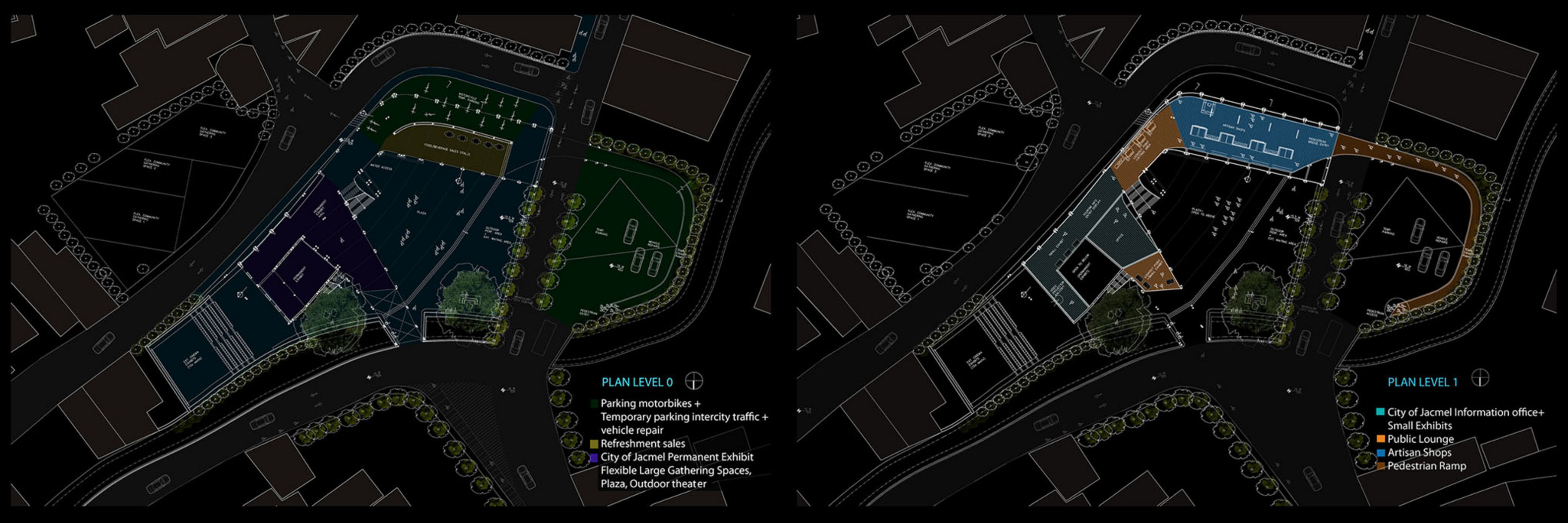
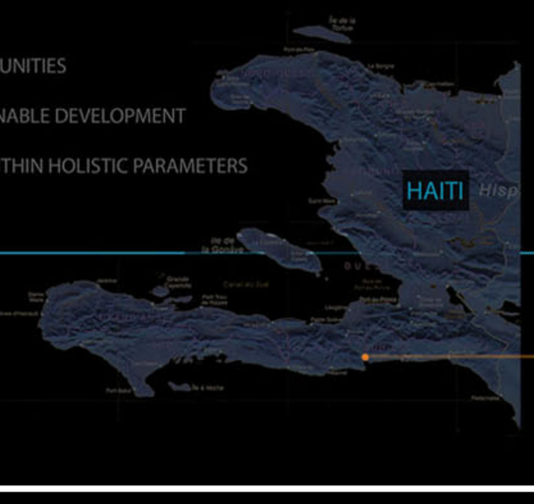
CITY PORTAL / URBAN LIVING ROOM:



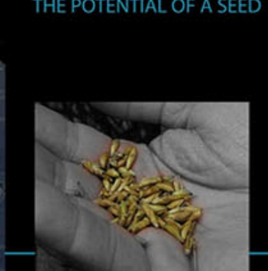
MAIN PLAZA

HOW TO "BUILD BACK BETTER"?

* TARGET PROBLEMS AS OPPORTUNITIES
* FOCUS ON LONG TERM SUSTAINABLE DEVELOPMENT
* EVALUATE WHERE TO INVEST WITHIN HOLISTIC PARAMETERS



THE POTENTIAL OF A SEED



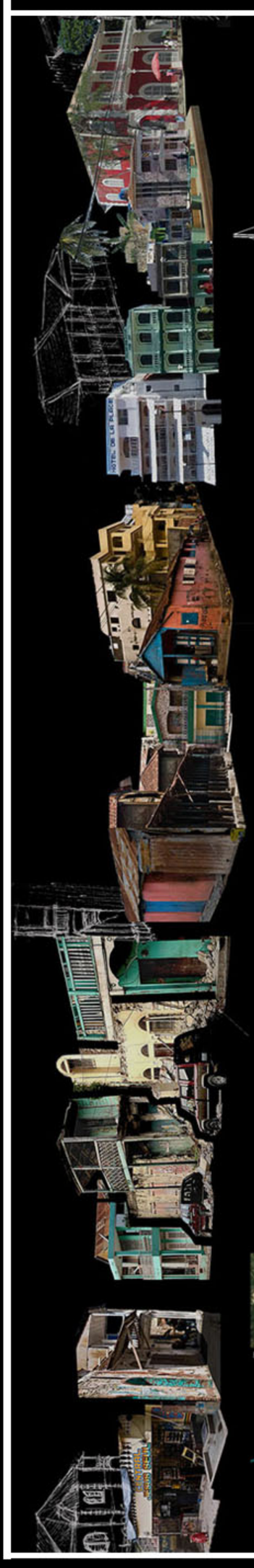
WITHIN A LONG TERM SUSTAINABLE DEVELOPMENT FRAMEWORK:

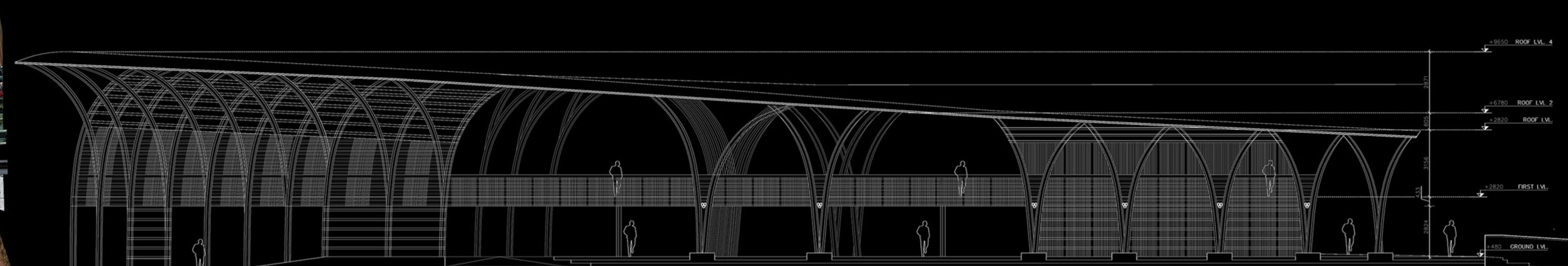
HOW CAN YOU PROMOTE DECENTRALIZATION,
WHILE RESTORING THE ECOSYSTEM AND SUPPORTING ECONOMIC GROWTH,
IN POST-EARTHQUAKE CONSTRUCTION IN HAITI?

SITE:

INTRODUCTION

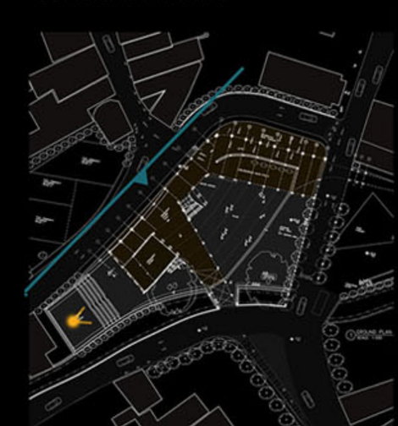
CITY PORTAL / URBAN LIVING ROOM:





EXTERIOR CINEMA SQUARE

SOUTH EAST ELEVATION



DESIGN FOCUS:

- Aims to support priorities of the city
  - Promote Jacmel's strengths and identity
  - Provide an alternative for post-disaster rebuilding
- Redefinition of building typology supports cultural flows
  - Provides setting for local community
  - Responds to Haitian lifestyle - "Life takes place outdoors."
- Showcase resilient qualities of bamboo promoting its use
  - Utilize and enhance natural curvature of bamboo culms
  - Demonstrate high level of versatility and possible use of bamboo as a building material

[Public building will therefore be highly accessible]

- Jacmelians and Haitian visitors can easily come into contact with the use and application of bamboo as a local and sustainable option for building construction, as well as Jacmel's identity and richness.

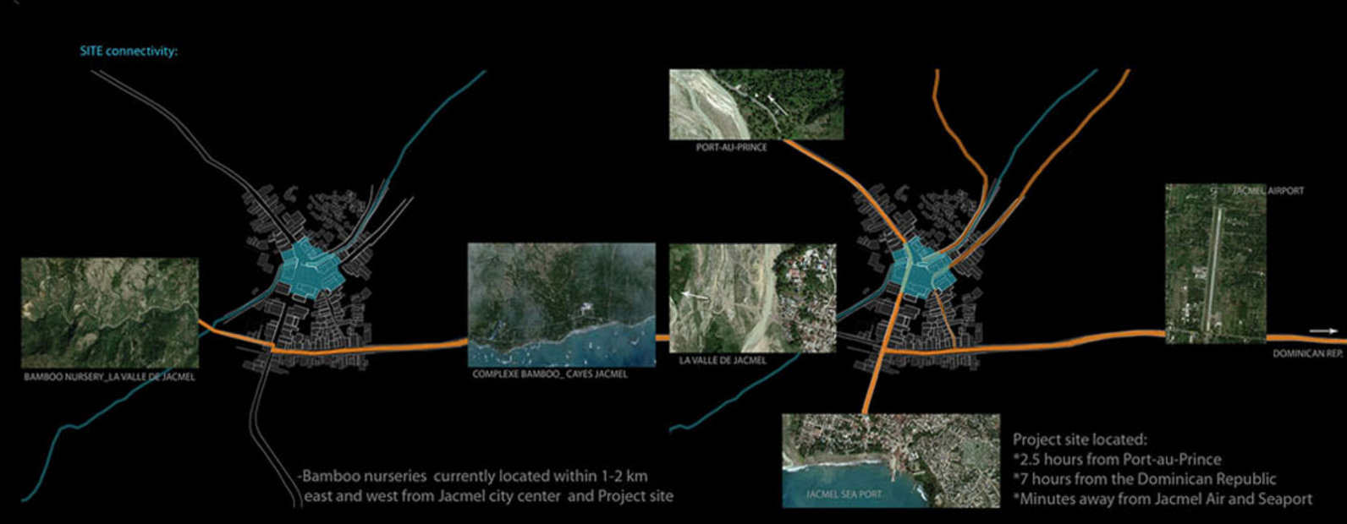
[Key location chosen]

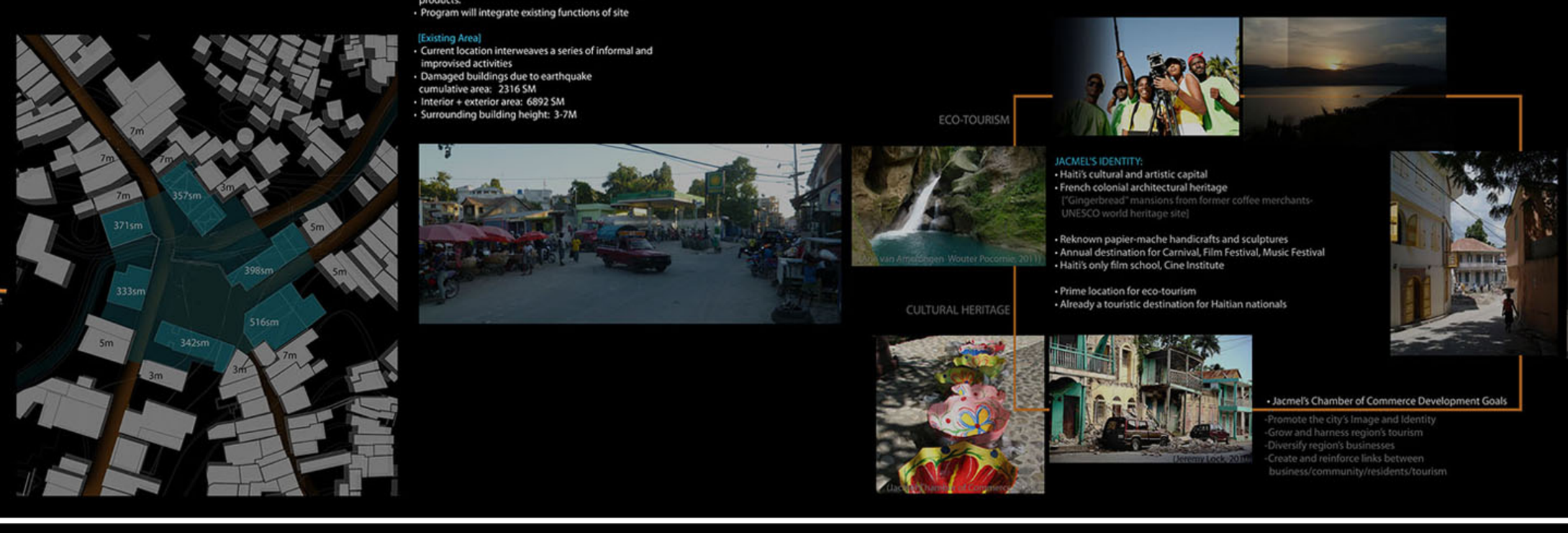
- Primary stopping point with high traffic profile
- Project site is located at the main land portal and arrival from the National highway (Port-au-Prince and surrounding cities) into Jacmel.
- High level of accessibility and use of bamboo will also support current local initiatives in promoting and establishing viable markets for diverse bamboo based products.
- Program will integrate existing functions of site

[Existing Area]

- Current location interweaves a series of informal and improvised activities
- Damaged buildings due to earthquake cumulative area: 2316 SM
- Interior + exterior area: 6892 SM
- Surrounding building height: 3-7M

SITE connectivity:



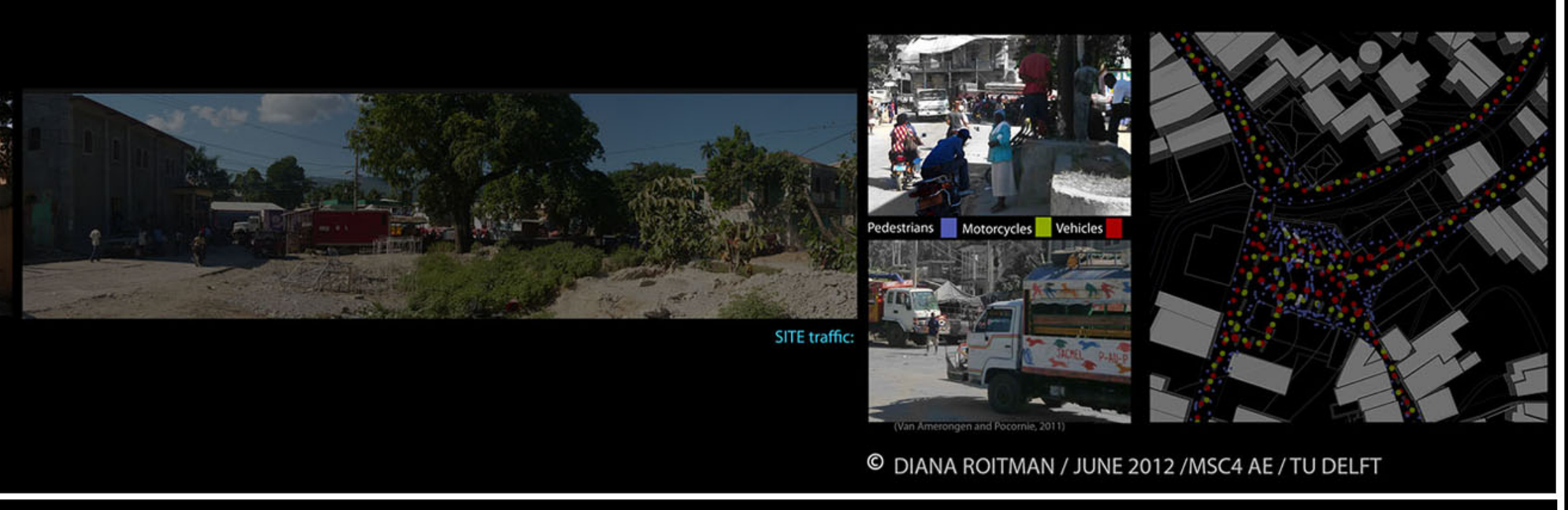


JACMEL'S IDENTITY:

- Haiti's cultural and artistic capital
- French colonial architectural heritage ("Gingerbread" mansions from former coffee merchants-UNESCO world heritage site)
- Reknown papier-mache handicrafts and sculptures
- Annual destination for Carnival, Film Festival, Music Festival
- Haiti's only film school, Cine Institute
- Prime location for eco-tourism
- Already a touristic destination for Haitian nationals

- Jacmel's Chamber of Commerce Development Goals
  - Promote the city's image and identity
  - Grow and harness region's tourism
  - Diversify region's businesses
  - Create and reinforce links between business/community/residents/tourism

SITE traffic:



SITE + CONTEXT

Urban Living Room_ Jacmel, Haiti
Ir. Arch. Diana Roitman
MSc Architectural Engineering 2012/ TU Delft

The project Urban Living Room (ULR) unfolded through multifaceted research on the condition of pre- and post-earthquake construction, environmental hardships, and socio-economic development throughout Haiti.
It became clear that the project's focus needed to challenge the status quo by promoting decentralized development, restoring the ecosystem, and supporting economic growth of local communities.
These complex challenges were met by the following design aims:

THE MATERIAL:

- Employing Guadua bamboo as a sustainable alternative for seismic resistant reconstruction. Currently, it is grown in the vicinity of the proposed building site for restoration purposes and as a local material source.
- Showcasing the high level of versatility available in bamboo based products and the generation of numerous new markets per respective product (bamboo cable, composite products, woven panels), in addition to utilizing natural culms with intentionally enhanced curvature (during growth) for structural purposes.

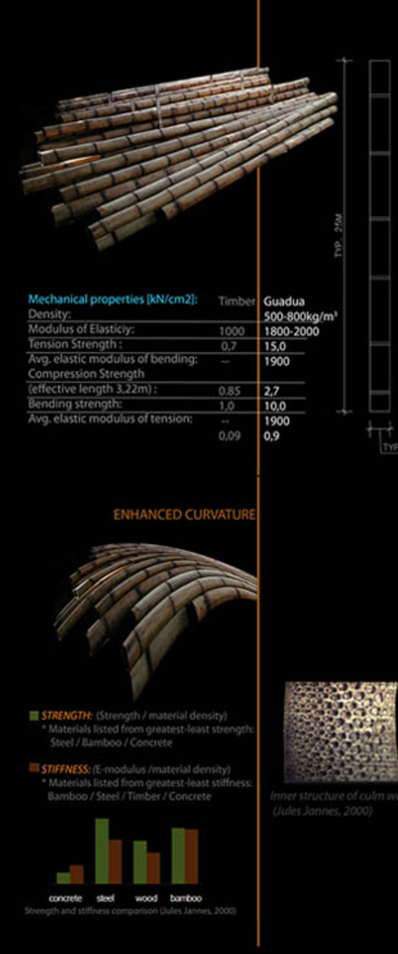
THE SITE:

- Choosing Jacmel (one of the most vibrant cities in the south) as a location for investment instead of Port-au-Prince thus decentralizing development initiatives. Promoting the city's rich natural and architectural heritage and supporting its identity as Haiti's cultural and artistic capital. Strategically placing the ULR at the main entry point into Jacmel effectively creating a City Portal with a high traffic profile for local tourism, merchants, artisans, and local bamboo building tradesmen to gain exposure and nationwide influence.
- Integrating the existing site conditions (prevailing wind directions, elevation changes, solar orientation, intense heat and rain) the design strategically responds to the context and climate of the location through diverse degrees of protection; thorough its massing, diversity in space heights, undulating roof, "double" façade, and shading elements.

THE LIVING ROOM:

- Designing a highly accessible public "Living Room", redefines conventional built typologies with a porous hybrid program and built structure which supports cultural flows providing flexible spaces for Jacmel's identity and strengths to be displayed (art, films, music, festivals).
- The Haitian lifestyle -"Life taking place on the streets"- can freely flow through informal and improvised encounters between Jacmelians, Haitian, or foreign visitors helping to strengthen the local economy.

CITY PORTAL / URBAN LIVING ROOM:



Properties:

- Bamboo possesses excellent strength properties especially tensile strength
- Bamboo has high strength to weight ratio and high specific bearing capacity.

SAFETY:

* Failure in bamboo is not failure.

* Bamboo returns to original straight form after load is removed.

CREEP:

* Increasing deformation on the long term- does not occur with bamboo.

SHEAR:

* Bamboo is stronger than wood in shear.
* Important attribute at joints (tensile force from fastener- results as shear on joint).

RESILIENCE_NATURAL HAZARDS:

* Due to high tensile strength (elastic nature of fibers) > bamboo extremely resistant to hurricane or earthquake forces.
* Bamboo housing has resisted 278 kph wind forces
* No damage found on 30 bamboo houses located in 7.6 earthquake epicenter in Costa Rica.

CULM wall COMPOSITION:

*Bamboo's culm wall is a natural composite.
Matrix: 50% (parenchyma) + Fibers: 40% + Vessels: 10%

*Top section of culm is strongest in compression and bending strength
*central section - longest internodes- strongest in tension
*lower section- lowest mechanical properties of whole culm

MICROSTRUCTURE:

* Microstructure of culm wall varies in density.
* Porosity decreases toward the exterior, reaching the highest density and highest silica content (5%).
* Irregular distribution pattern of microstructure increases stiffness (the resistance against bending) of bamboo by 10%.

REFORMED MICROSTRUCTURES:

* Microstructure of reformed bamboo currently being studied shows increase in mechanical properties

* Vascular bundles, fibres in inner part near ring become denser, many voids in the vessels disappear after reformation
* Shape of vascular bundle also changes from circular to elliptical.

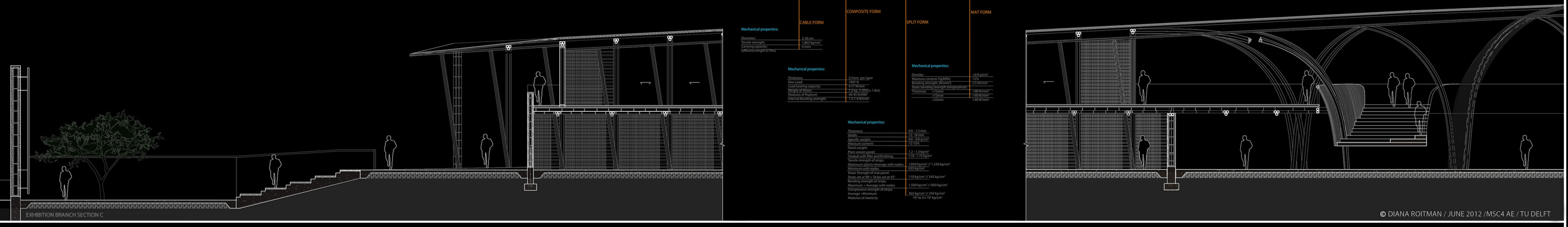
* Therefore, with the increase of density due to increased fibres overall strength and structural performance increases.

RETAIL SPACE

URL MODEL- MAIN PEDESTRIAN PORTAL

GUADUA BAMBOO: MATERIAL VERSATILITY

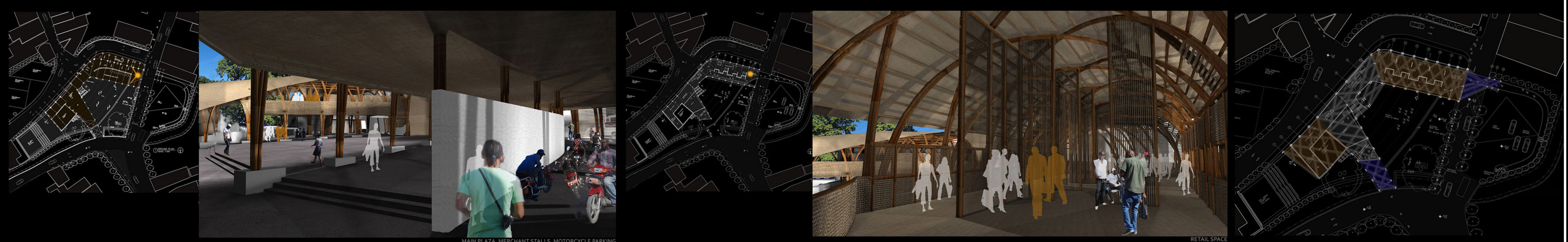
EXHIBIT SPACE



EXHIBITION BRANCH SECTION C

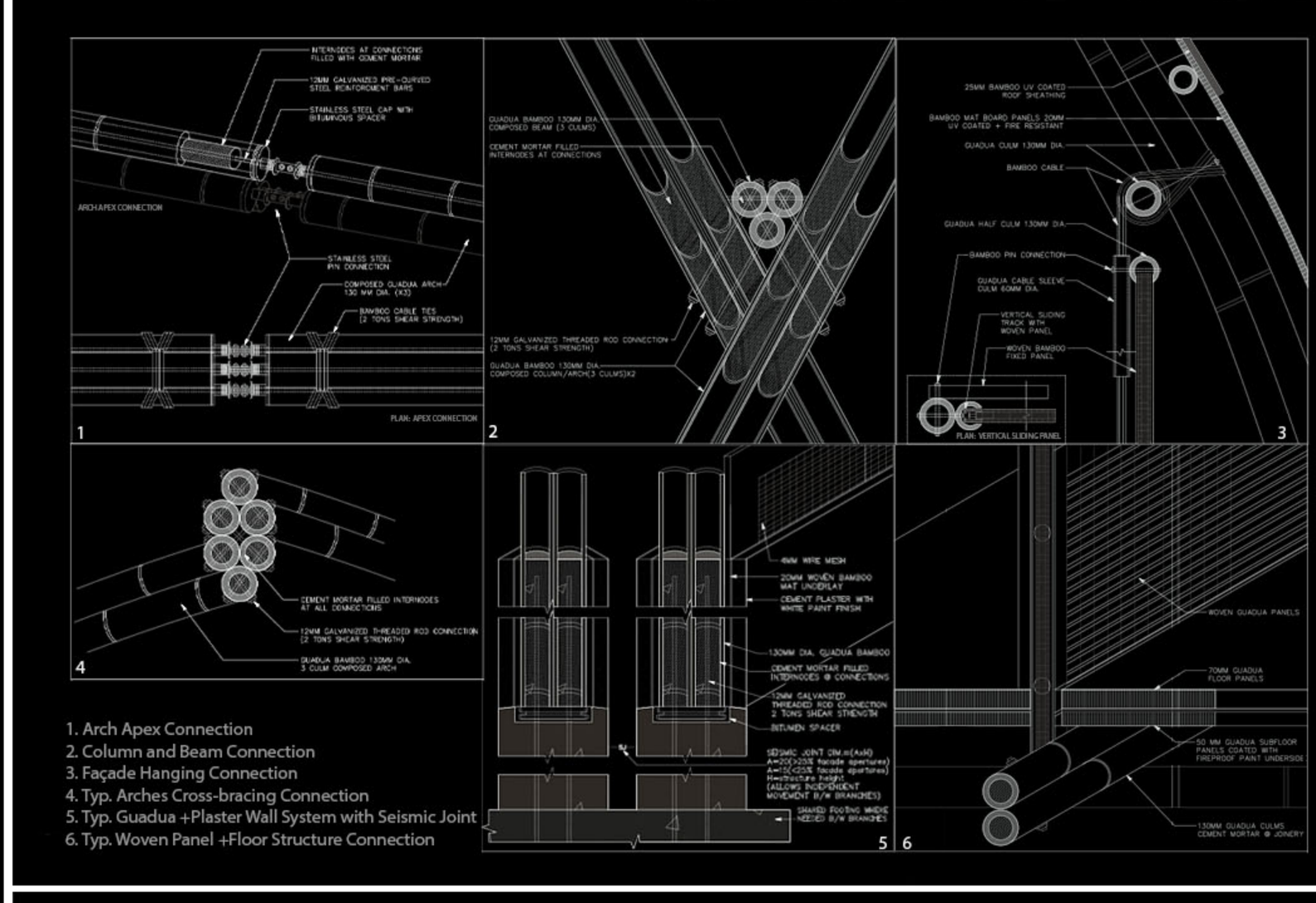
MATERIAL VERSATILITY

CITY PORTAL / URBAN LIVING ROOM:

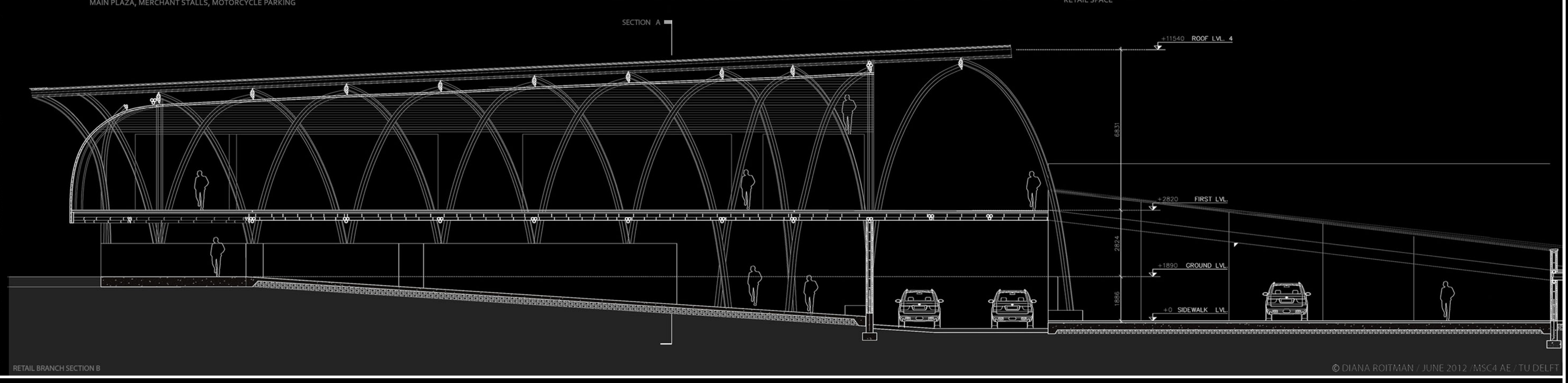


MAIN PLAZA, MERCHANT STALLS, MOTORCYCLE PARKING

RETAIL SPACE



1. Arch Apex Connection
2. Column and Beam Connection
3. Façade Hanging Connection
4. Typ. Arches Cross-bracing Connection
5. Typ. Guadua +Plaster Wall System with Seismic Joint
6. Typ. Woven Panel +Floor Structure Connection

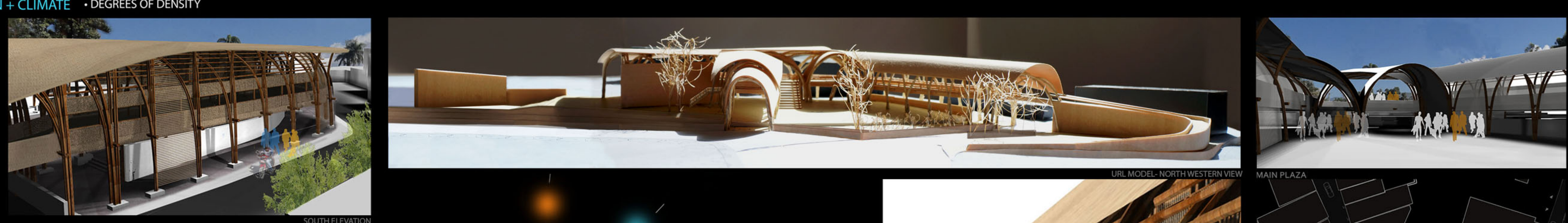


RETAIL BRANCH SECTION B

BRANCHING STRUCTURE

SKIN + CLIMATE • DEGREES OF DENSITY

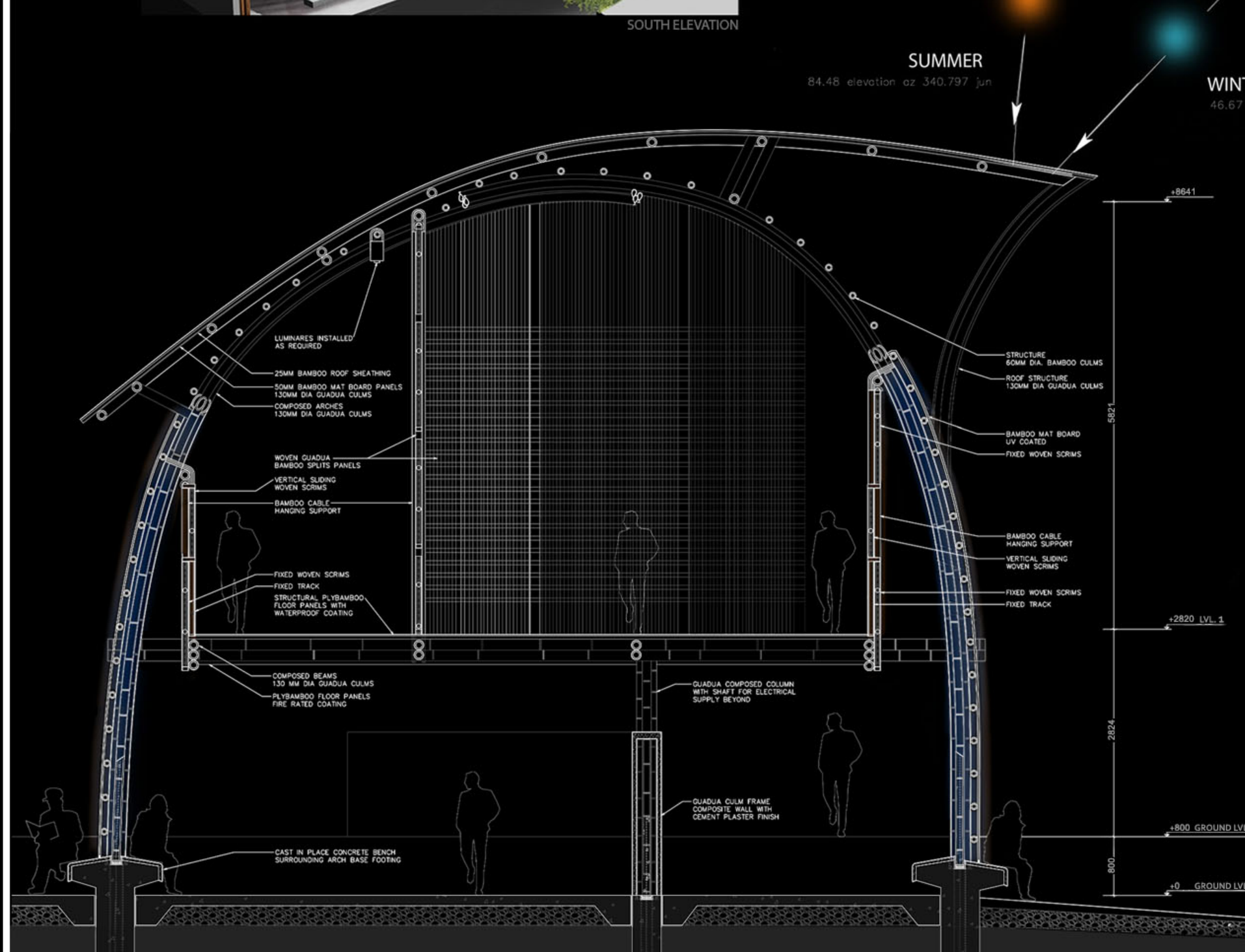
CITY PORTAL / URBAN LIVING ROOM:



SOUTH ELEVATION

URL MODEL- NORTH WESTERN VIEW

MAIN PLAZA



SECTION A

The Urban Living Room is designed to unfold while maintaining a constant relationship with the exterior, inviting in natural ventilation yet protecting against the harsh weather conditions found in Haiti, intense heat, humidity, and rain.

* Main branches of the building and plaza portals directly face prevailing wind direction decreasing wind shadows and effectively cooling all covered spaces, as well as reducing the temperature of the exterior spaces.

*Changing height of the 'branches' is strategically designed to take advantage of the change in ground elevation while playing a big role in promoting natural ventilation.
Utilizing the venturi effect, increasing the wind velocity from the eastern facade toward the increasingly taller spaces at the west cooler habitable shaded spaces are created.

* Care was taken to orient the shorter sides of the built up spaces east-west in order to reduce excessive heating. Due to the intensity of the sun as well as rain throughout the year, the roof and facade elements are of integral importance in providing appropriate protection.

*The roof's undulating curvature is strictly linked with the incidence angles of the sun at this location and cuts off direct solar gain throughout the year, while providing sufficient shading all along the perimeter of each branch.

*The facade systems employs the idea of layering by utilizing diverse degrees of density through screening elements.

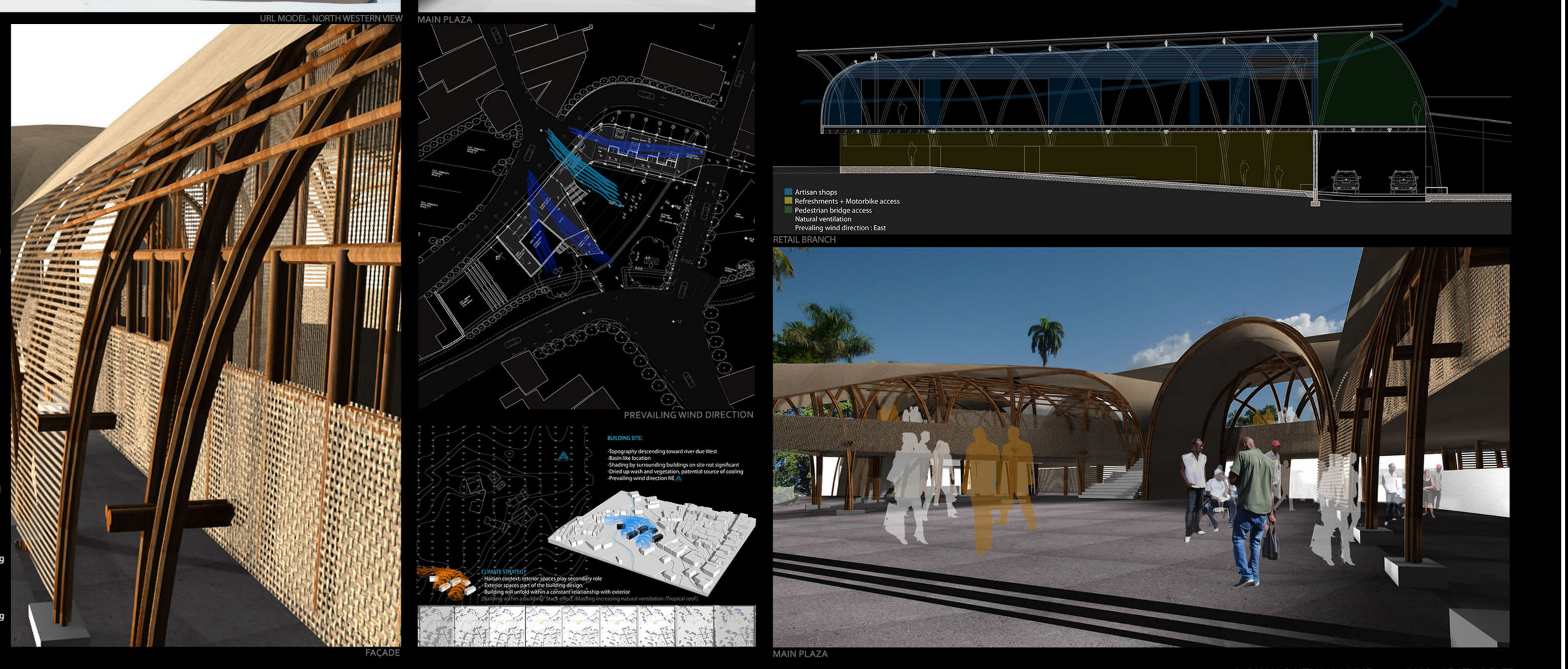
*The outer layers act as a rain-screen and have fixed shading elements, while the interior shading scrims can be accommodated by the users as needed.

FAÇADE

PREVAILING WIND DIRECTION

BUILDING SITE:

- Topography descending toward river due West
- Basin like location
- Shading by surrounding buildings on site not significant
- Dried up wash and vegetation, potential source of cooling
- Prevailing wind direction NE



RETAIL BRANCH

MAIN PLAZA

CLIMATIC RESPONSE