



Liverpool
City Council



UNIVERSITY OF
LIVERPOOL



Dr Juliet Staples

Liverpool's Water Interventions

1. Urban Catchment Forestry
2. Ecosystem Islands
3. Water Retention Ponds
4. Urban Raingarden



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 730426

Urban catchment forestry (SuDs)



20 trees *Metasequoia glyptostroboides*

Planted in silva cells

Total length of SuDs run 174.9m

Total catchment area of 765m²

Average volume of soil/tree 18.5m³

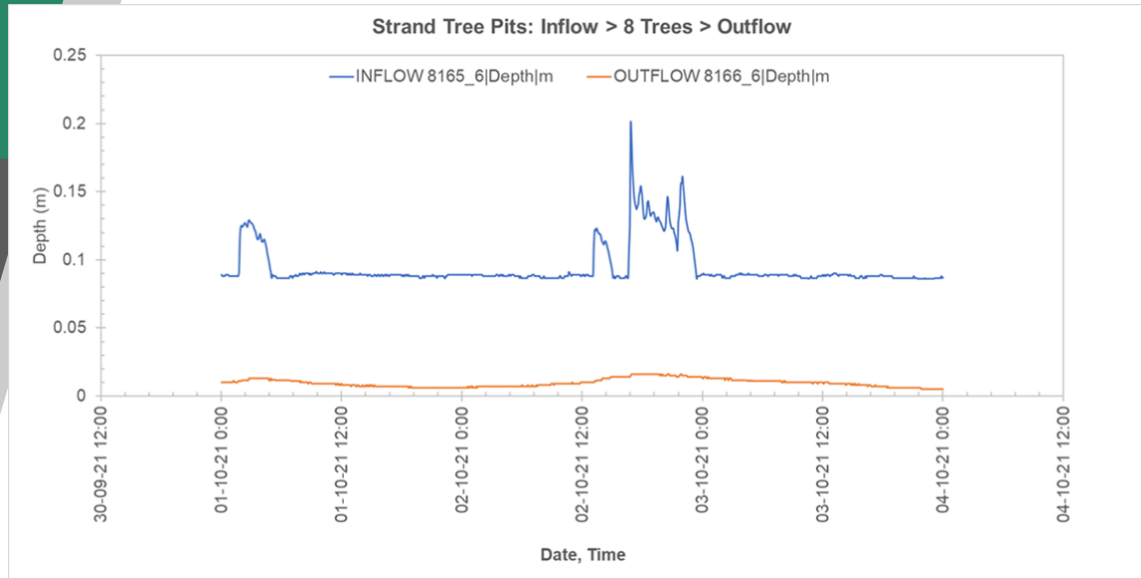
Includes soil sensors

Expected benefits:

- Slow the flow
- Reduce final discharge volume
- Improve discharge water quality
- Add shade/cooling/biodiversity
- Filter trees for air quality



Data from 8 tree pits and soil sensors



Ecosystem island - Sefton Park Lake



Freshwater location
Recycled material
Netting to deter larger birds
Many visitors
Adopted by Friends Group
Inspired other projects
Cost c. €6,400 (2020)
New habitat
Increase in pollinators
Improve water quality



Ecosystem island - Wapping Dock



- Pioneering design
- Saltwater dock location
- Recycled materials
- Anchored in sheltered place
- Many visitors and global interest
- Cost c. €95,600 (2020)
- Licence and permissions required
- Initial resident objection



Ecosystem design features above the water line

High buoyancy planter



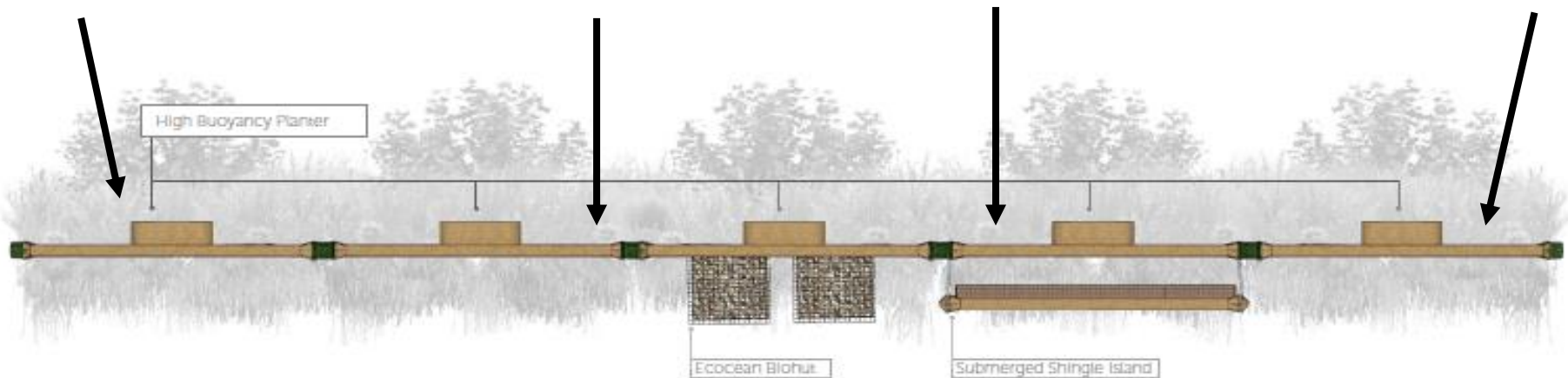
Mixed planting



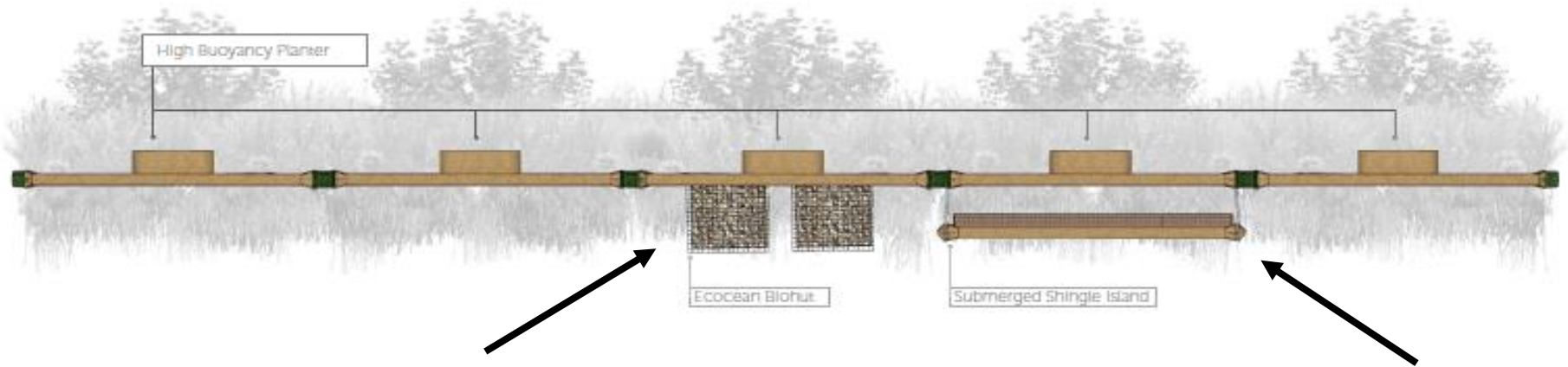
Rainwater catchment planters



Lightweight leca




Ecosystem design features below the water line



Submerged reef structure



Submerged shingle shelf



Island evolution above the water line

Summer 2020

23 original species

Summer 2021

16 original species remain

7 species lost

17 new species

(wind blown and local)

Island evolution below the water line

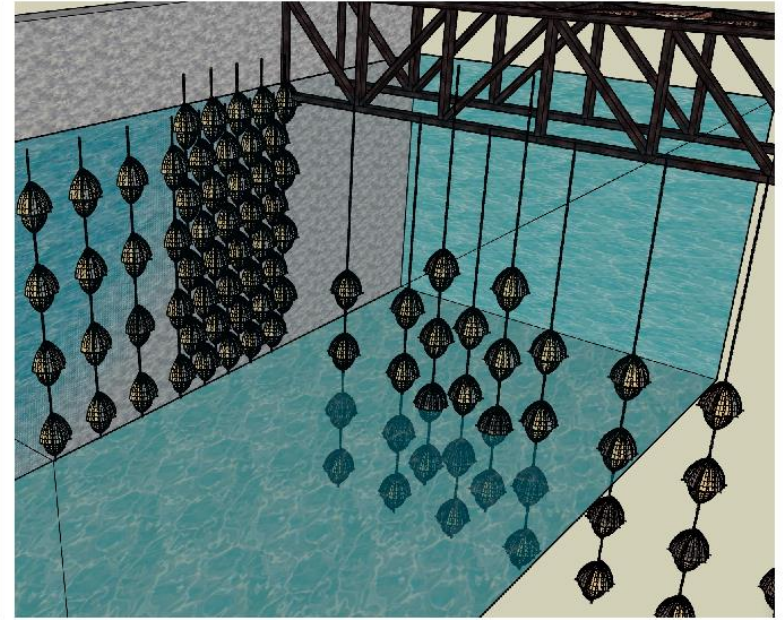
September 2020



March 2022



Island evolution next steps – Biomatrix Ltd





Top water retention pond - Otterspool



Problems included:

- Persistent flooding by the entrance (a low topographical spot)
- Overgrown and semi blocked inflow
- Narrow, straight, silted channel with fast flow under conditions of spate resulting in downstream flooding of the park and paths
- Low biodiversity and habitat value

Top water retention pond - Otterspool



Improvements included:

- Additional drainage grids back into the top pond
- Clearing the inflow, removing silt, widening and deepening the top pond for water retention and slowing the water flow
- New outflow
- Wildflower seeding on the banks and aquatic planting at the edges
- Introduction of bird and bat boxes



Lower water retention pond - Otterspool

Problems included:

- Persistent flooding of paths and access points
- Damage to paths from flood waters
- Permanent puddle in the park with boggy ground



Lower water retention pond Otterspool

Improvements included:

Creation of proper designated water retention pond with an overflow to estuary

Addition of viewing platform for educational groups and park users

Emergent aquatic vegetation and boggy species planting

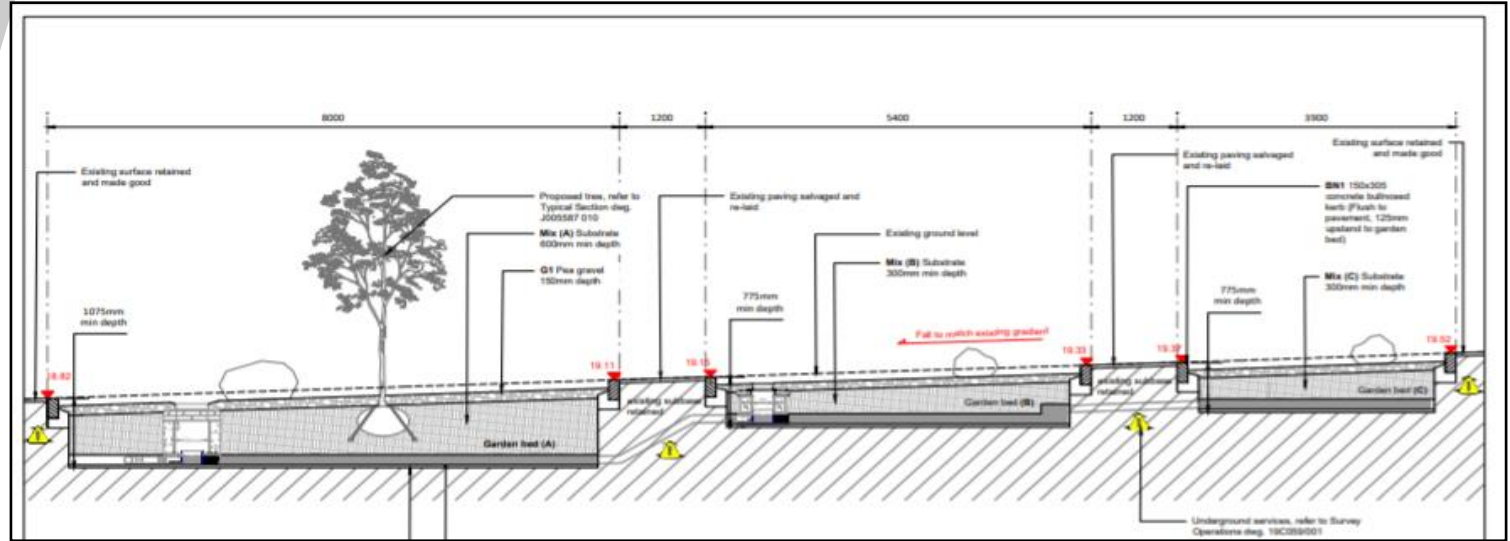
Woodland understory planting

New, wider pathways

Bird and bat boxes for biodiversity



Urban rain garden – in progress



3 rain garden beds with different substrate types (Compost/ horticulture grit/recycled aggregate)
Tree (Whitebeam Sorbus sp)
Soil moisture sensors in each bed

Testing:
Water storage capacity
Flow reduction halved (from 28.5l/s to 13.9l/s)
Water quality improvement
Substrate mixes, soil moisture, plant tolerances and pollinator species attracted.

Completion May 2022



Thank you

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