The Water Pavilion Narrative 4/24/18

The Water Pavilion is a vertical structure designed to collect and harvest potable cleaning drinking water from the atmosphere (through collecting rain and harvesting of fog), it will become an innovative, all-natural source of drinking water for the people of St. Kilda. Through the elegant, curved structures and transparent, flowy canopies, and the well-articulated paths where the towers are set overlooking the beautiful bay of St. Kilda, participants are able to absorb the luscious natural environment that St. Kilda has to offer. While they are leisurely walking or simply resting under the colorful canopies, they will be able to feel tranquility and a sense of admiration of having a personal interaction with the water harvesting process. In which the locals will appreciate from, for they will have a taste of clean drinking water that has been locally and naturally sourced from their own local neighborhood. The Water Pavilion at St. Kilda offers a unique spatial activity where our participants can experience a one-of-a-kind rain and condensation water harvesting process, through an all-natural development, without the aid of electricity.

The towers are a rare form of land art where it does not require advance technology and can harvest potable clean drinking water through the expense of minimal manual labor and inexpensive materials, such as bamboo and mesh polyester. Water vapor is a constant feature in the atmosphere, which makes the harvesting process ideal in local environments with high or moderate fog and humid conditions. The water harvesting quantity will depend solely on the climatic conditions and the goal for each day is to be able to harvest 40-80 liters (10-20 gallons) of drinking water for St. Kilda’s unemployed community and the remaining aboriginal population. The tower is built out of bamboo which will hold the mesh polyester inside of the tower. The process of the water harvesting is simple; rain, fog and dew condenses against the mesh and trickles down through a funnel into a reservoir at the base of the structure. The ETFE (Ethylene Tetrafluroethylene) canopy will provide shade as well as to prevent the collected water from evaporating.

The primary structural bamboo is a 1” thick and the secondary is ½” in diameter. The interweaving mesh inside is where the condensation and droplets of dew take place as it trickles down to the basin, funnel and finally the reservoir. The three water tower prototypes range from various heights and diameter. The varying height and width dimensions came from the design intent of having a central space for the locals of St. Kilda to celebrate the annual Tanderruum dance ceremony. From there, the site plan was designed based on the symbolic meaning of the Aboriginal flag of Australia. Where the yellow circle centered on the flag represents the tallest towers of 12 M in height and the central space of the Tanderruum dance and other significant events happening at St. Kilda. The surrounding towers which range in height of 10 M-7 M, signify the black and red colors, which are the Aboriginal people and its spiritual relationship to the earth.

The canopy is designed to give the locals and aboriginal people a place to celebrate the annual Tanderruum dance ceremony, which the people of St. Kilda hold dear as one of their most significant cultural traditions. Moreover, when the festivities are not taking place the canopy becomes a sheltered social gathering place for both the locals and tourists and as well as a space or public events. The ETFE (Ethylene Tetrafluoroethylene) film material is highly durable, UV transparent and very lightweight. Flexible photovoltaic (PV) cells and/or LED lighting can be integrated with a single layer so the colors of each canopy can be seen and enjoyed during the day or night. There are many benefits of having an ETFE material as the canopy; dirt or dust will not stick onto the film, excellent transparency of 90%-95%, allowing for UVs to pass through which results to photosynthesis. Moreover, depending on the number of layers or patterns applied to the film, the amount of sunlight passing through the canopy can be controlled and altered for the climate of St. Kilda. Wanting the central space to signify importance, the design intent of the canopy is to be one continuous fabric and offering ample amount of shade for the people to rest, unwind, and give them options of various activities, the elasticity of the canopy is vital and with the ETFE film has a 600% elasticity until breaking point with a tensile strength of 21-23 N/mm^2.

The longevity of the film to environmental exposure such as pollution, dust, dirt, and harsh climatic weather conditions (sun exposure or rain) the film will not deteriorate. The film has great sustainable feature where it is cost energy efficient to transportation of the material to St. Kilda has very little energy consumption, reducing the carbon footprint. Additionally, the enhanced technology of the film has created superb insulation and a well-balanced daylight exposure. Having the Water Pavilion built at St. Kilda is cost effective due to the film is the lightweight material which can act as a substructure as extra support for the water towers. Most importantly, having a land art at St. Kilda that is not only cost efficient but also sustainable for the environment, where the canopy can be effortlessly recyclable; the ETFE can be replaced where old materials can be remolded into the new ETFE products, such as the wires that will hold it up structurally. Due to the ETFE’s high resistance and elasticity, the building element can resist the load of earthquakes or blast, however, under shock conditions the film will deflect under heavy load. The canopy is a single layered application form and will be reinforced with cable wires, such that the pavilion is a haven for locals and tourists alike can unwind, where the place will be illuminated with the colors of the aboriginal flag overlooking the view of the St. Kilda Bay, ideal for sunset watching.

Calculations for the Number of Liters of Water it can Harvest:

* π(0.85)^2 x H ( 4.7 M) x 7.48 (number of gallons in cubic foot) x Number of towers (4) yellow:

= 80 L x 4 = 320 L

* π(0.62)^2 x H (3 M) x 7.48 (number of gallons in cubic foot) x Number of towers (8) black:

= 27 L x 8 = 216 L

* π(0.35)^2 x H (1.7 M) x 7.48 (number of gallons in cubic foot) x Number of towers (8) red:

= 5 L x 8 = 40 L

= 576 L x 365 DAYS OF THE YEAR

= 210,240 L

* 5.8 % of St. Kilda Unemployed = 1,230
* Remaining Aboriginal people = 122