

LAGI 2025 Fiji

123kW FLEXIBLE SOLAR PV CELLS
2.9 MILLION LITERS ANNUAL WATER COLLECTION
6,500kg ANNUAL PRODUCE PRODUCTION

A structural system that collects and processes rainwater, supporting a canopy of flexible photovoltaic cells

Drua Column is a structural element that treats, captures and processes rainwater, deployed in a series of community structures throughout the building site. This unit, a column, supports a series of community spaces, including a seated walkway, an outdoor education space, an area designated for Kava ceremonies, and a community greenhouse for growing crops in the off-season. Situated within a community whose culture is deeply connected with the water, various cultural motifs are integrated into the form of the column and the canopies it supports. Firstly, the primary series of water treatment veins is adhered to a concave steel frame, mimicking the framing of a Drua, a sacred canoe in Fijian culture. The canopies that these columns support, which sport photovoltaic cells and rainwater collection, also reference this vessel. In this instance, the canopy refers to the concave triangular sail of the boat. Additionally, elements within the column including the stainless steel storage tank and plexiglass solar still lens imitate the iconic concavity of the Kava Tanoa, a vessel used to serve the traditional drink. Light, delicate, and translucent materials are used to embrace the delicate nature of sailing vessels as well as to make as minimal of an impact on the site as possible, both visually and physically. These components are low in cost, and readily abundant, making them easy to replace or add to if necessary. The modular nature of the columns and sails themselves allow for alternative arrangements as seen fit by the community, allowing for a dynamic, shifting space.

The water collection and filtration systems, along with the energy systems integrated into the column and water canopy were chosen for their efficiency, and in some instances, ability to operate without any external power aside from the sun. Ultraviolet light treatment is the most energy intensive system implemented into this design. While it does require extra power, the system is gravity based, allowing unfiltered rainwater to pass through it without the need of a pump. The remainder of the water harvesting and filtration process is completely operational without the use of electricity. Desalination takes place through a solar still, which evaporates the ultraviolet treated rainwater up to a concave plexiglass lens, where droplets form and concentrate above a copper funnel, dripping into the network of pipes that ultimately flow into the larger storage vessels. In areas that receive shade from adjacent trees, fog collecting material replaces the impermeable PVC fabric canopy. Additionally, a barrel-roofed greenhouse channels rainfall into a series of gutters that ultimately end up in Drua Columns as well. Between the fog catcher and rainwater collection, 2,900,000 liters of water can be expected to be collected annually from the 1,500 square meters of roof. The PVC fabric canopies act as an impermeable surface, creating a gutter for rainwater collection, as well as serving as a surface to adhere photovoltaic cells to. To account for wind and the flexibility of the fabric, flexible cells are used in the canopies. Each standard canopy is outfitted with 64 individual panels, covering a total of 20 square meters. The canopies are oriented toward the sun to ensure optimal energy generation, and are strategically placed throughout the site in the areas that receive the most annual direct sun hours. In total, the 600 square meters of photovoltaic cells dispersed throughout 29 canopies generate 123kW for the village's residents.



