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CONTAMINATED SITES 2022

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*The activity has been implemented within the framework of national project
Information and providing advice on improving the quality of environment in Slovakia.
The project is cofinanced by Cohesion Fund of the EU under Operational programme Quality of Environment.*

Soil and Sediment Capping with Active Geocomposites

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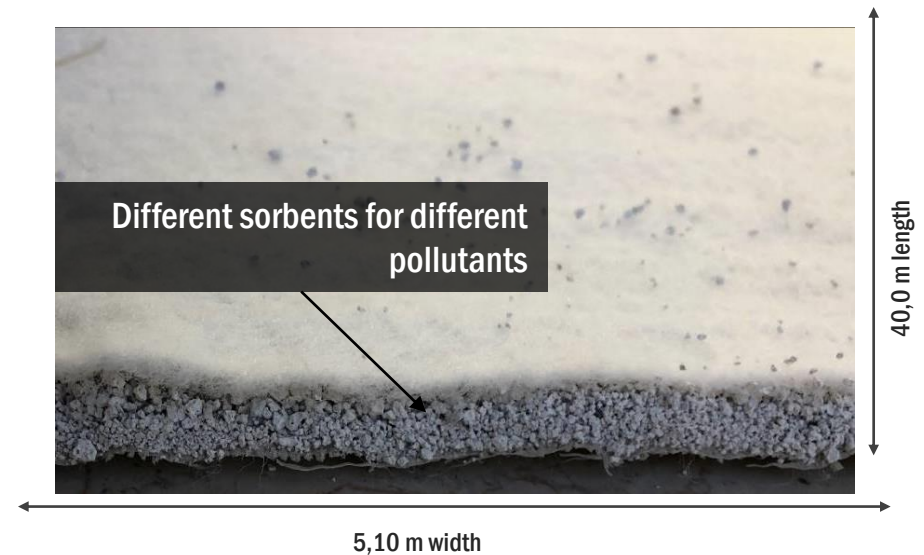
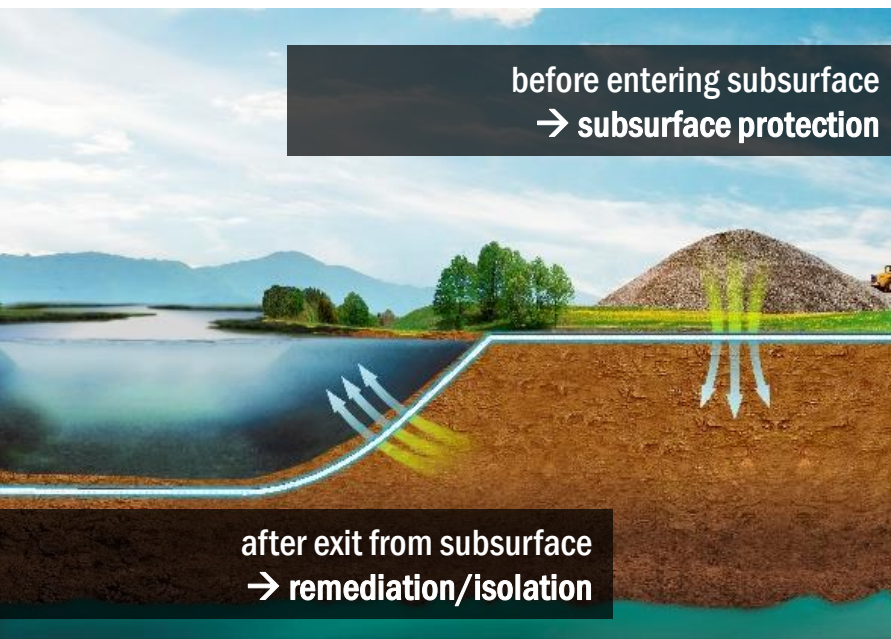
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Capping = Interrupting exposure pathways

... with geotextiles and sorbents

- # Active Geocomposites = permeable contaminant barriers
- # Barrier to the pollutants not to the water or vapor
- # Effective where contaminants are spread over wide area (diffuse sources)



Subsurface protection



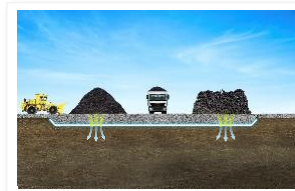
Construction sites



Infiltration trenches



Infiltration ponds



Storage yards



Earth structures

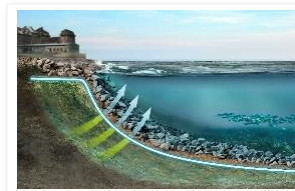
Remediation/Isolation



Oil curtains



Brownfields

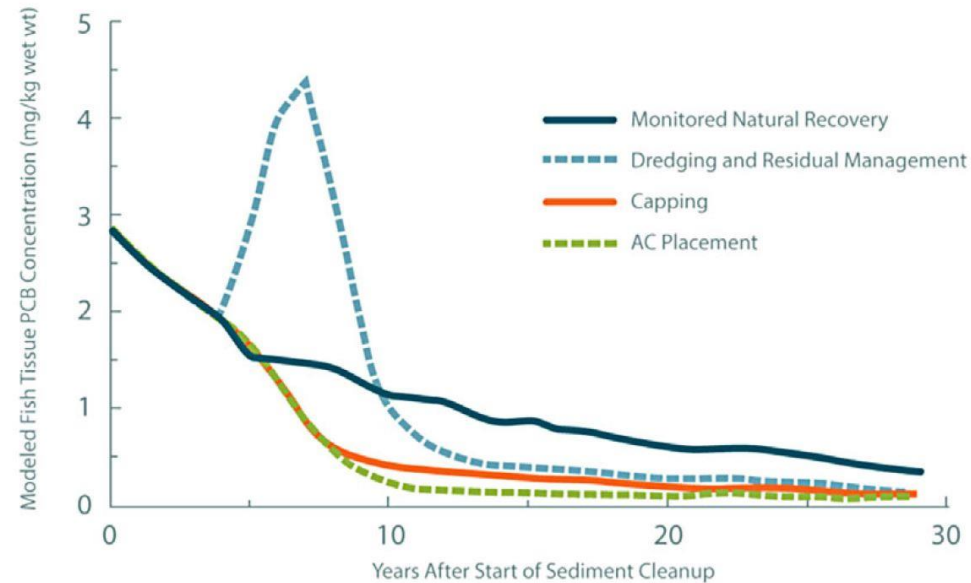
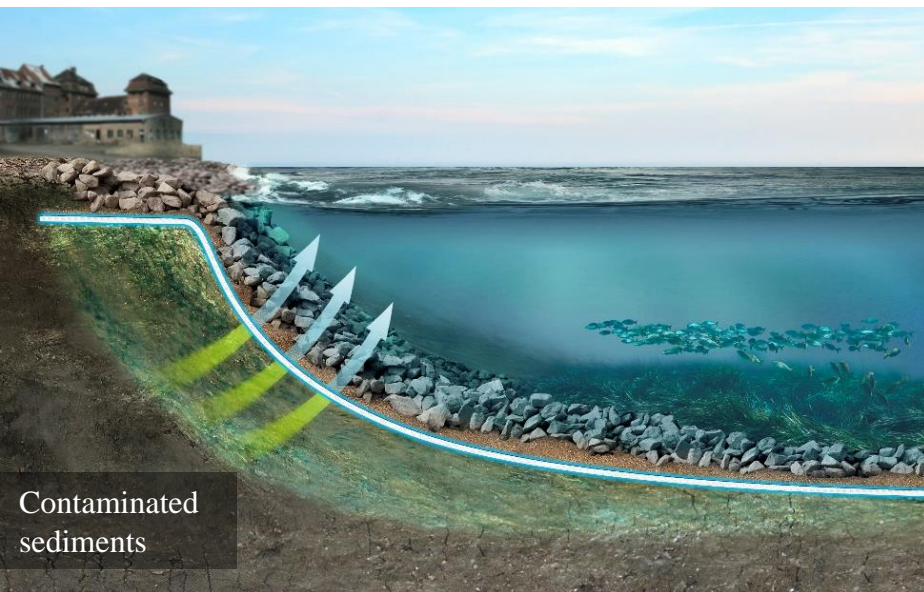


Subaqueous sites

Subaqueous Sediment Capping

Contaminants in pore water

- # Cap isolates contaminated sediments but is permeable to groundwater
- # Allows immediate contaminant reduction and only gentle interference to the environment

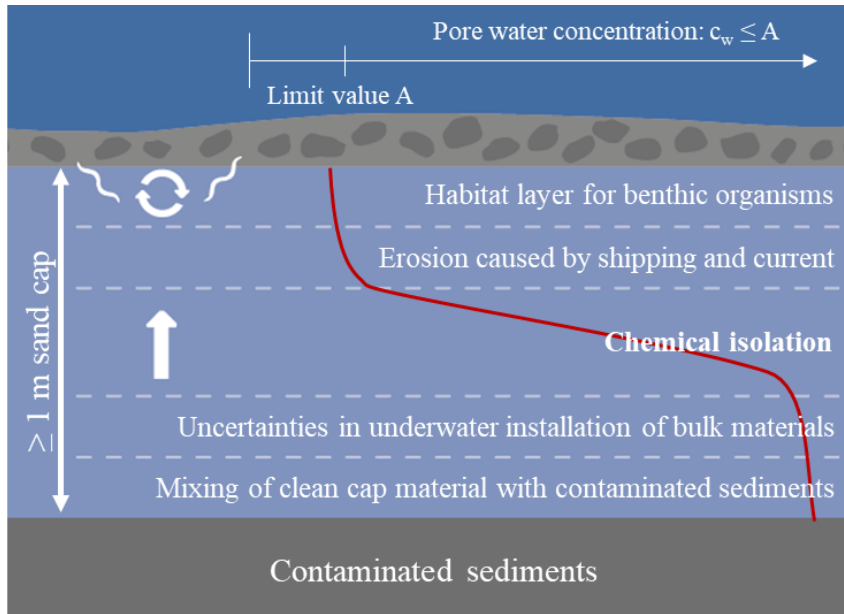


Patmont et. al, 2014

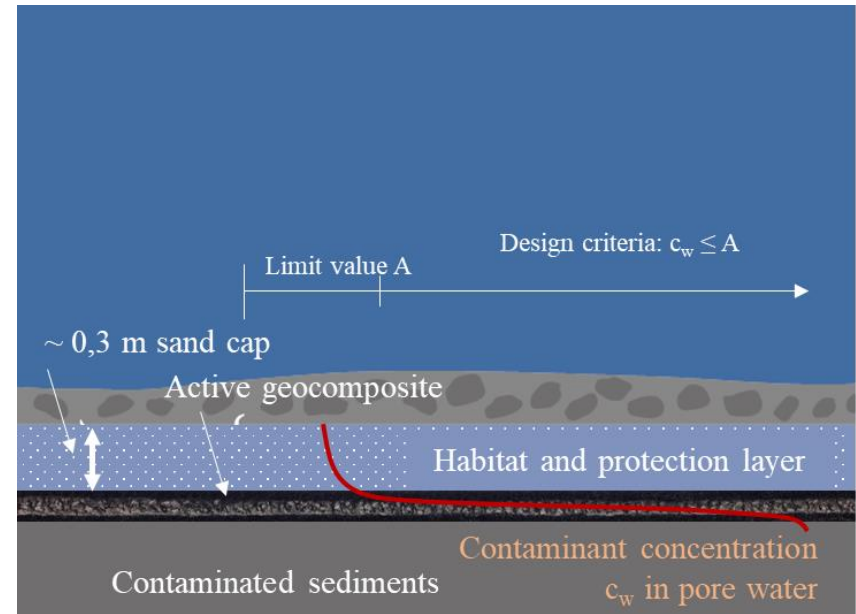
Subaqueous Sediment Capping

Conventional Cap vs. Active Cap

- # Sorbents strongly improve chemical isolation compared to sand
- # Geotextiles reduce uncertainties
- # Technical guidelines are available in USA and Norway



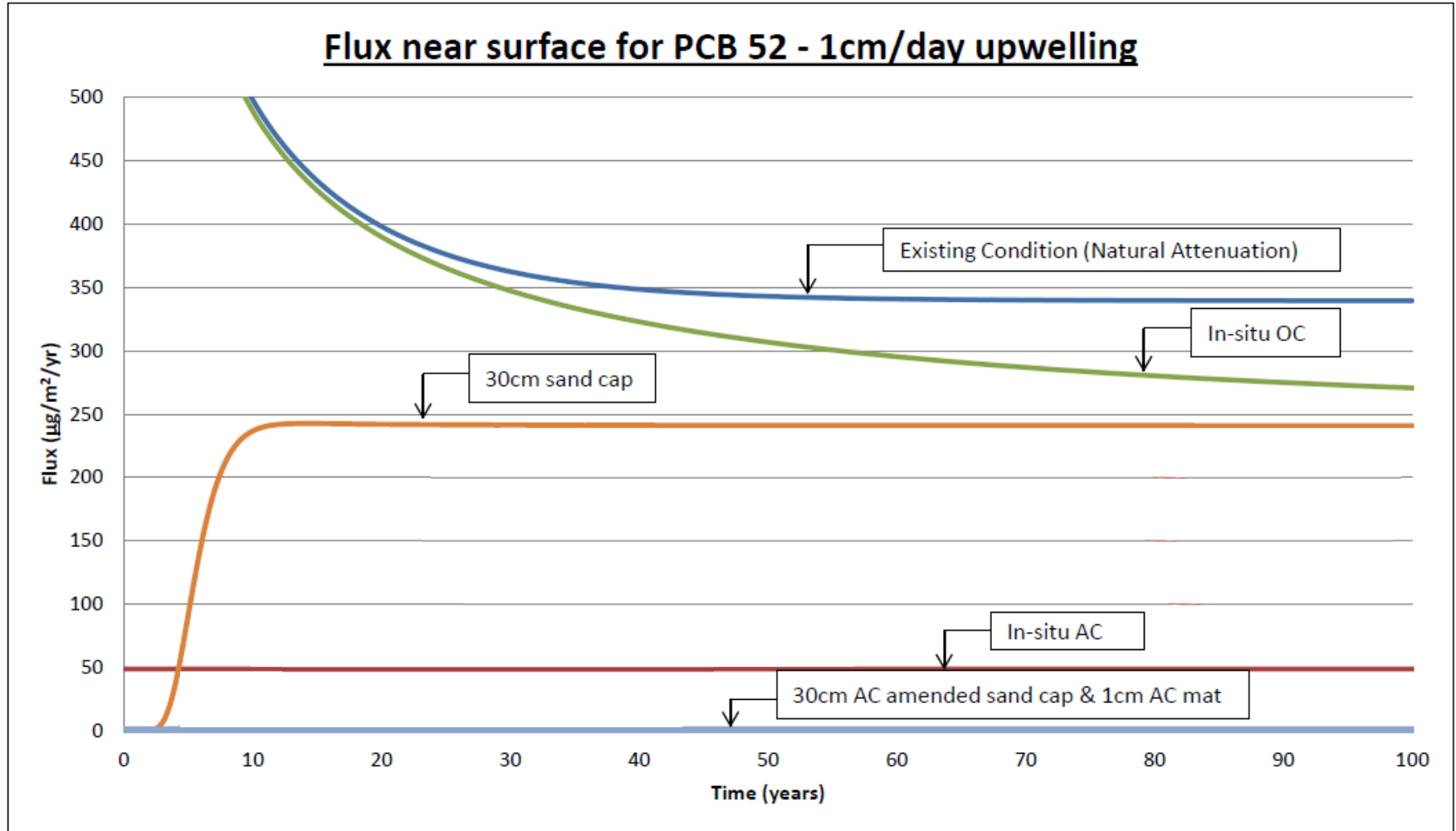
≥ 1 m of sand



30 cm of sand + 1 cm Active Geocomposite

Subaqueous Sediment Capping

Flux simulation





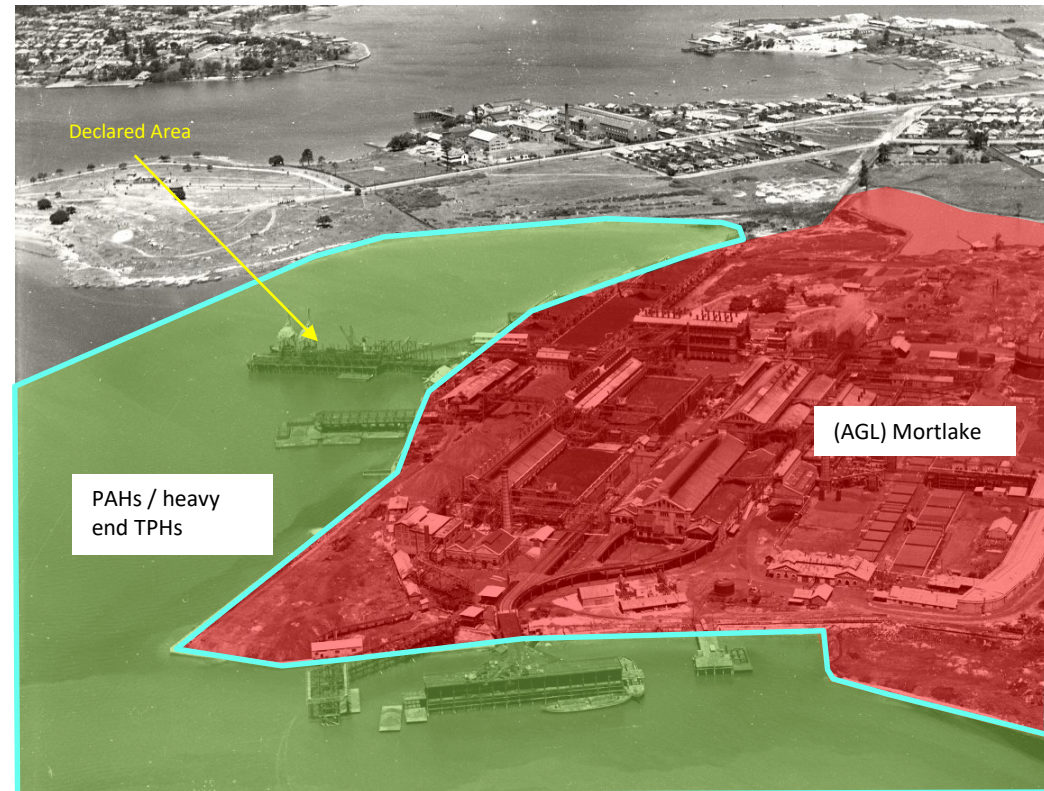
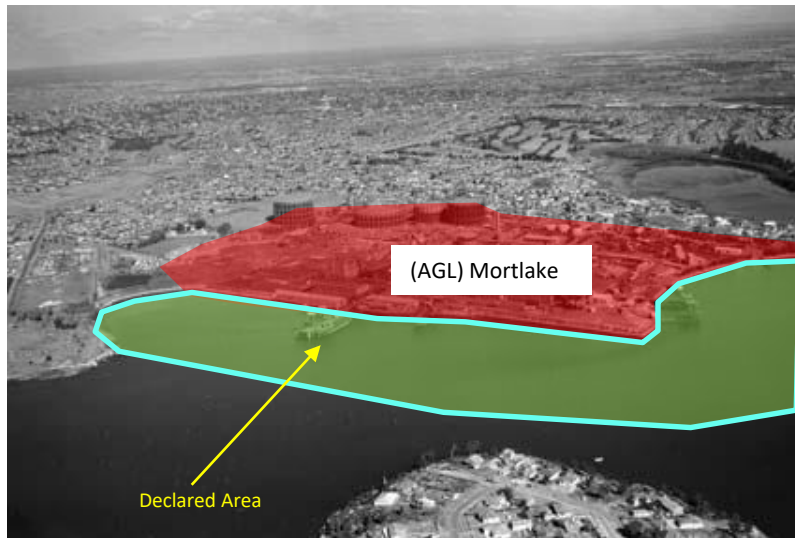
Kendall Bay Sediment Capping

Photo: HUESKER Australia Pty Ltd

Kendall Bay, Sydney 2020

History of the site

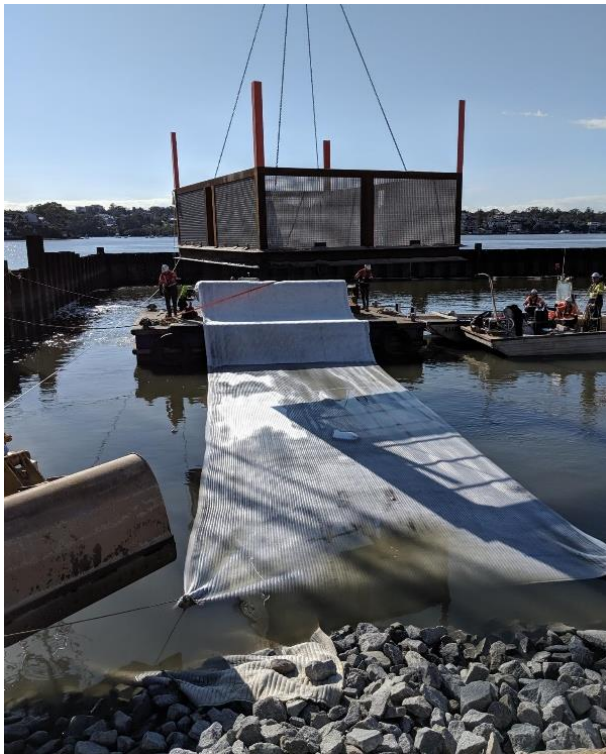
- # Bay was used for loading and unloading of coal and other materials
- # High concentration of PAHs and TPHs in sediments



Kendall Bay, Sydney 2020

Remediation works

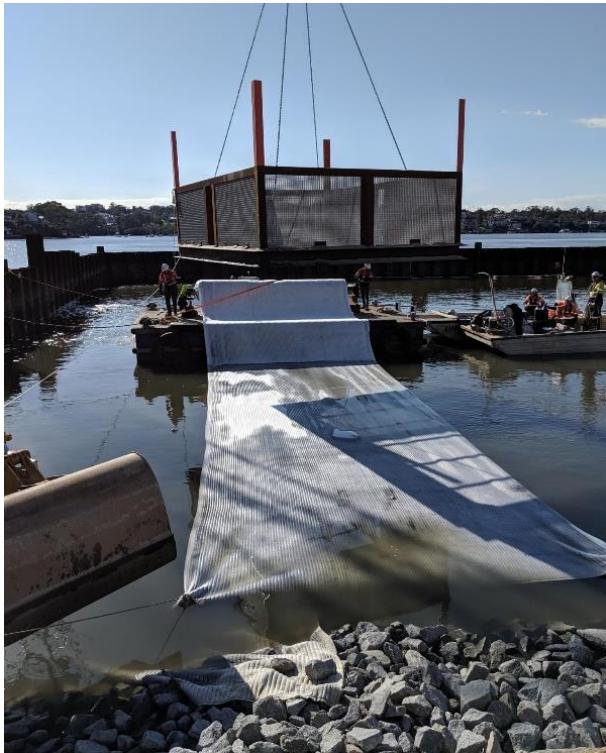
- # Geocomposite filled with 3.4 kg/m² activated carbon



Kendall Bay, Sydney 2020

Remediation works

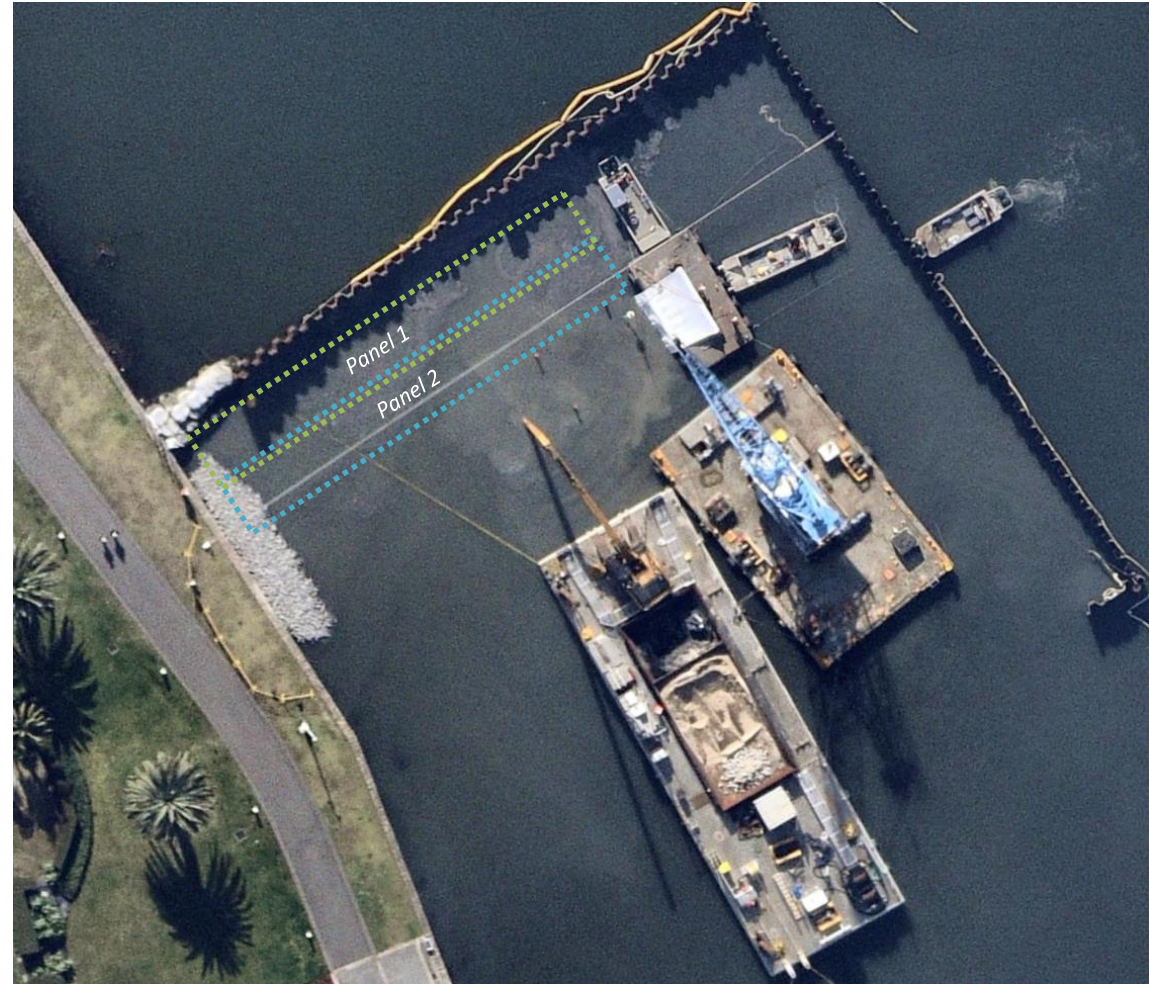
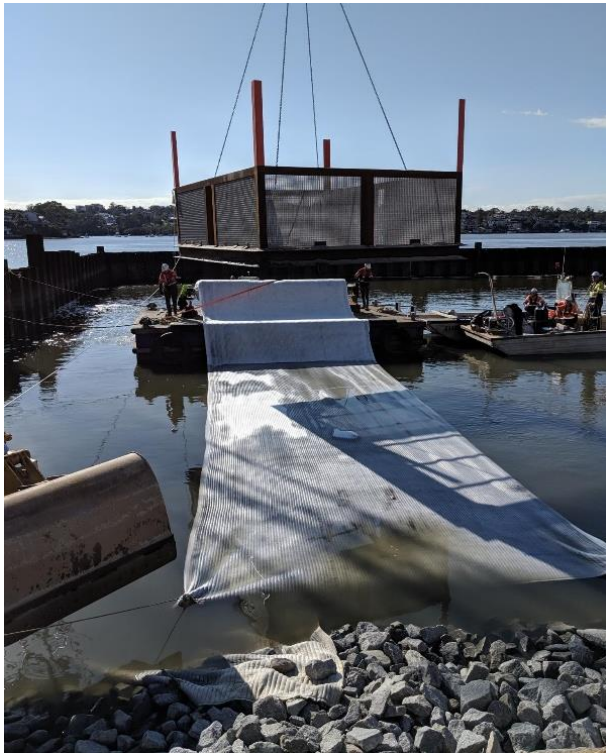
- # Installation of 1000 m² per week



Kendall Bay, Sydney 2020

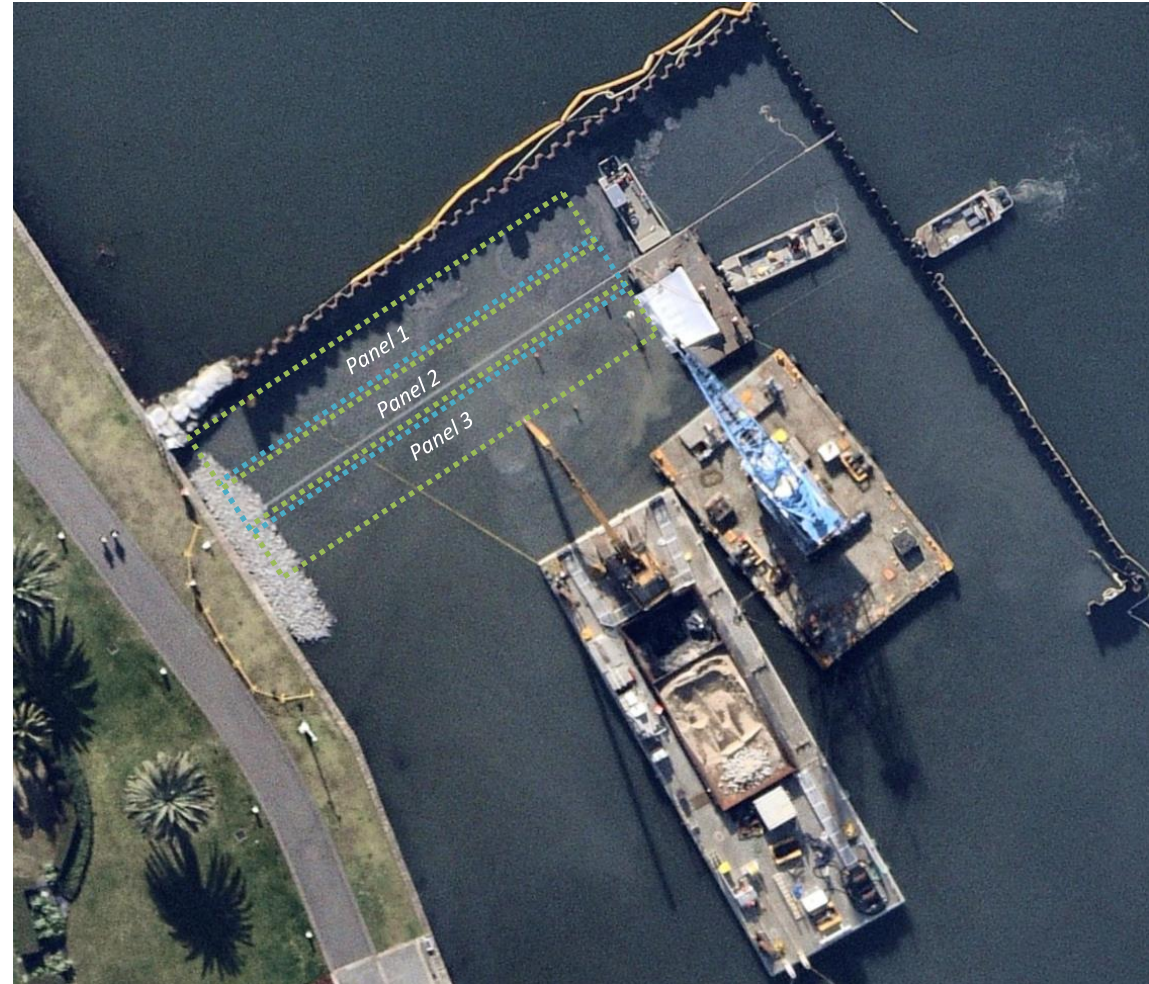
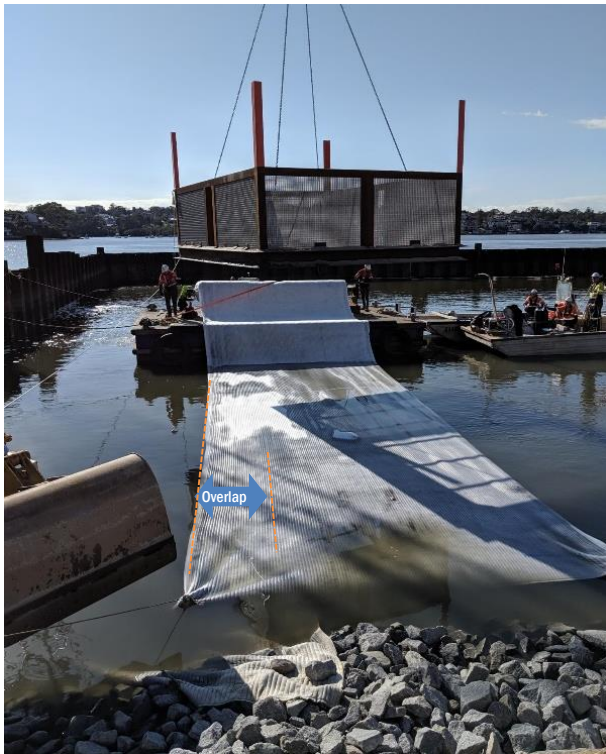
Remediation works

- # Installation of 1000 m² per week



Remediation works

- # Installation of 1000 m² per week



Contaminants in soil vapor

Permeable filter for reuse of brownfields

- # Useful when contaminant leaching to groundwater is not concerned
- # To minimize artificial changes in water table elevation
- # Where soil moisture is needed to sustain bioremediation
- # Where it is acceptable for vapors to diffuse to the atmosphere



Soil Capping

Contaminants in soil vapor

- # **Impermeable** diffusion barrier for sites not suitable for permeable solutions
 - # Where contaminants present in the unsaturated zone are likely to be mobilized by infiltrating precipitation and impact groundwater
 - # Vapor capture is desirable (e.g. increased effort for methane collection)
 - # Release of vapors to the atmosphere is not acceptable



- # Drainage geocomposite
- # Geomembrane with e.g. aluminium or EvOH core
- # Active Geocomposite

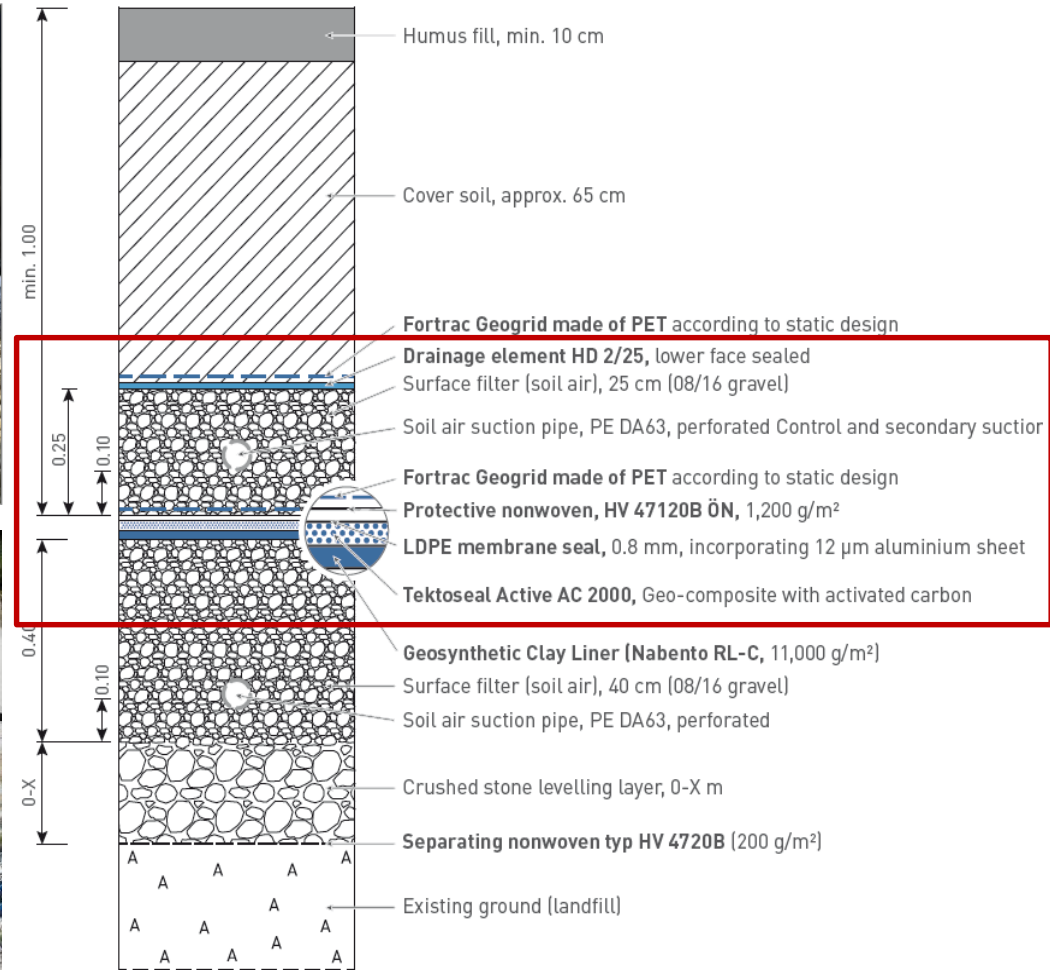


History of the site

- # Filled between 1926 and 1981 with
 - # Blue Chalk (By-Product from Acetylene Synthesis)
 - # Ash, slag, Construction waste
 - # Mercury contaminated Waste
 - # Chlorinated Hydrocarbons (CHC) containing sludge and filter cakes
- # In 2012/13 remediation by thermal treatment in a rotary furnace of a cement plant started
- # In 2014 hexachlorobenzene was detected in locally produced food in proximity to cement plant → excavation and treatment stopped
- # Result of another pan-Europe tender: **no procedure with continued clearance offers legal, technical, temporal or financial security**
→ Need for site capping

K20 Brownfield, Austria 2018

Sealing system with active Geocomposite



K20 Brownfield, Austria 2018

Site impressions

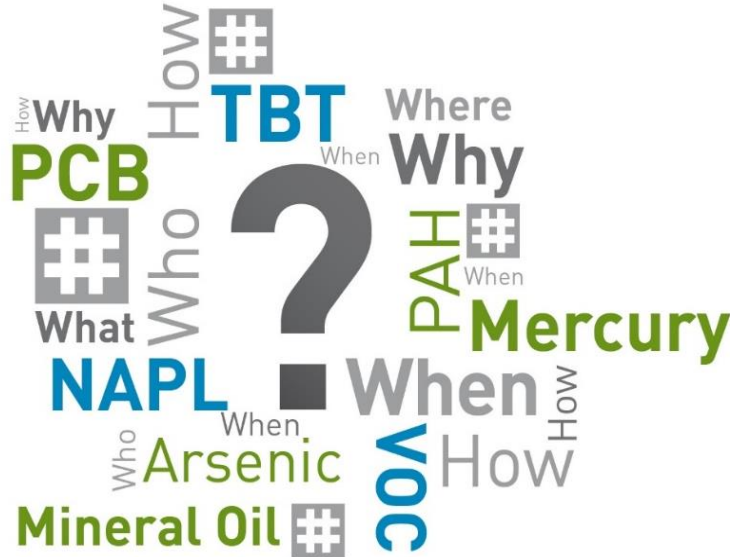


Questions



HUESKER

Ideas. Engineers. Innovations.



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