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# Vermillion Sands: Material Processes and Artificial Nature

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Vermilion Sands is a living canopy structure that was installed on Vancouver's waterfront in the summer of 2014. The installation embodies an investigation into the innovative use of materials and processes to produce experiential atmospheres that exploit the productive tensions between what is commonly perceived as the artificial and the natural.

The programmatic vehicle for the investigation is a structure that provides a loggia-like entry to an arts festival's grounds while also offering a cooling shade space in response to the August sun. The resulting canopy is comprised of 260 custom-fabricated modules, each hydro-seeded with either white clover or perennial grass, that were grown in a nursery, and then suspended from a grid of aircraft cable. Pursuing this unprecedented methodology, the result is an axial roof structure that is abstract and pure while also being heterogeneous and biotic.

The project synthesizes various domains of critical design inquiry into a unified multi-sensory and haptic space. Of particular note is the investigation into geometric form, fabricated from a geotextile fabric, which enables productive growth while achieving requisite qualities in relation to aesthetics, light and shadow, and solar protection. Also, critical is the way the project works to achieve an ambient atmosphere through artificial light and an integrated misting nozzle system.

Vermilion Sands is the title of a 1971 collection of short stories by JG Ballard. In this sci-fi collection, each story focuses on a particular

design or artistic medium in which nature is hybridized with technology to produce surreal and baroque results – for example, singing plants, living fashion, and cloud sculptures. Within the context of the Anthropocene we currently inhabit, where the ability to disentangle the 'natural' from the 'artificial' is fleeting; we can only hope that the aesthetics and sociality of the future will be increasingly populated with designs akin to those in Ballard's prescient texts. It is our fantasy that Vermilion Sands the canopy could be a character within *Vermilion Sands* the book. The research embodied in this design project, in our opinion, is a significant part of the effort to find the best possible versions of a sustainable future.

## **GROWING GEOMETRY**

The project involved research into the types of materials and processes that can afford new forms of artificial nature. This work involved close collaboration with a hydro-seeding company to test various scenarios for 'planting' the modules. Hydro-seeding is a planting process that involves spraying a slurry mixture of water, mulch, guar gum (a biodegradable adhesive), and seeds onto a surface. It is commonly used on infrastructural projects such as the spraying of highway embankments. With the hydro-seeding company we tested and evaluated different mixtures and geotextile substrates to determine a combination that performed well in this novel application of an existing technology. The research also involved testing various geometric forms

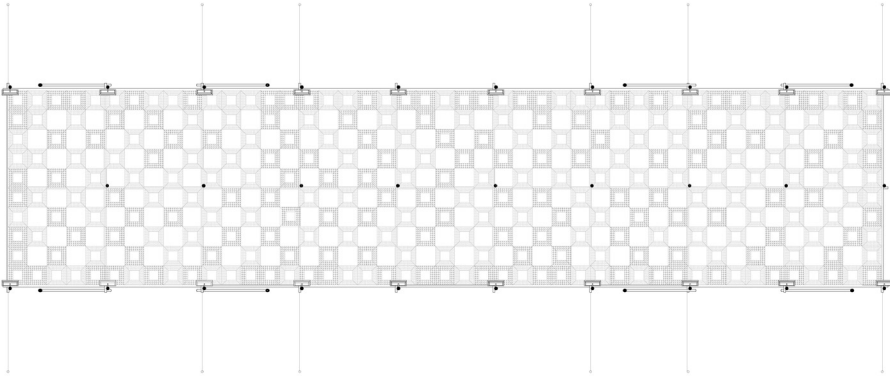
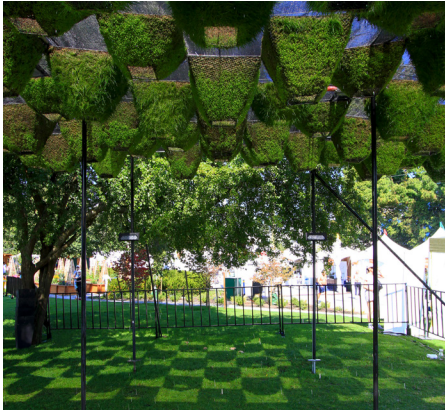
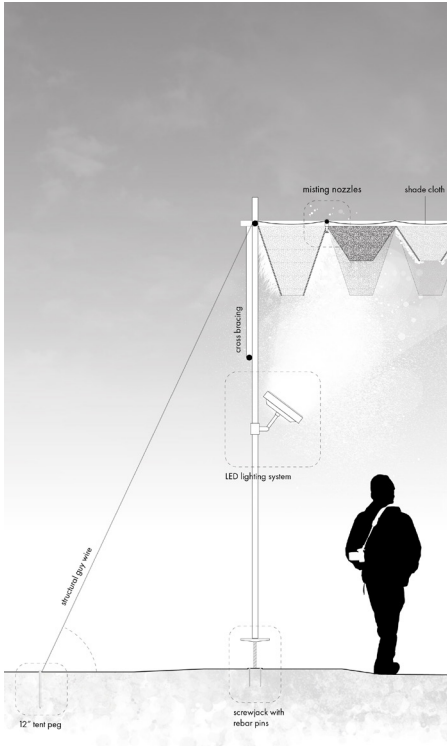
through full-scale mock-ups to determine which surface combinations and angles facilitated the desired growth and formal qualities.

## **AMBIENT ATMOSPHERES**

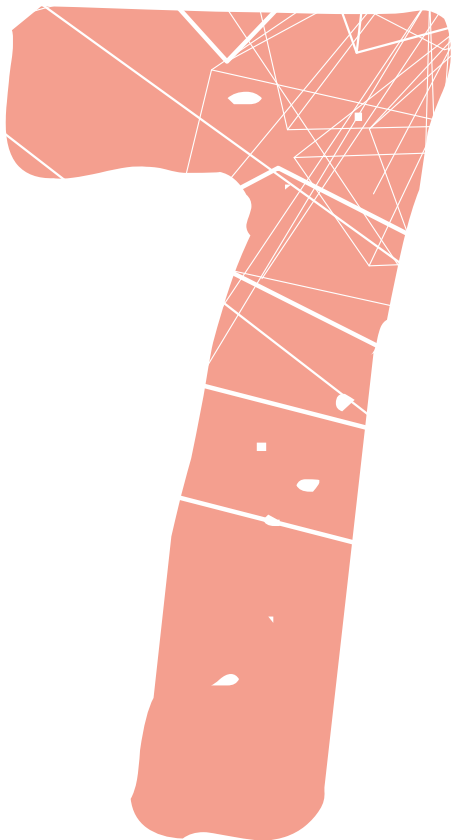
The project involved research into embedded systems that provide sustenance for the plants' survival while at the same time heightening the experiential pleasures for users. To irrigate the plants an array of 150 nozzles are integrated in the canopy grid. Through an electronic timer, various tests were performed to find a calibration that ensures adequate irrigation while also offering adiabatic cooling for people under the canopy. At the same time, LED lighting is incorporated into the columns to uplift the modules and the misting plumes. The combination of lighting and mist offer an ethereal atmospheric ambience to the installation.

## **FABRICATION PROCESS**

The fabrication process followed four steps. First, a wire fabricator produced 260 truncated pyramid-shaped frames from 10 gauge steel wire. Second, geotextile fabric was sewn to each frame. Step three is the hydro-seeding process. A mobile tank was towed to a spraying yard and half of the modules were sprayed with clover and the other half with ryegrass. The final stage before on-site installation is the growing period. The modules were grown in nursery for 30 days prior to installation.







# **MEDIA INVESTIGATIONS**