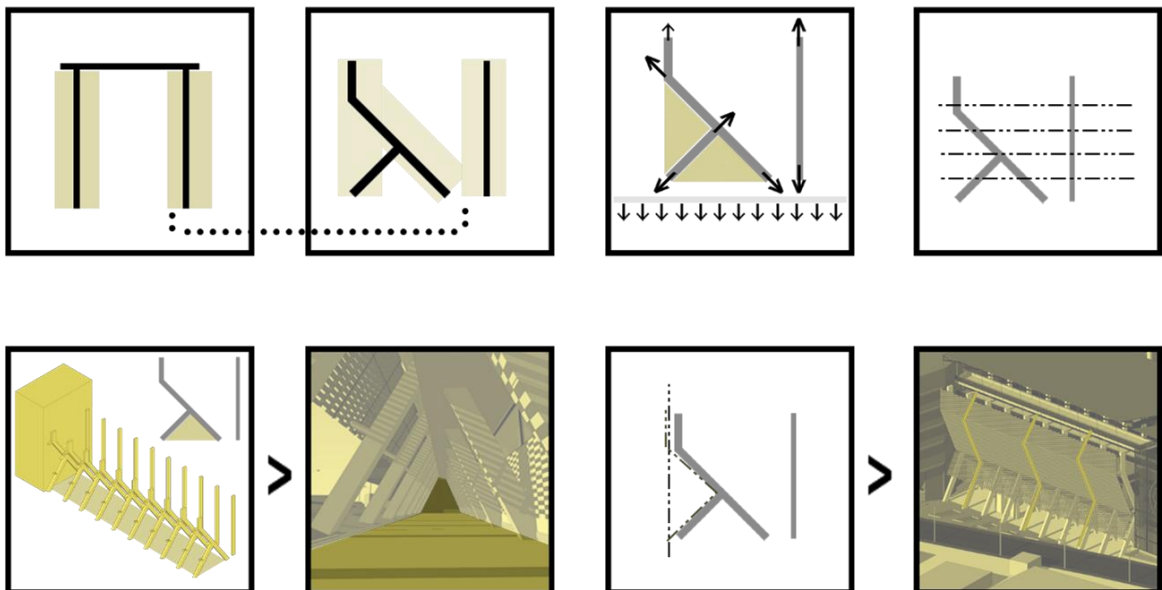
Two towers at the ends of the project connected by horizontal circulation and distributed by the fixed point in the middle of the project Brima Attouga stadium.

STRUCTURAL APPROACH

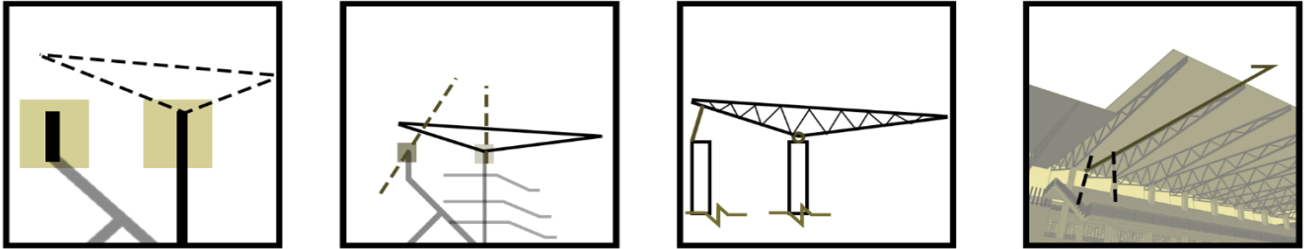
1. Structural system that allows the arrangement of bleachers without visual interruptions thanks to its truss systems, freeing the supports and generating an opening to the entire stadium.
2. The location of the volume around the solar orientation, being a shadow generator, with the linking of barriers that have the purpose of ventilation and protection, using the concept of lattice to generate a partial illumination.
3. Mitigation of the heat island phenomenon and the thermal incidence on the soccer field by burying it at least 3 meters below the ground level.

STRUCTURAL SCHEME.

It is based on the decomposition and rethinking of the common portico, taking the elements and adapting them to a more versatile need; they are mainly based on a geometric development for the distribution of loads, this geometry is regulated according to the triangle, since this is the most stable structural form.



The structure is also intended to be an organized element of the space that allows circulation within it without being in the way, providing main accesses and other functions. The play of diagonals in the external element allows a dynamic facade giving versatility to the stadium in its main access



In terms of the roof, the tops of the vertical structure at its highest point are taken into account, as well as continuing with the idea of the triangle as a base structure, the truss designed will be supported on a ball joint in its middle and the external side is structured by a tensioned cable, thus giving freedom to the roof to handle an extensive span and through the balance between weight and tension these forces are counteracted in the ball joint becoming stable and light

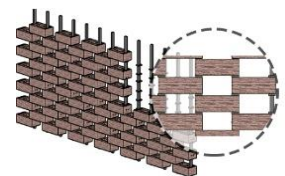
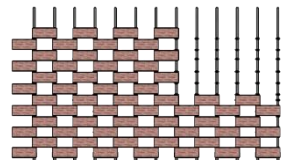
DESING APPROACH

DESIGN STRATEGY FOR A LIGHTWEIGHT AND PERMEABLE ENCLOSURE

For the construction of the stadium, the use of a lattice in laterite brick is proposed; this with the intention of reusing the land removed to implement the playing field that in this case will be buried, promoting the facade from the vernacular concept, in addition, this lattice has a function that reduces the light intensity of the day and disperses the current of winds, implementing a decrease in the management of heating systems encouraging circular resources and green energy making electricity an enhancer of development in Freetown.

"Lateritic soils are characterized by having a high content of Aluminum, Iron, Manganese and Titanium in relation to other constituents; as for the content of sesquioxides, different theories have been put forward that seek to explain the accumulation of these..." (Moreno, 2018). This means that the composition of this material argues the low thermal transmission it possesses, because in similar function to clay: "they can be considered correct, since the material studied is mostly composed of highly heat conductive materials, so its thermal conductivity should be higher than the thermal conductivity corresponding to the common earth" (Zalazar-Oliva, Góngora-Leyva, Retirado-Mediaceja, & Sánchez-Escalona, 2019).

The area being intervened is characterized by its hot days and great exposure to the sun. By implementing a material with such a low internal heat transfer, we are able to consider it as a non-intrusive construction tool that can withstand high temperatures without suffering any pathology of this kind. In conclusion, this material is a good alternative to use as the main envelope element, as it allows to generate a constructive rooting to the implanted sector by using the same materials found in the city and as a contingency plan to the amount of material extracted by the bioclimatic strategy.



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