



ATLANTIS 2.0

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Refugees

- There are currently about 70.8 million refugees in the world fleeing from countries due to war and corruption.
- That is about 9x the population of New York City!



Central American Migrant Caravan


- People from all over the world come to Columbia to embark on a dangerous journey through the jungle and across national borders.
- They are stopped at the US-Mexico border and forced to wait in camps while they go through the asylum seeker process, which could take months or even years.
- They just sit there at the camp living off donated food and risk being kidnapped by human traffickers.



Mediterranean Crossings

- Many refugees from the Middle East travel to Northern Africa and board overloaded boats in order to cross the Mediterranean into Europe.
- These boats are often old and poorly maintained, leading to many tragic shipwrecks that result in the deaths of hundreds at a time.
- The boats that do make it to Italy and Greece often get turned away or detained, putting the refugees in camps.



An aerial photograph showing the aftermath of a hurricane. The scene depicts a densely packed residential area where many houses have been severely damaged or destroyed. Debris is scattered across the landscape, and some structures are partially collapsed. A large, semi-transparent white circle is overlaid on the left side of the image, containing the title and a list of bullet points. The background shows a mix of destroyed buildings, some remaining trees, and a body of water in the distance.

Victims of Hurricanes

- The people who lost their homes to Hurricane Maria are currently staying in hotels funded by FEMA.
- Difficulty finding jobs due to lack of permanent address.
- FEMA is kicking these people out after 2 years, but their homes are still destroyed.

An aerial perspective of the Oceanix City concept, showing a vast expanse of blue water populated by numerous floating islands. These islands are interconnected and feature a variety of architectural designs, including modern buildings with solar panels, green spaces with trees, and circular platforms. The islands are anchored to the ocean floor, creating a modular and scalable urban environment. A large, semi-transparent white circle is overlaid on the left side of the image, containing the title and a list of features.

Oceanix City

- Floating city proposed by BIG
- Anchored to the ocean floor
- Modular
- Biorock

Freedom Ship

- Proposed ship that can permanently house residents
- Basically a skyscraper lying down on a boat
- Airport on top
- Travels the world
- Only rich people can live here
- Not much open air on the inner parts
- Attempt to make a “community at sea”





- A floating city for refugees and other displaced people.
- About half the size of Manhattan
- Can house about 5 million people.
- Super lightweight
- Drifts on ocean currents
- Can also be controlled like a boat

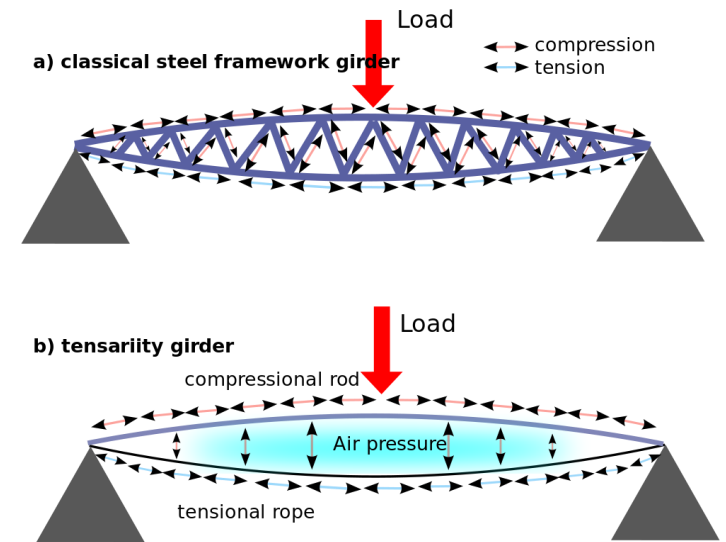
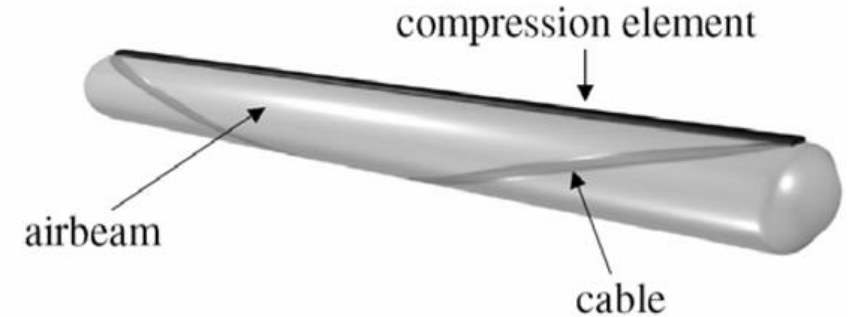




- Independent city state
- Has its own economy with imports and exports
- Trades with nations that it passes by
- Jobs for the refugees
- Possible to live permanently
- Can also live here while waiting for immigration process

Tensairity

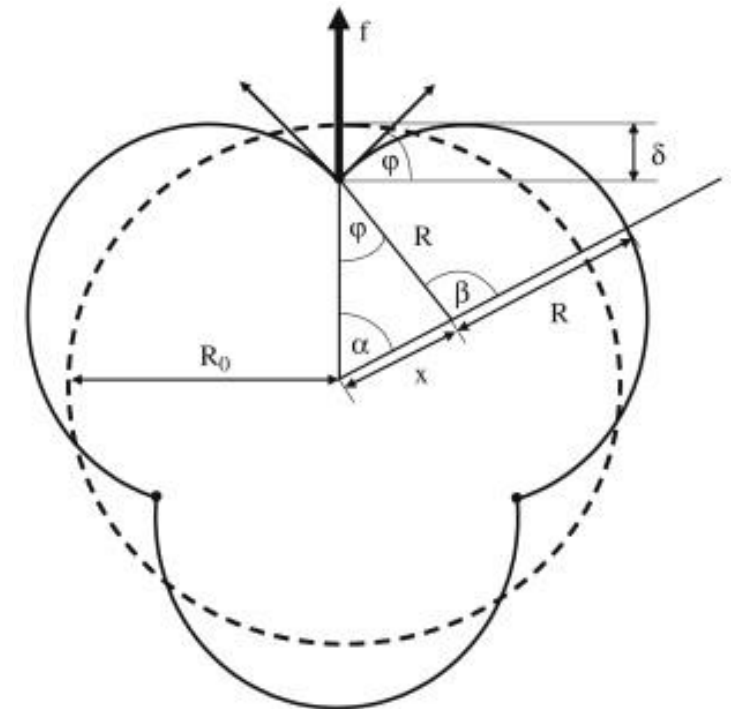
- When a pole is attached to the top of an air beam, it becomes the compression element.
- Two cables wrap around the air beam in a double helix.
- When a load pushes on the beam, the compression element and tension cables keep the air beam from deforming, greatly improving its strength.
- 0.4 bar tensairity beam = 15 bar air beam
- More than 30x stronger than normal air beams.





It Works for Columns Too

- Spindle shape with 3 compression members running the height of the column.
- Compression members hold air beam in its original shape.



Weight of Tensairity Members

95% of the volume is air.

The other 5% is aluminum.

1/6 the weight of a steel girder.

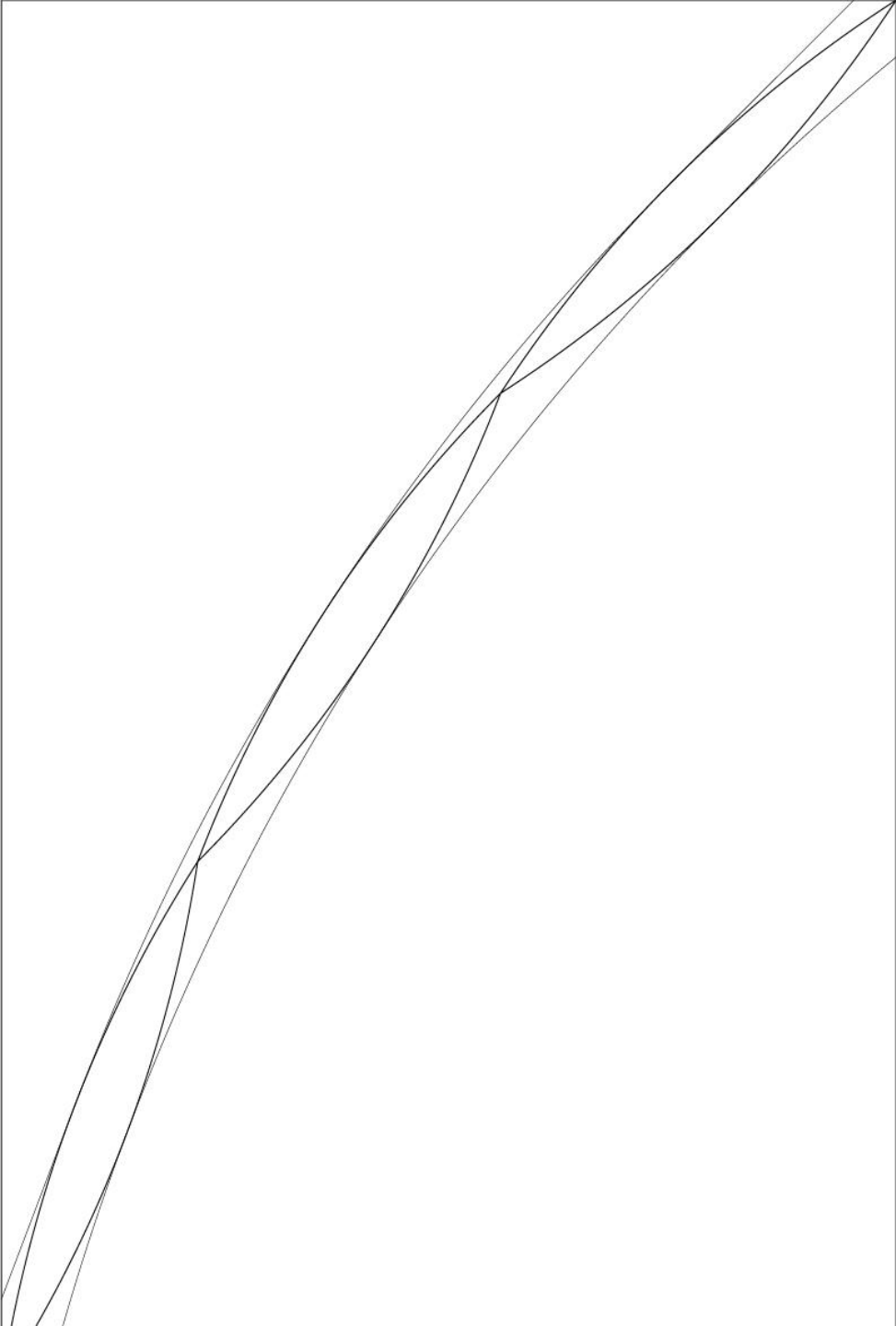
Can be even lighter with carbon nanotube cables.

Could potentially float in the air if filled with hydrogen or helium.

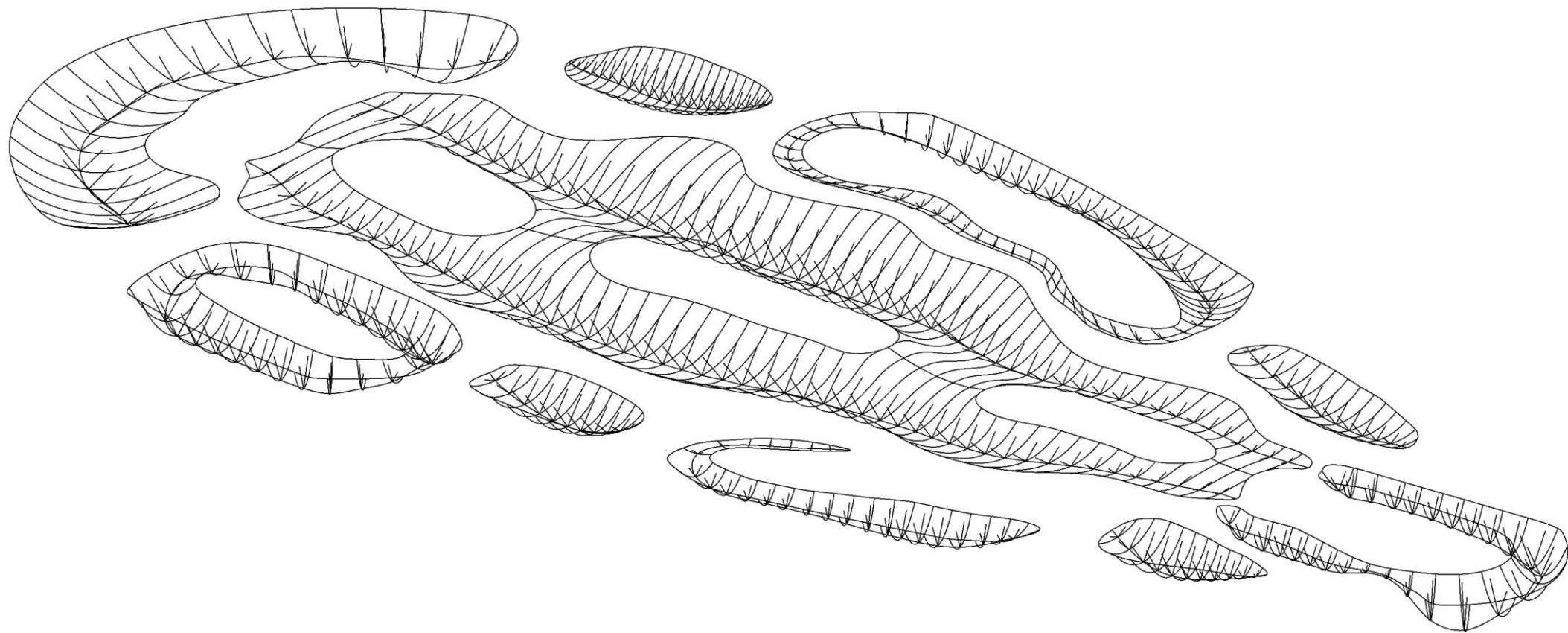
Current Applications

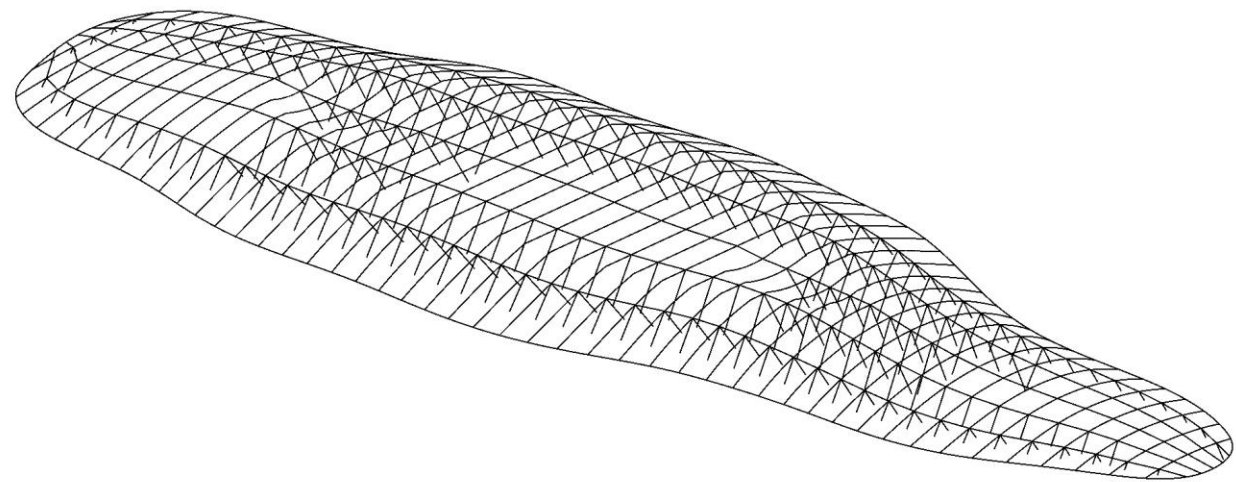
- Roofs
- Temporary Structures
- Kites
- Airplanes

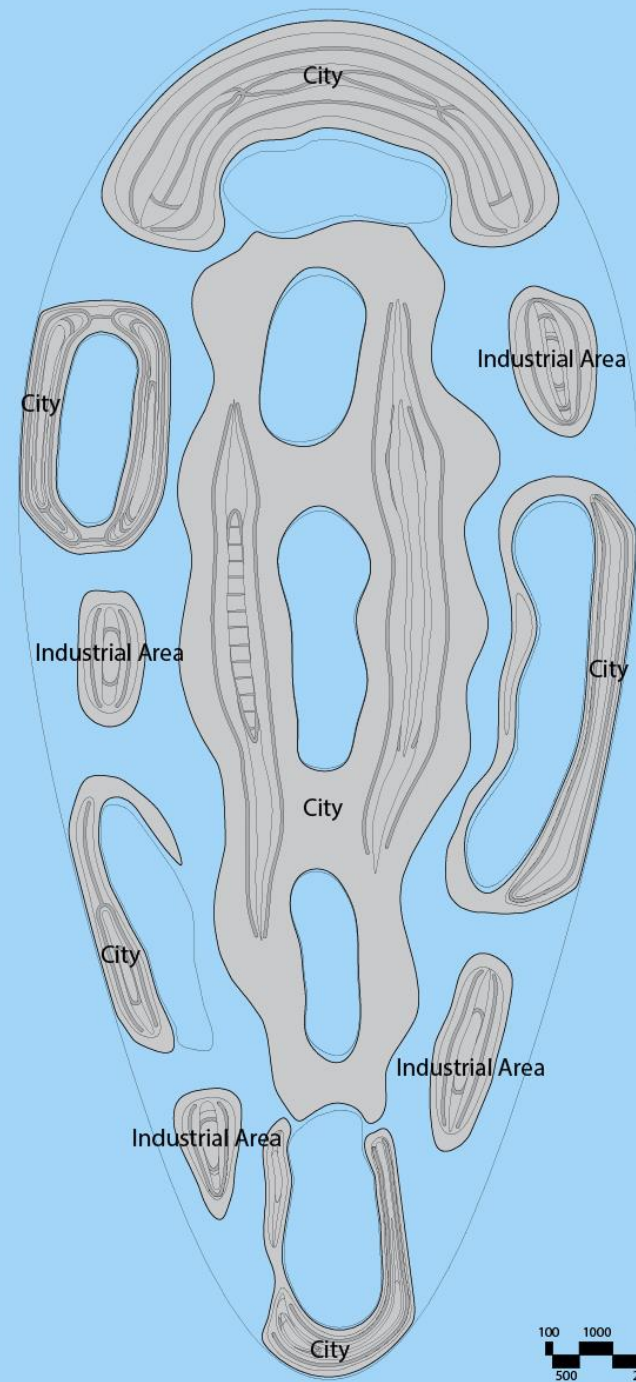
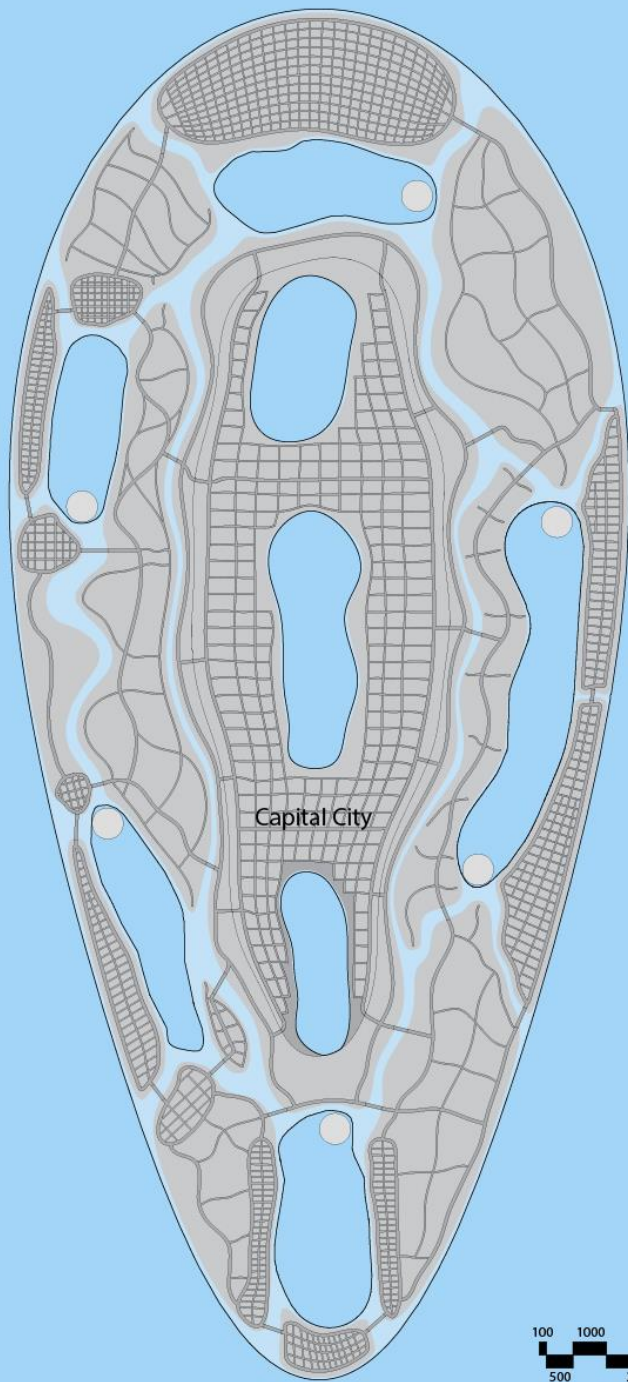
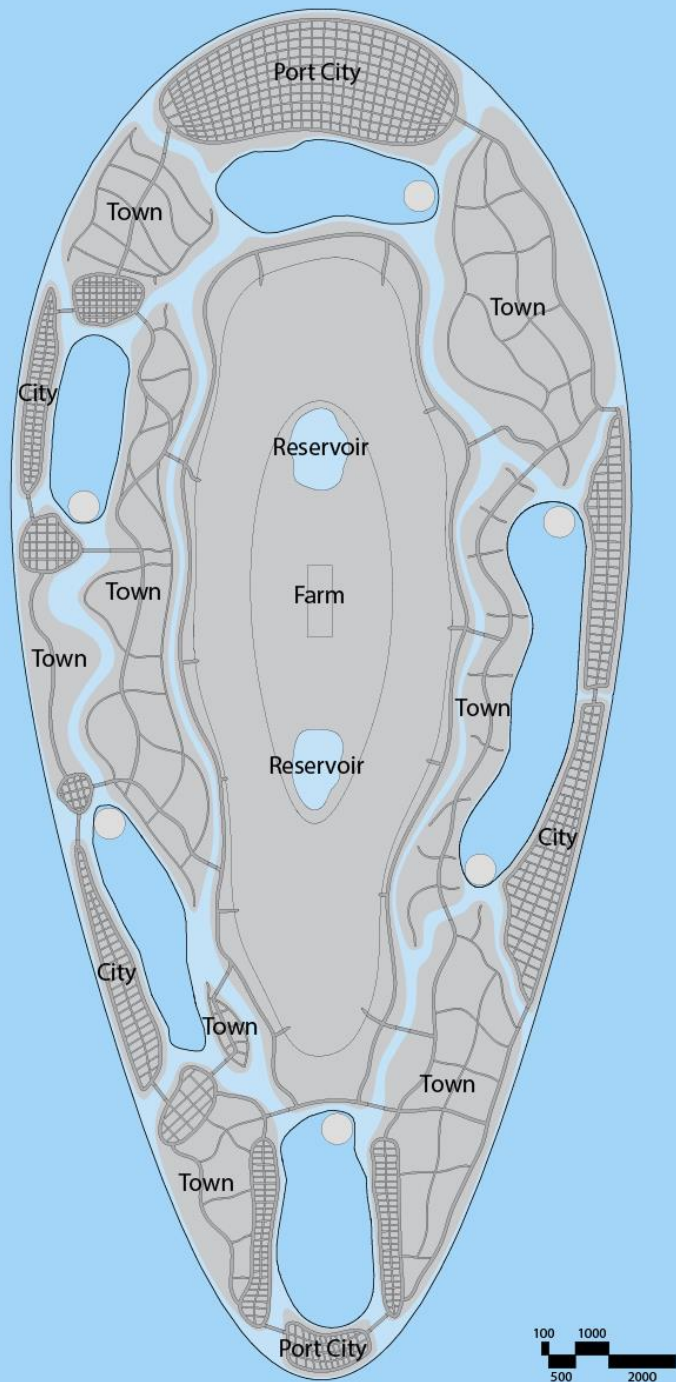


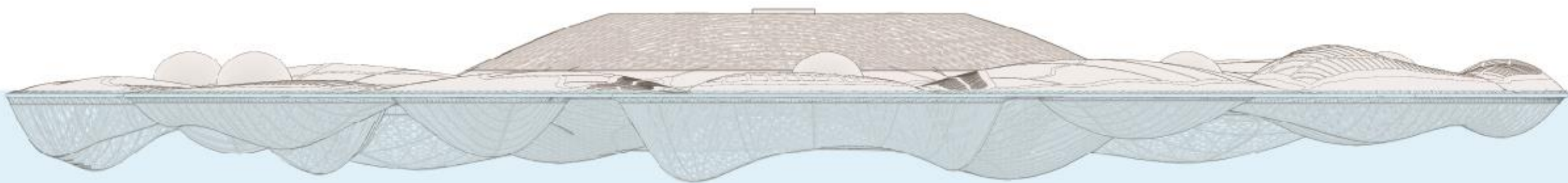


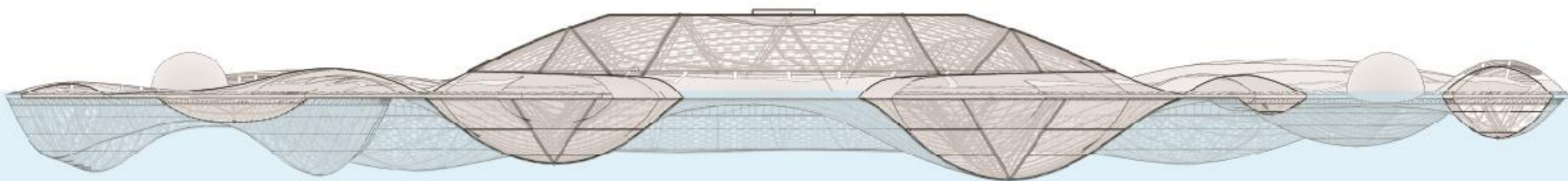
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- Tensairity beams and columns would allow this massive structure to float more easily

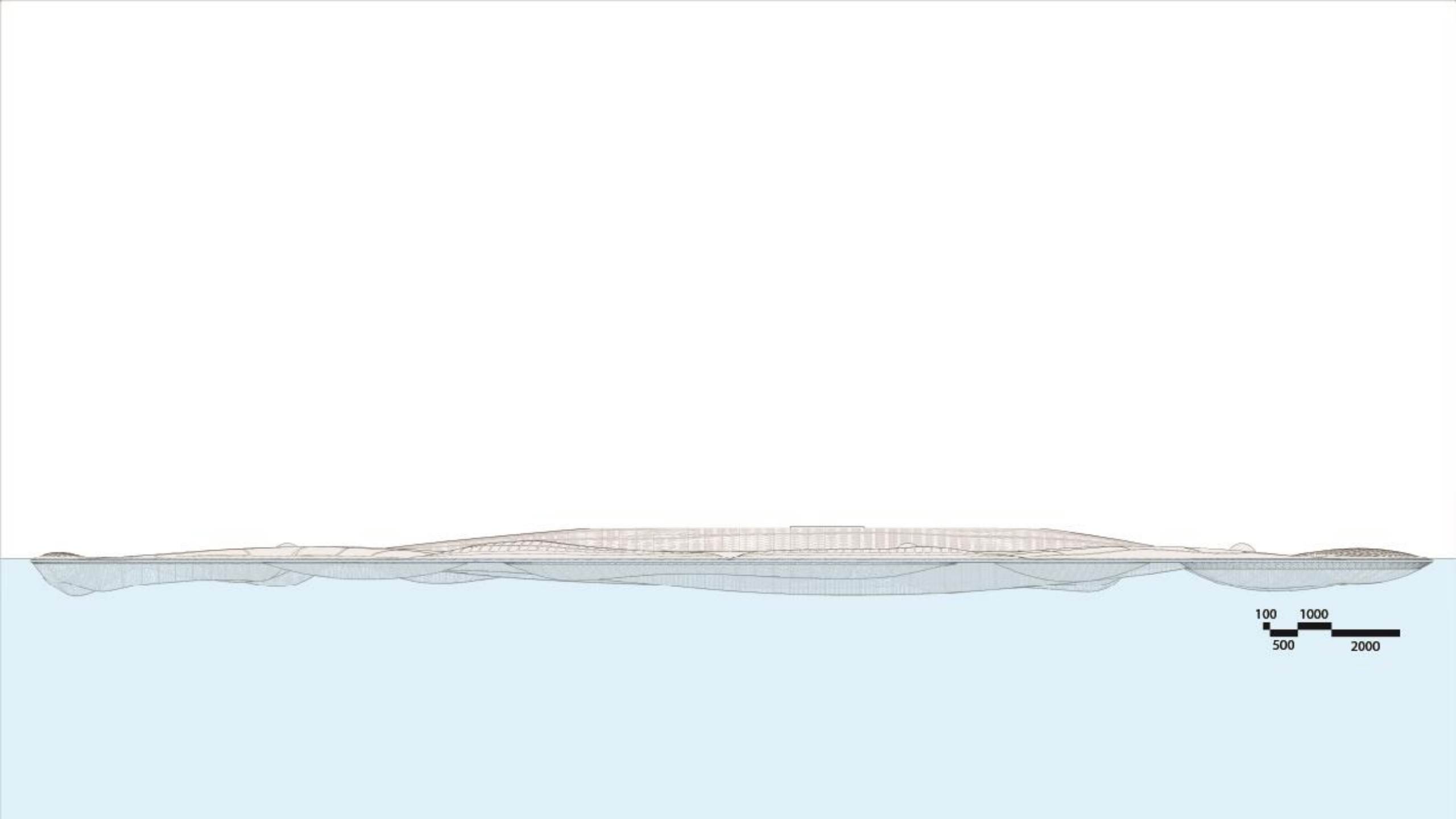


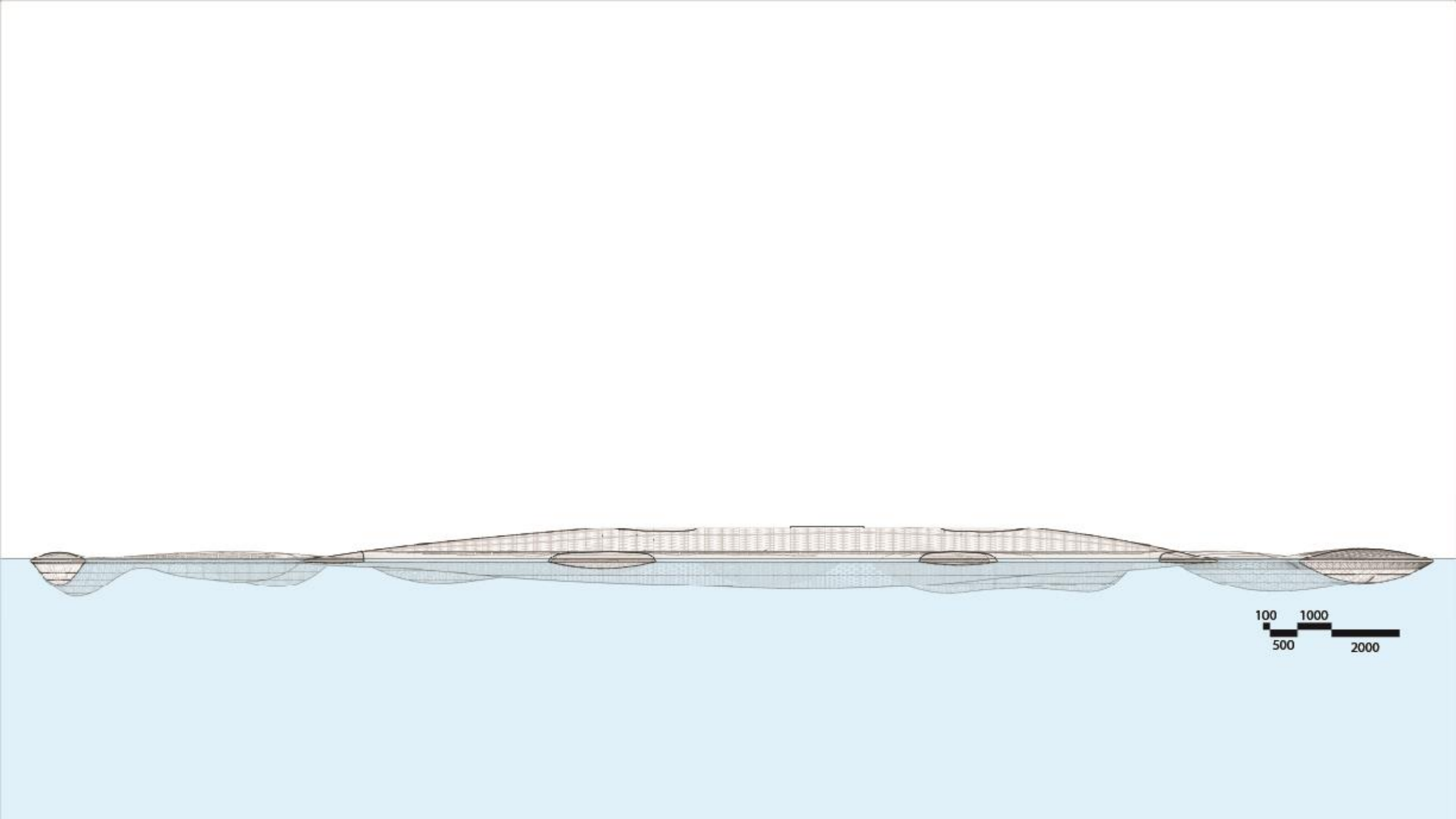


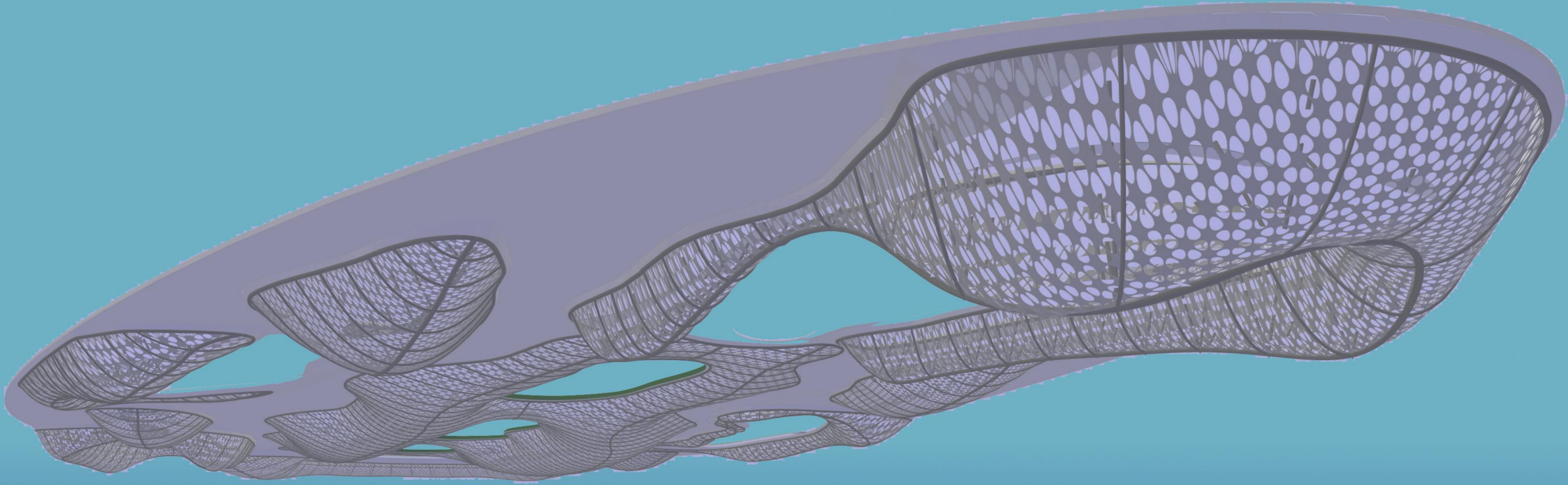








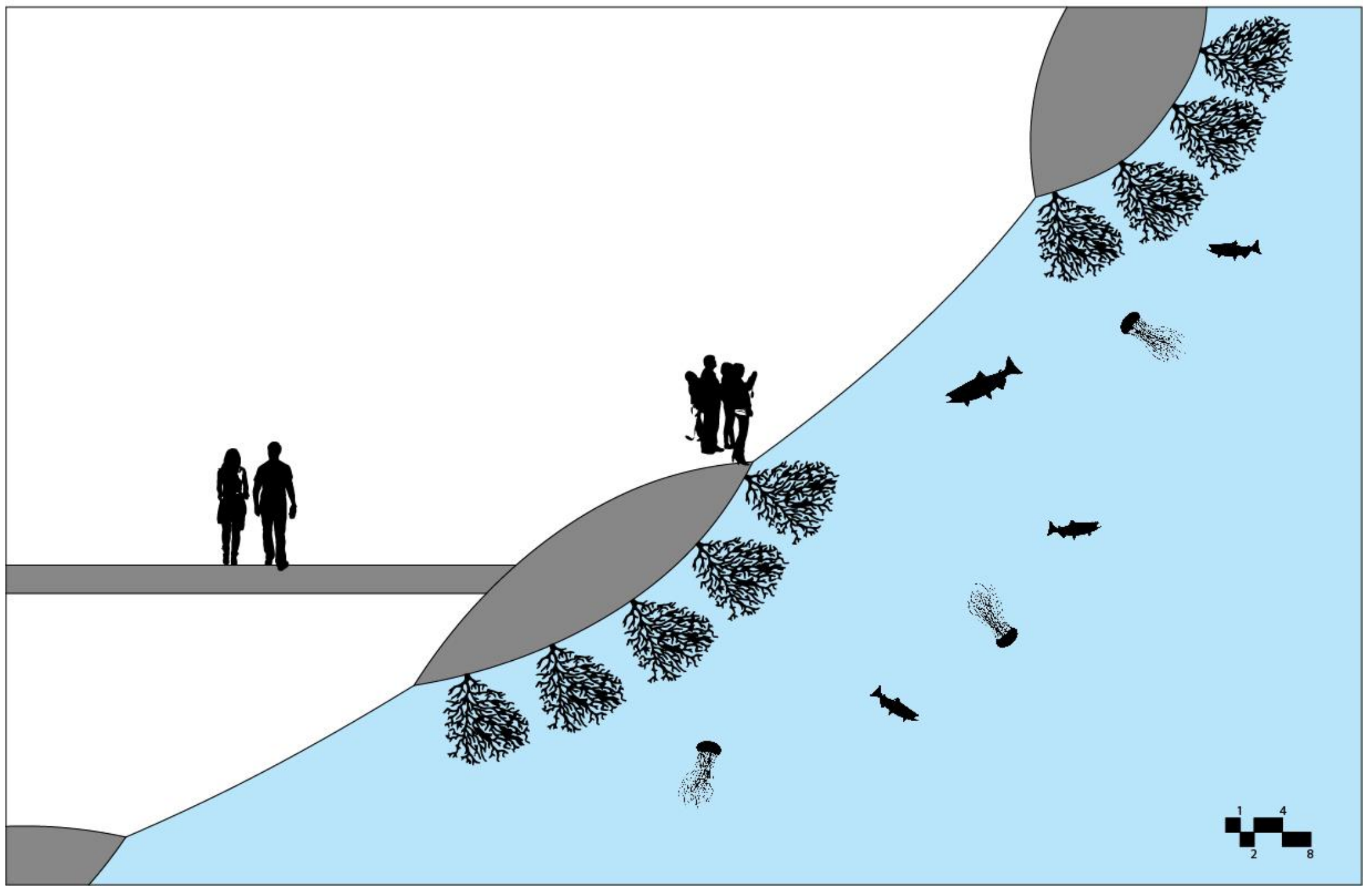


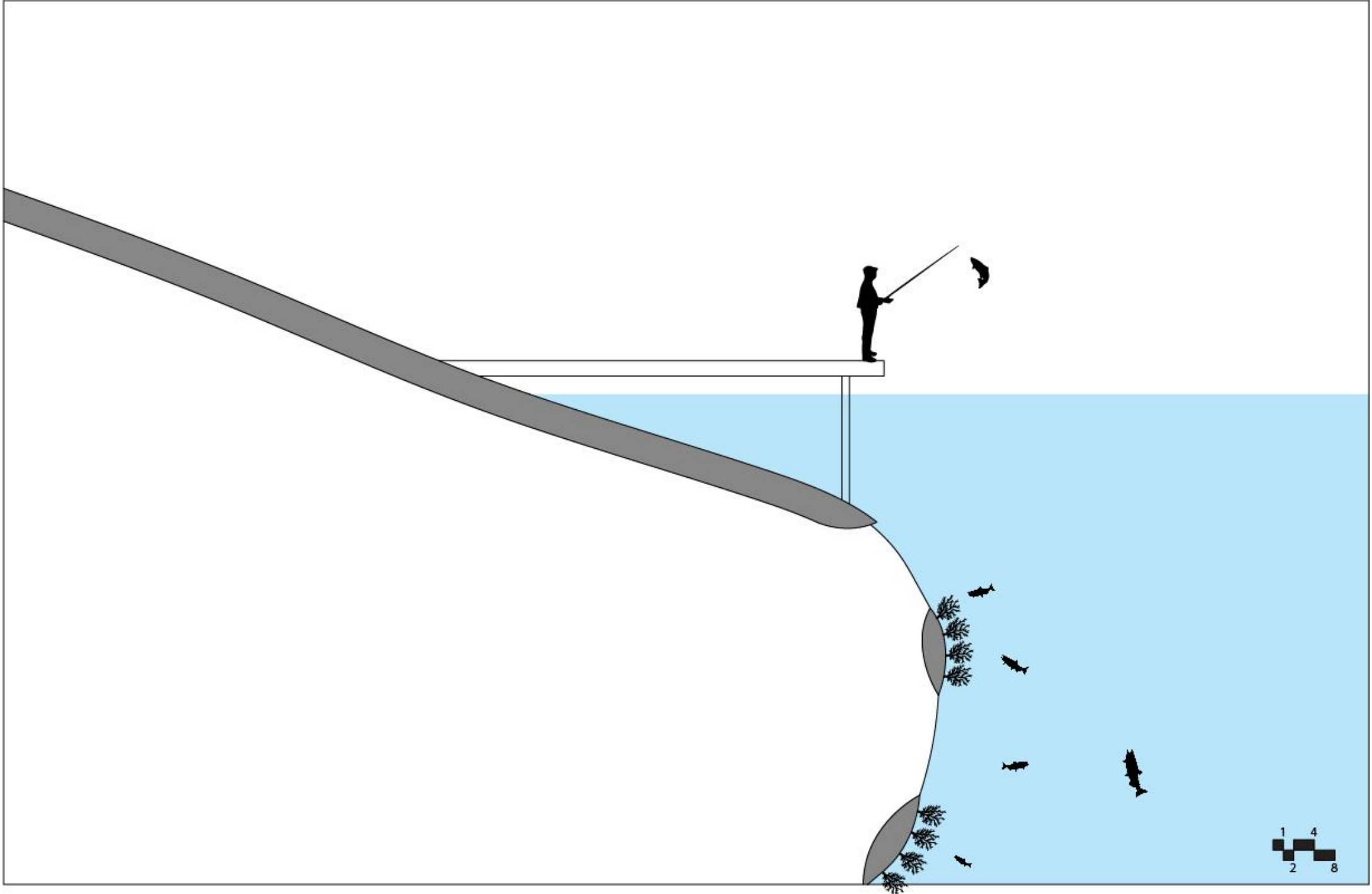


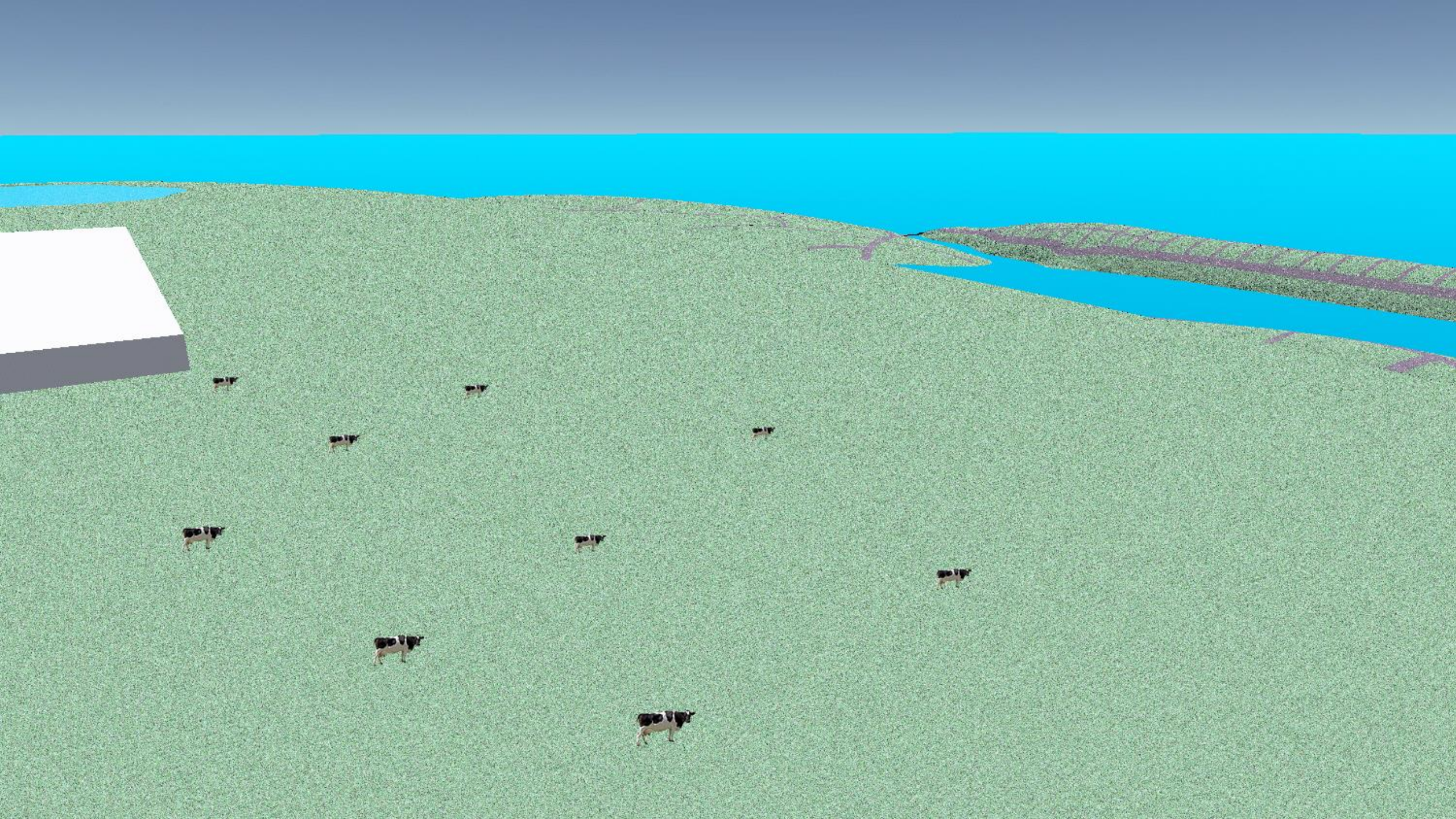
Biorock

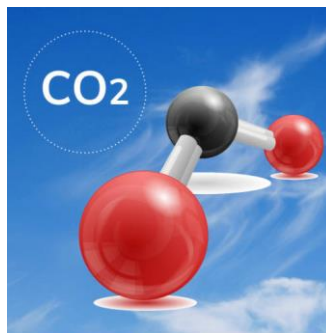
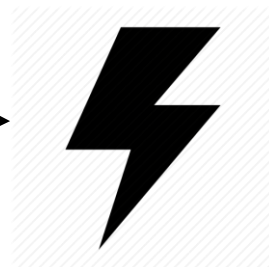
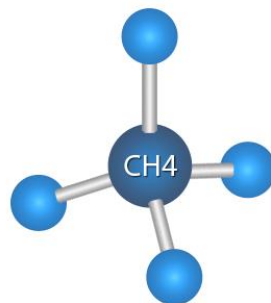
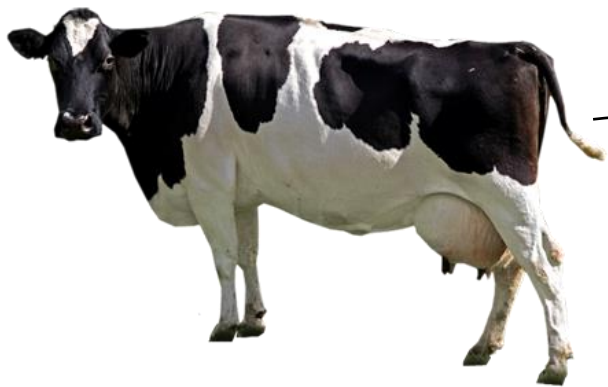
- Strength of concrete but 1/3 the weight
- Promotes the growth of corals







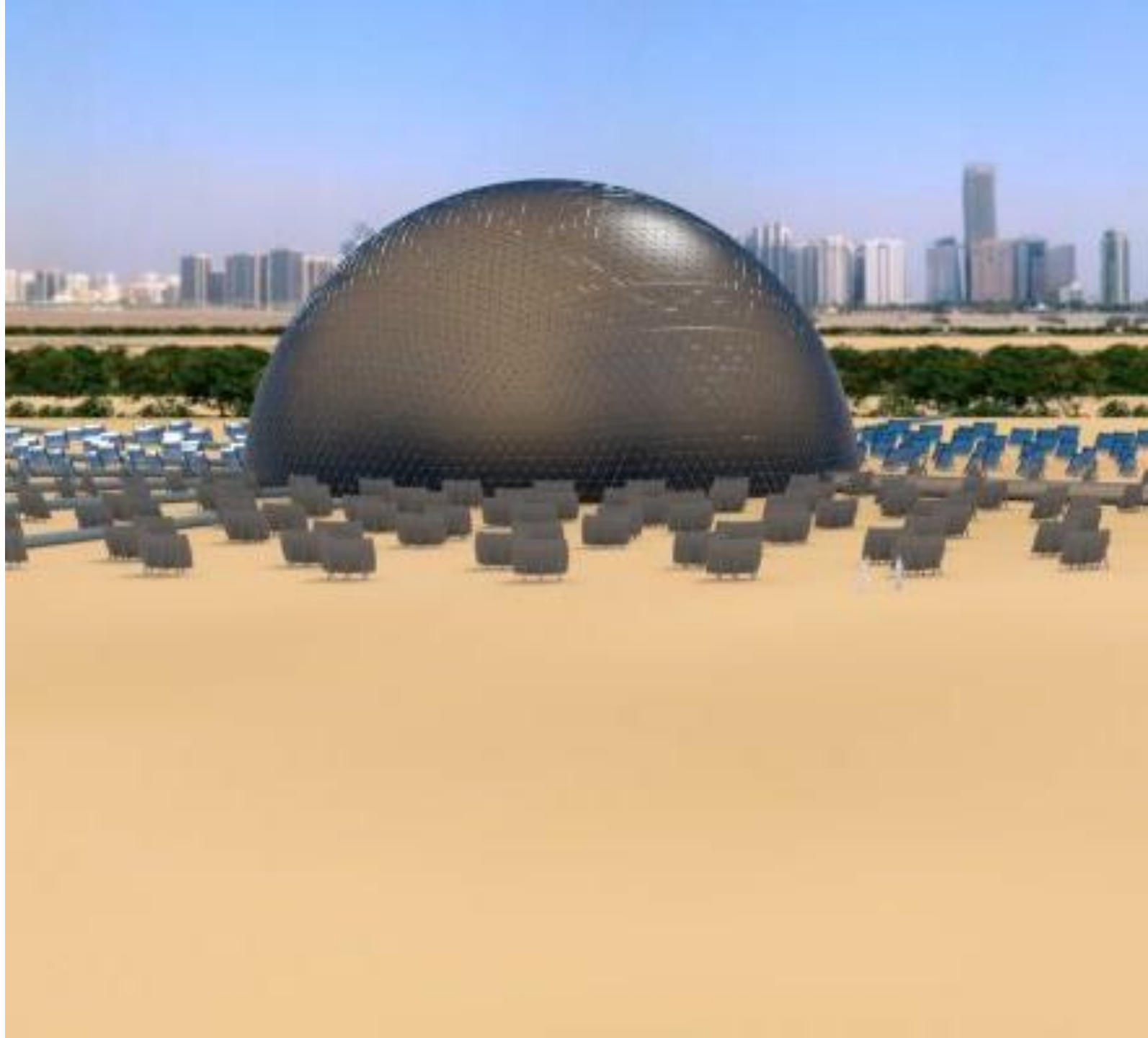


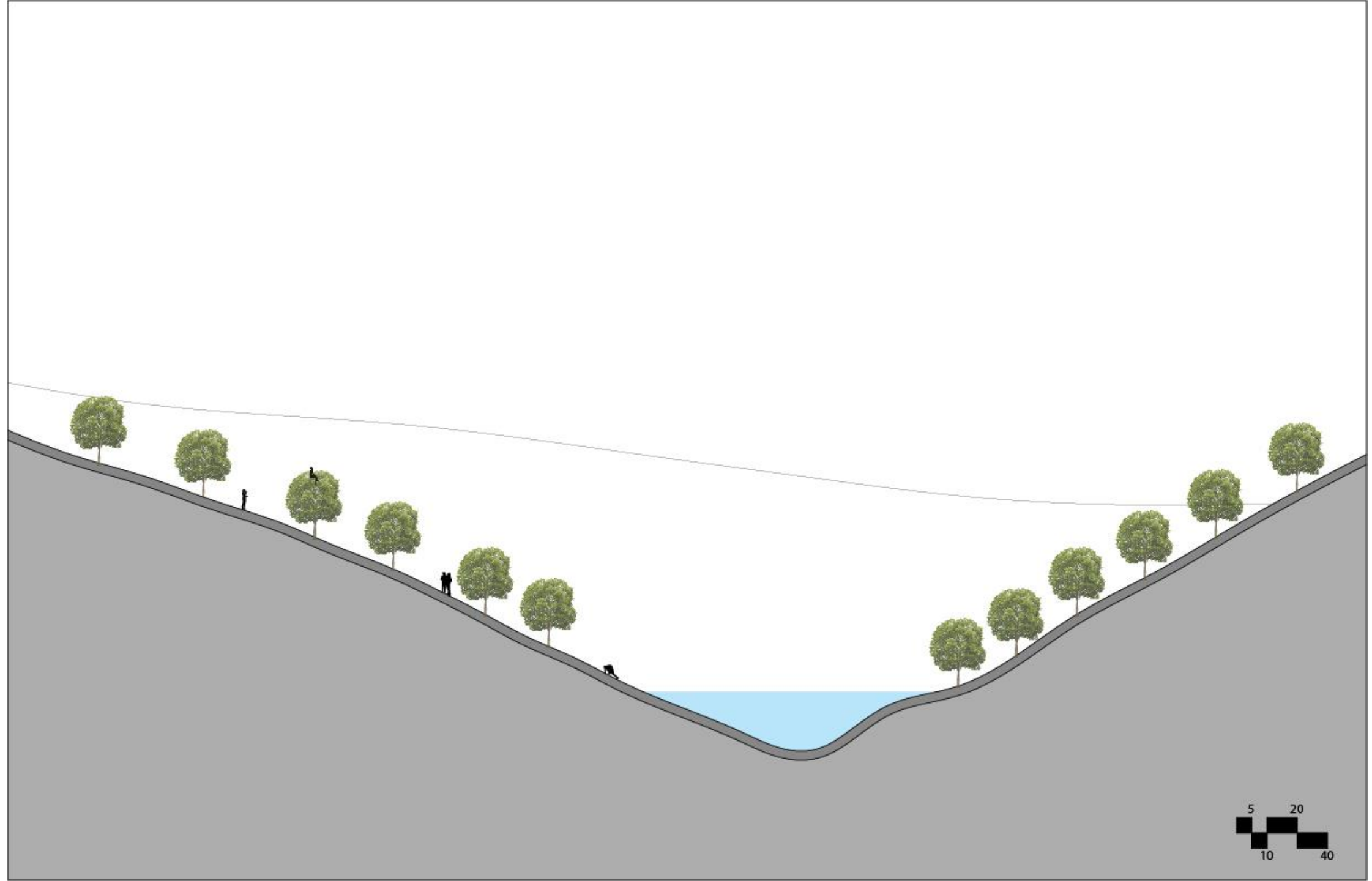




Desalination Dome

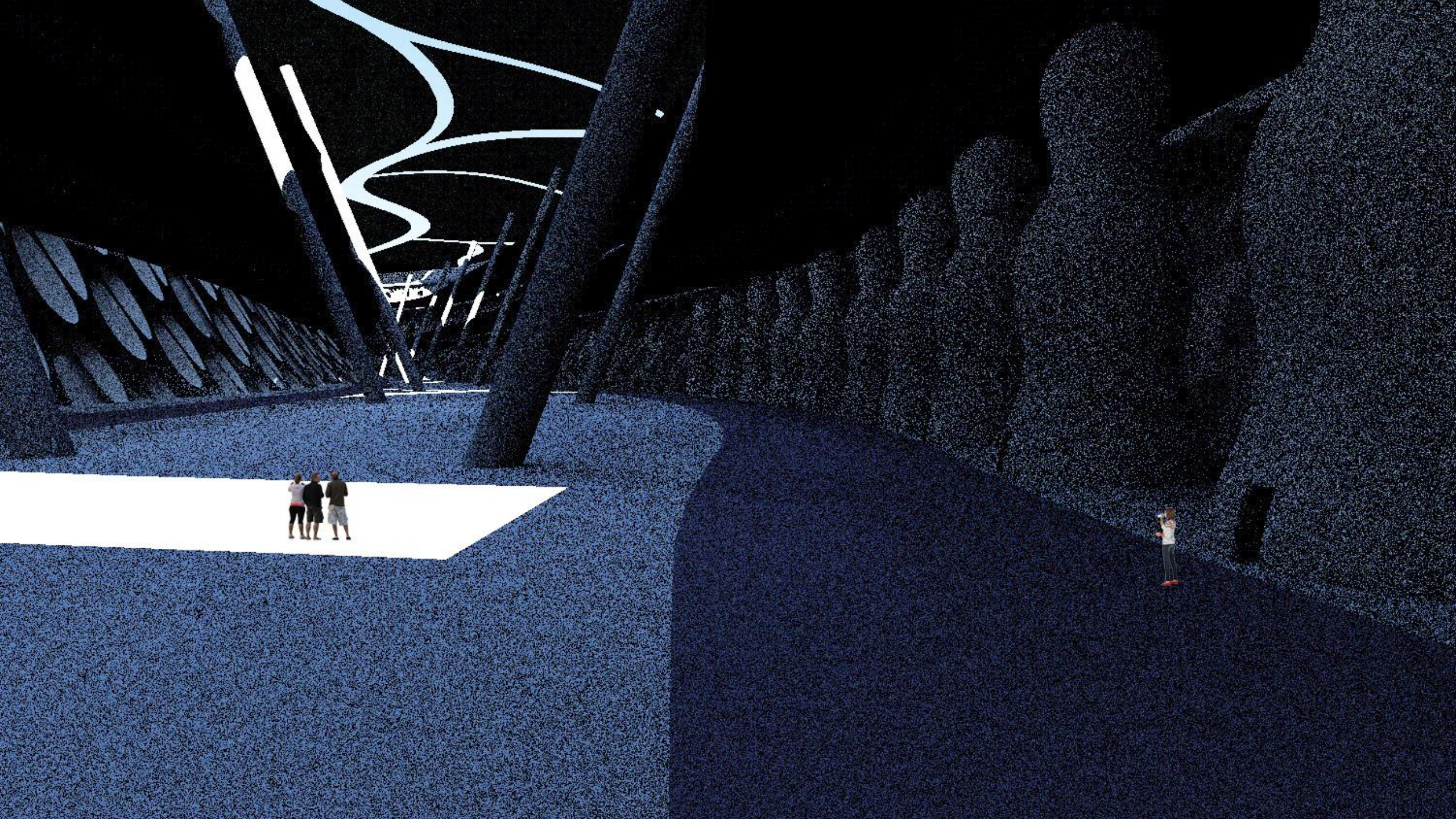
- New technology by Malcolm Aw
- Dome shaped greenhouses surrounded by mirrors
- Saltwater inside evaporates, then condenses on the sides
- The condensation is collected by pipes on the sides

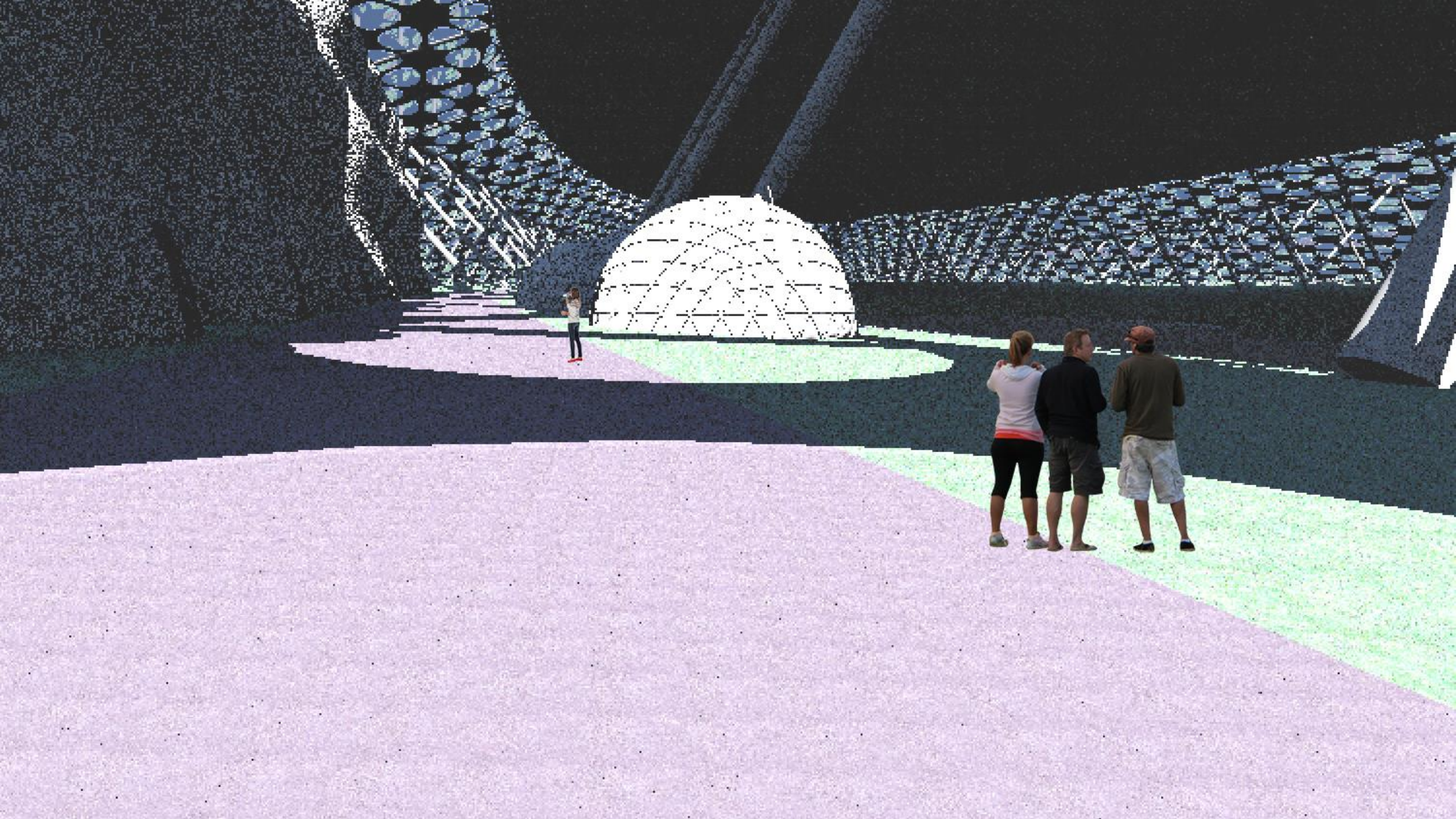












Works Cited

- Luchsinger, R.H., Pedretti, A., Steingruber, P. and Pedretti, M., 2004. The new structural concept Tensairity: Basic principles. *Progress in structural engineering, mechanics and computation*, pp.323-328. <https://pdfs.semanticscholar.org/0933/16ebd1776c4ada3969bb882a112101aee999.pdf>
- Luchsinger, R.H., Pedretti, A., Steingruber, P. and Pedretti, M., 2004. Light weight structures with Tensairity. *Shell and Spacial Structures from models to realization*, pp.80-81. https://www.researchgate.net/profile/Rolf_Luchsinger/publication/251300416_LIGHT_WEIGHT_STRUCTURES_WITH_TENSAIRITY/links/555c261b08ae91e75e76cfaa.pdf
- Plagianakos, T.S., Teutsch, U., Crettol, R. and Luchsinger, R.H., 2009. Static response of a spindle-shaped tensairity column to axial compression. *Engineering Structures*, 31(8), pp.1822-1831. <https://www.sciencedirect.com/science/article/pii/S0141029609000881>
- Wever, T., 2008. Tensairity: The effect of internal stiffness on the buckling behaviour of an inflatable column. <https://repository.tudelft.nl/islandora/object/uuid:bd22b5ee-d31e-4300-8b39-5092096eadf4>
- https://www.washingtonpost.com/national/hurricane-maria-thousands-of-displaced-puerto-ricans-might-be-pushed-out-of-temporary-housing/2018/08/11/e6c413aa-83b0-11e8-9e80-403a221946a7_story.html
- <https://www.bbc.com/news/world-latin-america-45951782>
- https://en.wikipedia.org/wiki/Central_American_migrant_caravans
- <https://www.cnn.com/2019/03/04/politics/migrant-caravans-trump-immigration/index.html>
- <https://www.washingtonpost.com/world/2019/01/30/migrants-crossing-mediterranean-journey-has-become-deadlier/>
- <https://www.unhcr.org/en-us/protection/operations/5592bd059/sea-route-europe-mediterranean-passage-age-refugees.html>
- https://en.wikipedia.org/wiki/European_migrant_crisis
- <http://large.stanford.edu/courses/2017/ph240/xiao-m2/>
- https://en.wikipedia.org/wiki/Dry_dung_fuel
- <https://big.dk/#projects>
- <https://www.biorock.org/>
- <https://www.innovatorsmag.com/solar-powered-clean-water-production/>
- https://en.wikipedia.org/wiki/Freedom_Ship
- <http://freedomship.com/>