

Rafts for Phytoremediation of Surface Water

DESIGN DEVELOPMENT & USER TESTING DETAILS



Ashley R. Lincoln

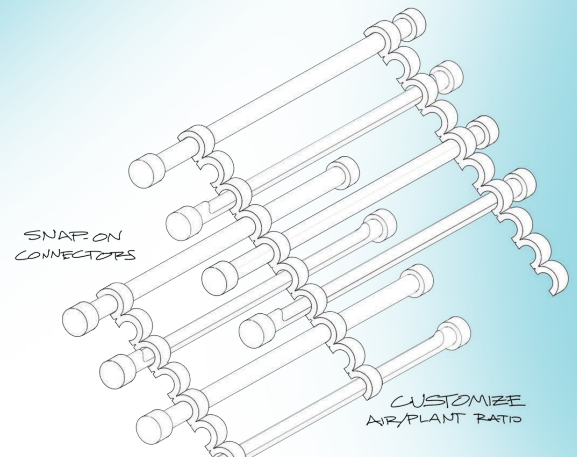
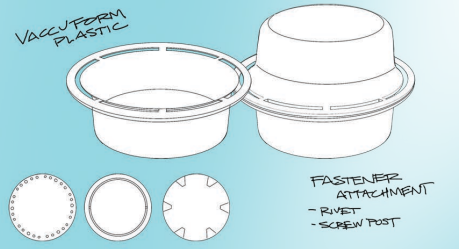
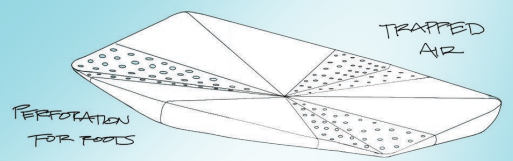
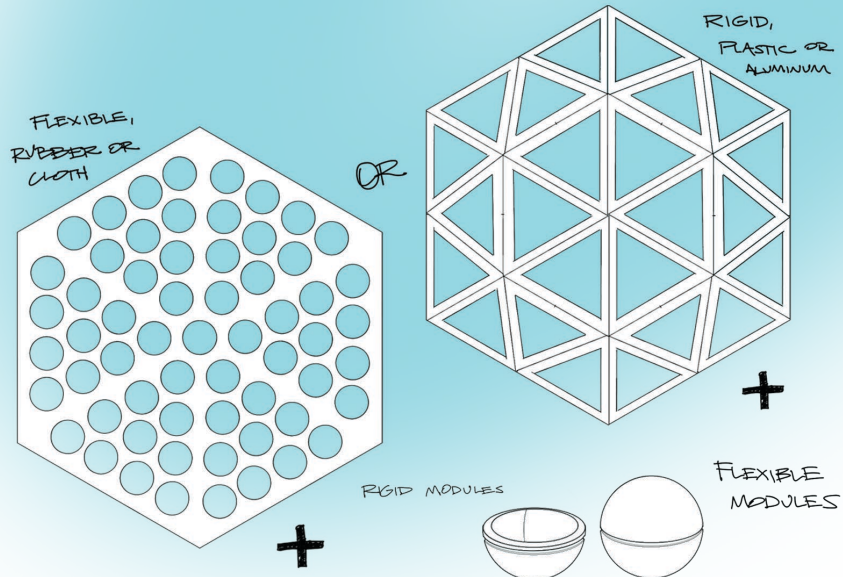
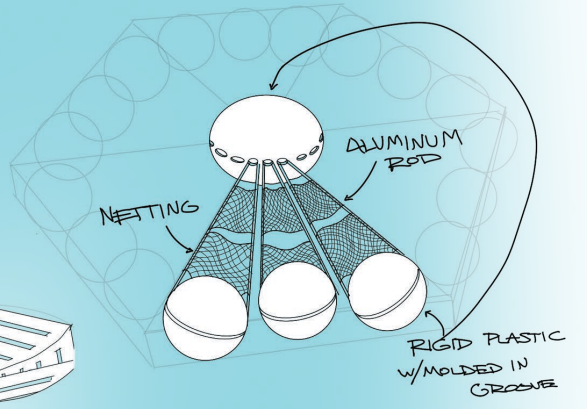
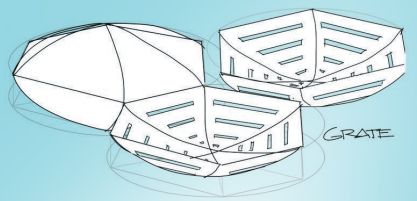
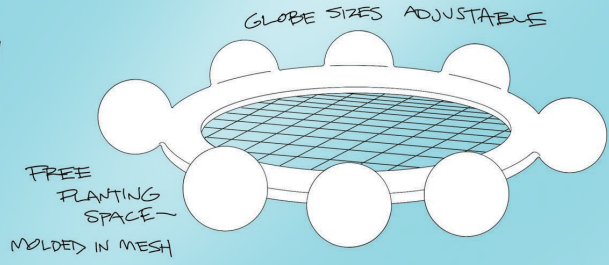
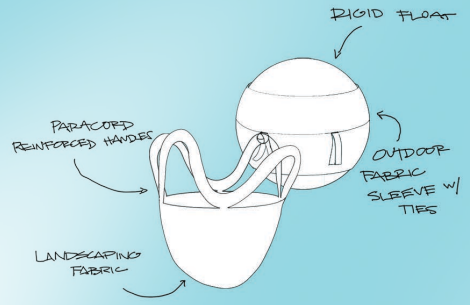
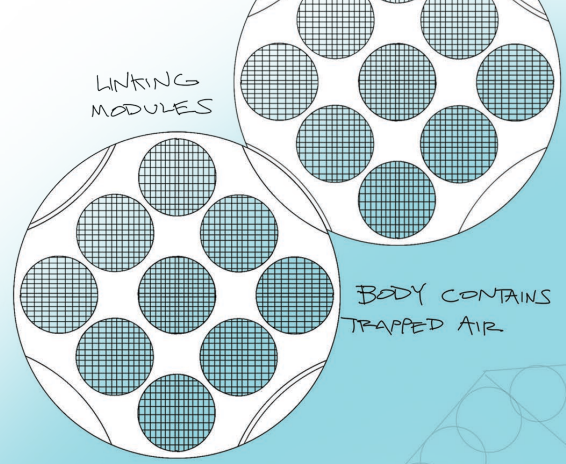
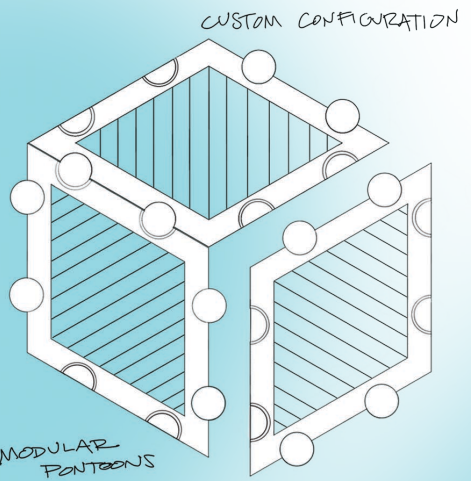
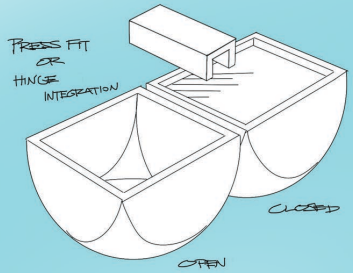
MS Industrial Design

University of Houston

Gerald D. Hines College of Architecture & Design

PART 1

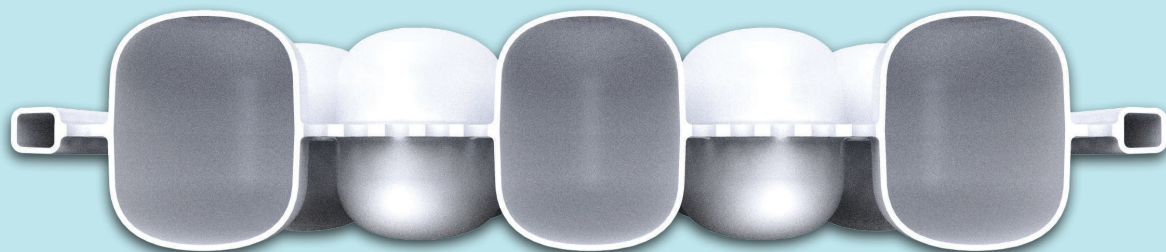
Design Development



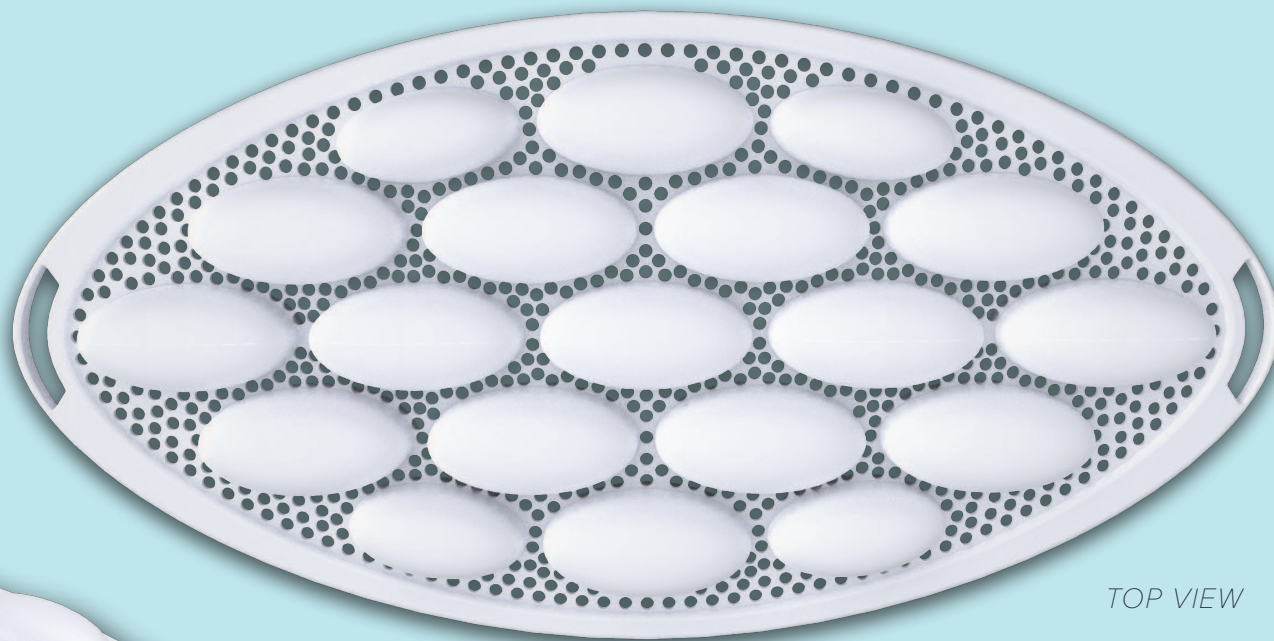
SKETCH EXPLORATIONS

- SIZE
- CONNECTIONS
- MATERIAL
- BUOYANCY
- PRODUCTION METHOD

INITIAL MODEL RENDERING



SECTION VIEW



TOP VIEW

PERSPECTIVE VIEW





PROTOTYPE

PART 2

User Testing



TEST SITE

Testing took place at the University of Houston's Meditation Pond, right outside the Gerald D. Hines College of Architecture and Design. Over the course of a week, thirty diverse subjects participated in user testing activities.





RAFT TESTING



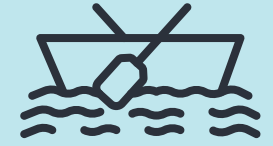
CARRY

Participants were asked to carry an empty, full-size raft prototype approximately 50' along the bank of the pond.



PLANT

Using provided cattail and switchgrass plants, participants were asked to plant the raft. They were given no instruction, other than to stop when they felt like it.



DEPLOY

After planting, participants were asked to deploy the raft into the pond. The raft was attached to a safety anchor to prevent it from floating out of reach and disrupting other tests.

TEST OUTCOMES

CARRY

Participants were observed carrying the unit with either one or two hands, and displayed eleven distinctive carrying styles. Of those observed, two caused unnecessary twisting of the trunk. Several participants mistook the connection points for handles.

PLANT

Participants utilized four distinctive planting postures; single or double-knee kneeling, squatting, or bending over. A few participants who self-described as having zero experience with gardening attempted to thread the plant body or roots through the perforation.

DEPLOY

Participants utilized six posture and handling combinations to deploy the raft. This was described by all participants as the easiest task of the test. One notable participant elected to throw the loaded raft into the pond. The plants, and the model, surprisingly remained intact.



CONNECTION UNIT TESTING



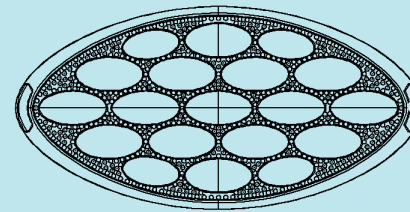
CONNECTOR A
Carabiner



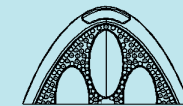
CONNECTOR B
Industrial Twist-Tie



CONNECTOR C
Strap with Buckle



FULL SIZE RAFT
(x2)



PARTIAL FULL SIZE RAFT
(x4)

Participants were asked to use one type of Connector at a time to link up to six raft units. Individuals could choose where and in what manner the connections were executed, but all were required to deploy their configurations to the water upon completion.

TEST OUTCOMES

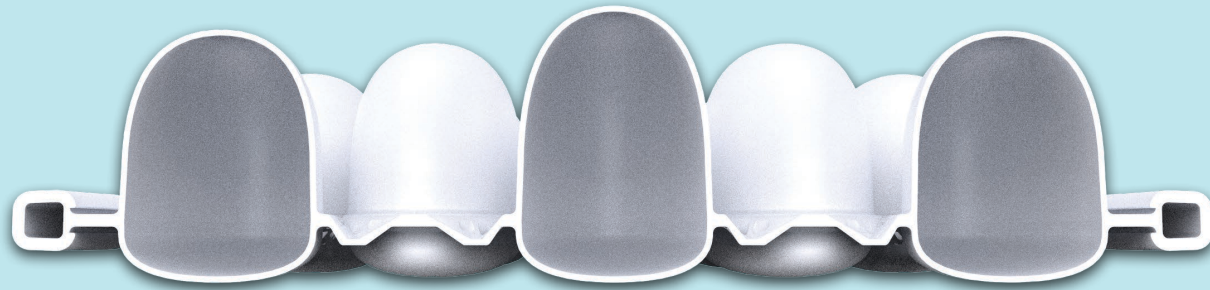
FUNCTIONAL ATTRIBUTES

The future connection unit design should be operable with one hand, adjustable length, allow for multiple configurations, buoyant, and should constrain raft movement once secure.

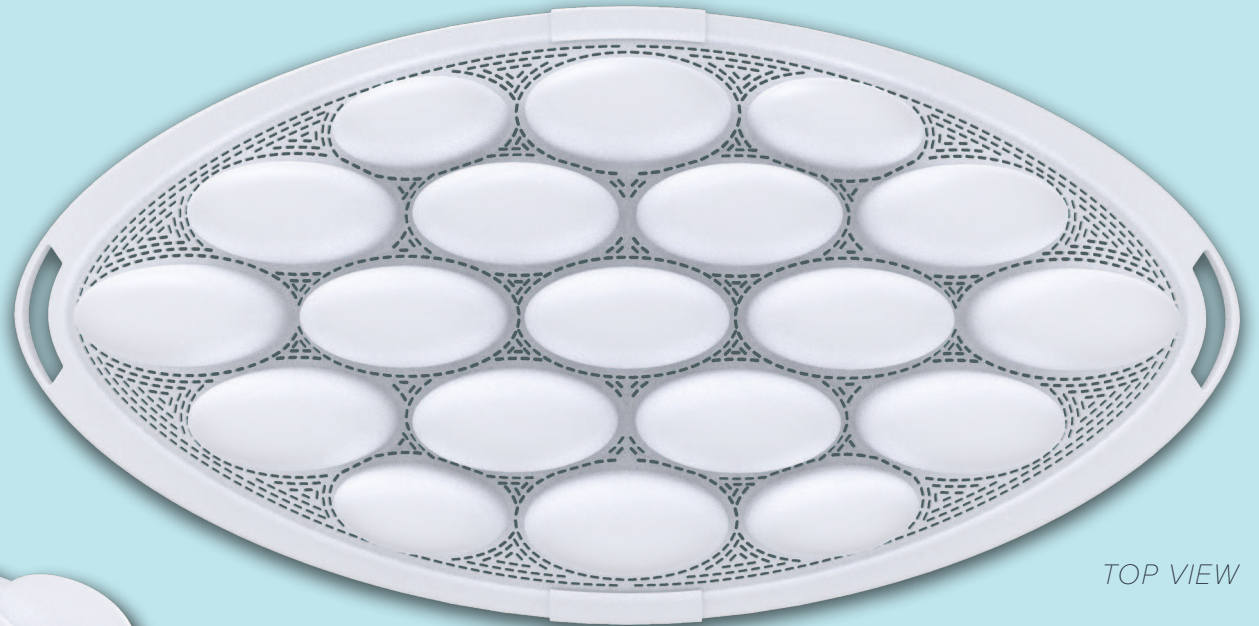
SUBJECTIVE CHARACTERISTICS

The future connection unit design should evoke feelings of familiarity, creativity, beauty, and speed among future users.

FINAL MODEL RENDERING



SECTION VIEW



TOP VIEW



PERSPECTIVE VIEW

