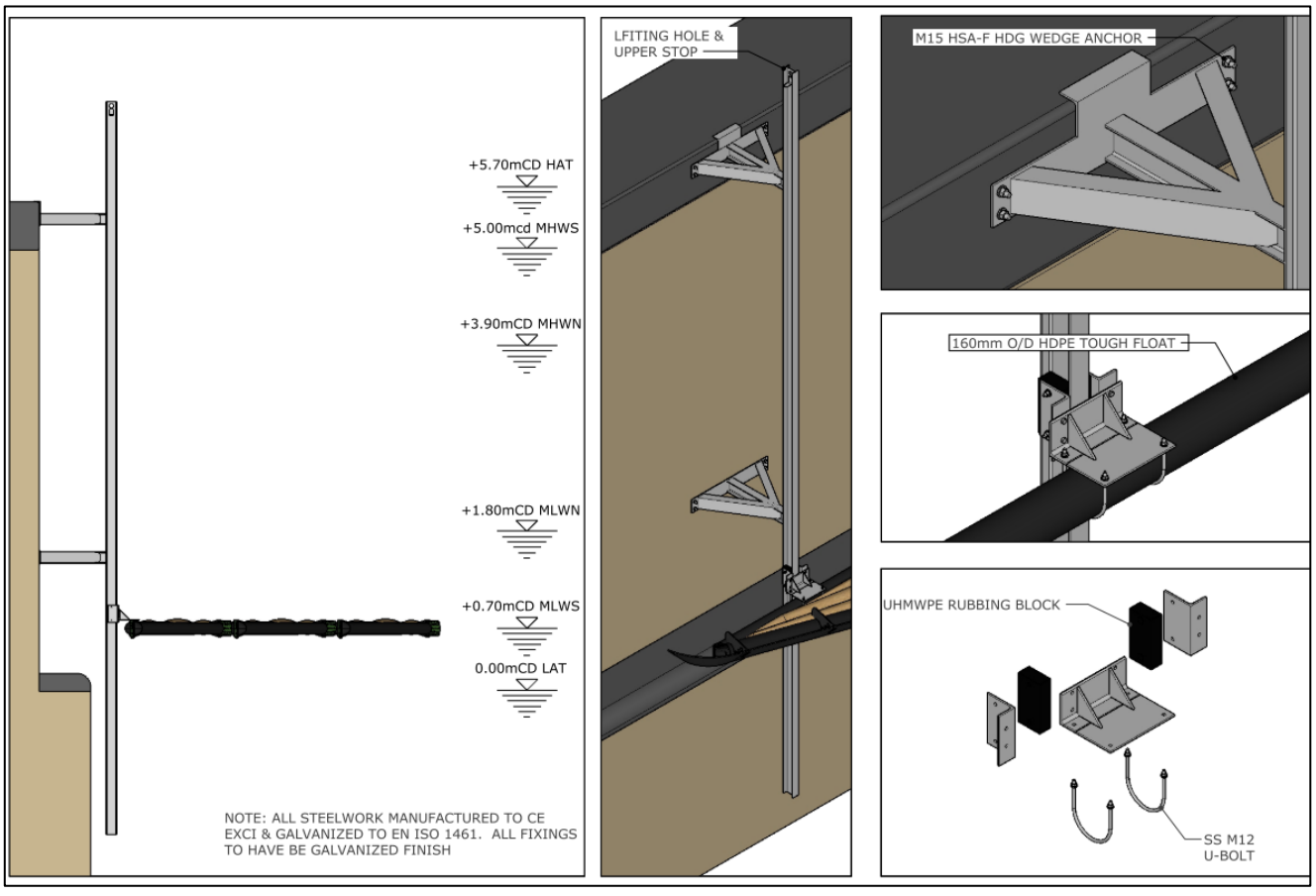
MODULAR FLOATING ECOSYSTEMS

Tidal and Dynamic Waterways

The Biomatrix Modular Floating Ecosystem has been designed to withstand velocities of up 3.5 m/s (6.8 knots). There are several systems operating across the UK and around in the world in challenging conditions (large tidal fluctuations, high wind, current, waves, and debris). In Norwich in September 2019 an installation managed heavy rains and flooding on the River Weaver under similar conditions to what you might also see on the Thames in Spring and Autumn. As the River Weaver rose, the anchoring system used to secure the ecosystems allowed the flood waters to flow freely underneath the buoyant ecosystem allowing it to rise undamaged. After the event the ecosystem has gone on to establish and thrive in its riverside environment. Additionally, Biomatrix conducts extensive destructive testing of its ecosystem modules and completes a structural engineering review of each installation that models the combined loading from current, wind, and debris strikes.

Biomatrix Floating Ecosystems are constructed with durable materials including HDPE and stainless steel, which do not degrade in water or sunlight. The system has a design life of at least twenty years. This is the strongest 'Floating Island' available on the market. Durability is an essential aspect of the materials sustainability ensuring that the materials used won't break apart and can eventually be re-claimed and recycled. 100% of the materials used in Biomatrix products are recyclable. No inseparable composites are utilised.

The Biomatrix ecosystem modules are fixed together to create a structure with a large surface area and substantial buoyancy (>80 kg/m^2). In addition, the systems will be securely anchored to the quay wall using a "tide rail" system.



Tide Guide Schematic

Tide Guide Installation

This system is used extensively in the design of floating marinas, pontoons, and other floating structures, and it allows the Floating Ecosystems to move up and down with changing water levels along a structural steel beam. The height of the beam will extend beyond the top of the quay wall to ensure the Floating Ecosystems remain in place and above water even during extreme flood events. At extreme low tide/water level, the ecosystem modules are able to rest on river bed without issue.

PLANT BIOMASS

Biomatrix floating Islands mimic naturally occurring riparian wetland biomes using exclusively native plant species. One of the main benefits of these units is that they require no watering and nature tends to be very effective at managing itself once the floating structures are in place. Additionally, the floating structure creates for a direct connection between the plant root structure and the water column below. This allows the plants to update nutrients directly from the waterbody. No fertiliser or herbicides are required.

With respect, to plant litre and debris, the vast majority is captured and incorporated into the plating substrate on top of the ecosystem structure. The ecosystem will also be edged with mesh bird fencing to prevent opportunistic grazing from large waterfowl (geese, swans) while still allowing access for smaller species (ducks, coots, mergansers) to nest. At the same time, the mesh also prevents plant biomass and planting media from spilling from the ecosystem modules.

Floating Ecosystem Planting and Mesh Edging

MAINTENANCE & MONITORING ACTIVITIES

Bi-annual maintenance visits are recommended during the first two years as the biomass matures. Annual visits are recommended thereafter. Monitoring and maintenance can be provided by Biomatrix Water or Biomatrix can provide Monitoring Training so that this may be carried out by a third party.

Monitoring and maintenance visits shall include the following:

Plant Care

- Typically, selective spot trimming of annual plants in autumn, or spring once per year, using hand tools or strimmer, removing some plant material and re-incorporating some of the trimmed plan material in to the planting lanes for 3D islands or laying down between plants on 2D and 5D islands, to maintain planting media structure. Generally removing as little plant material as possible.
- Removal of undesirable plants, as needed. Occasional spot planting of target desirable species.

Floating Ecosystem Structure

The floating Ecosystems structure is robust and constructed from durable materials, to limit maintenance requirements. As general good practice, it is useful from time to time to visually inspect the system for any wear and tear. It is good practice to have your installation inspected and monitored every 1-4 years, according to site conditions.

Anchoring

Anchor inspection typically involves the inspection of hardware where it connects to the islands, and anchor cable/anchor ropes / cables / guides and a general check of the overall anchoring system as would be carried out with a typical pontoon mooring system.

Ecosystem Structure

Connection flanges and bolts can be observed as well as anchoring hardware and floats. Maintenance is only required on these elements in the event of specific wear and tear or when damage from external factors is observed.

Litter removal

In areas where windblown or washed down litter is present litter removal is suggested as needed to maintain a clean and natural ecosystem.