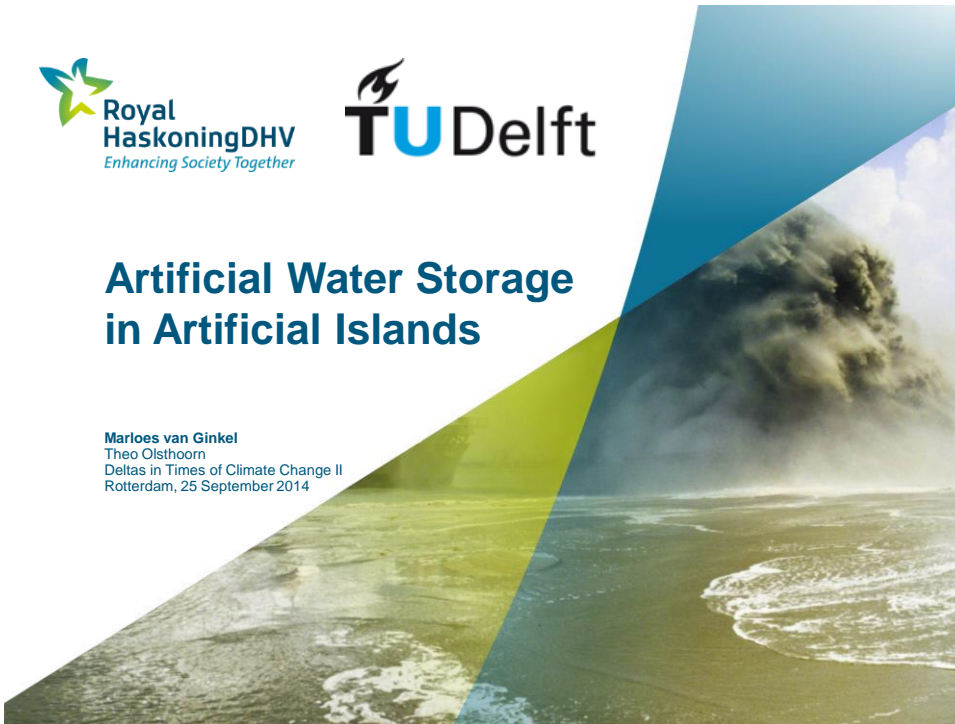


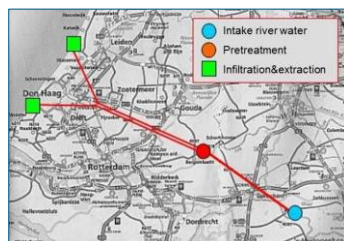
Artificial Water Storage in Artificial Islands

Marloes van Ginkel
 Theo Olsthoorn
 Deltas in Times of Climate Change II
 Rotterdam, 25 September 2014



Artificial Subsurface Water Storage

- ASR
 - Aquifer Storage Recovery
- MAR
 - Managed Aquifer Recharge



Water Storage

- Seasonal storage
- Long-term storage
- Emergency storage
- Reclaimed water storage for reuse



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Subsurface Storage Pros

- Multifunctional use of the area
 - large space available
 - land requirements are minimal
- Advantages for water quality
 - Constant temperature, absence of sunlight heating and evaporation losses
 - No mosquitoes or algal bloom
 - Potential bacteriological purification and equalisation of the water quality

Requirements:

- *Water*
- *Sandy soil*
- *Wells*



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Artificial Islands



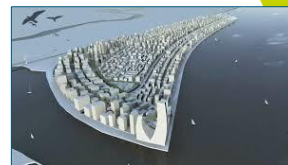
Palm Jumeirah
Dubai



Maasvlakte II
Rotterdam



Eko Atlantic
Lagos



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Artificial Islands

- Constructed of sand
- Designed from scratch
- High water demands
- Limited freshwater resources
- High land prices



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Water Demand



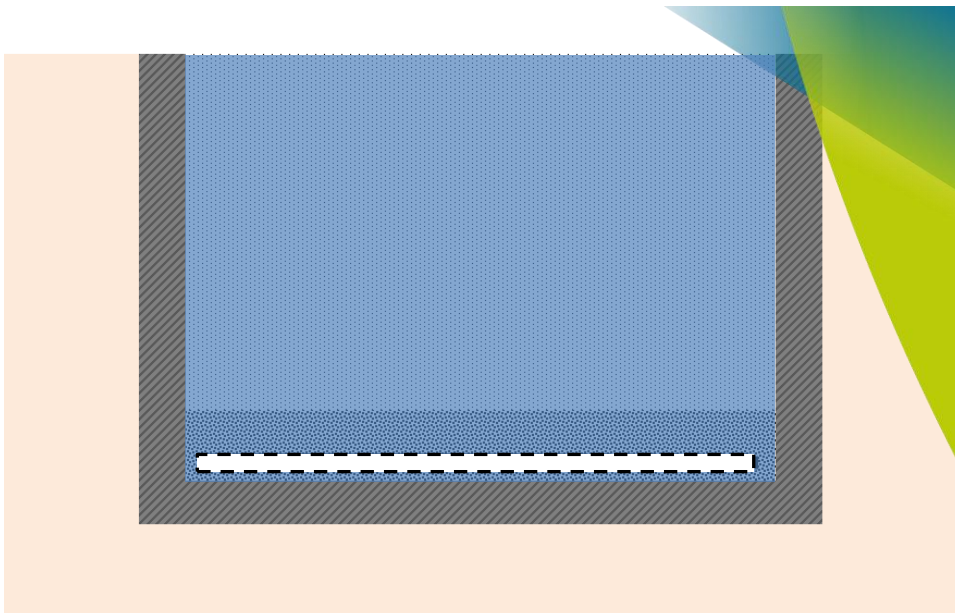
Water Supply

- Pipeline from the Main Land
- Seawater desalination
- Rainwater Harvesting
- Reuse

Construction from Scratch

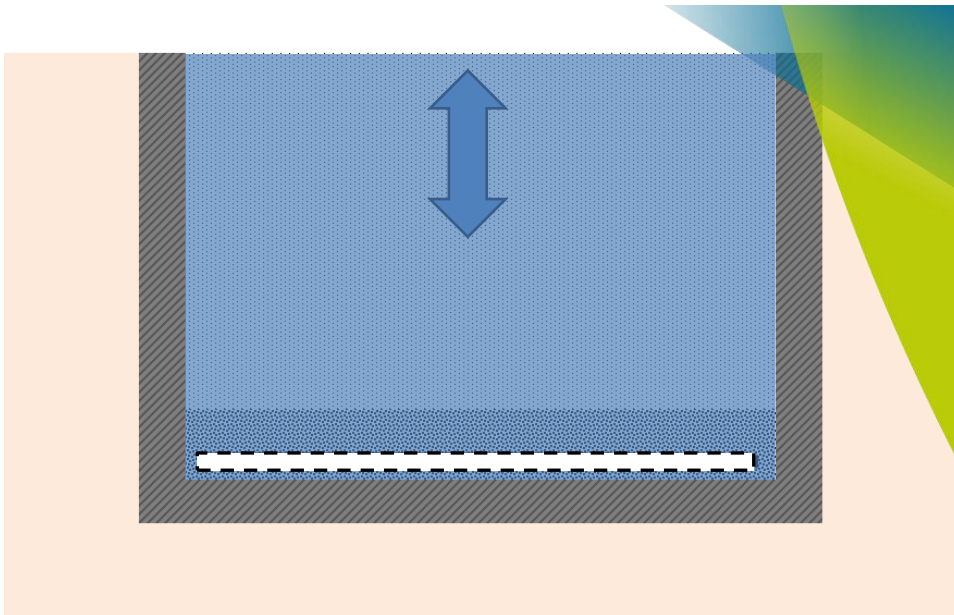


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Closed system

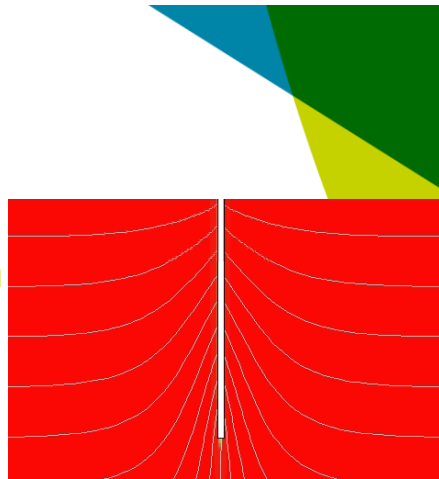
- Clogging of filter bed and drainage pipe
- Maintenance is difficult
- Seepage pollutes the system



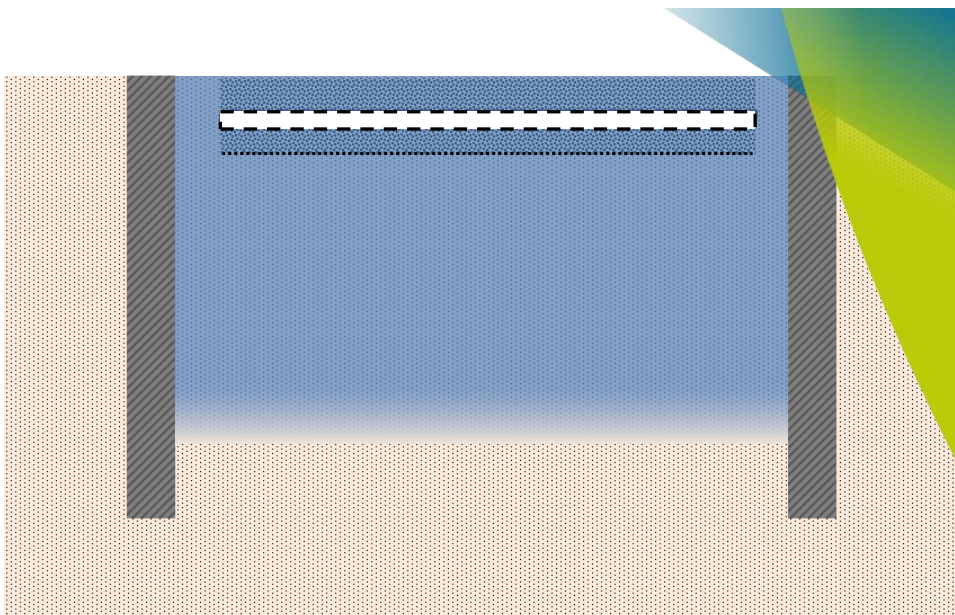
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Partly open system

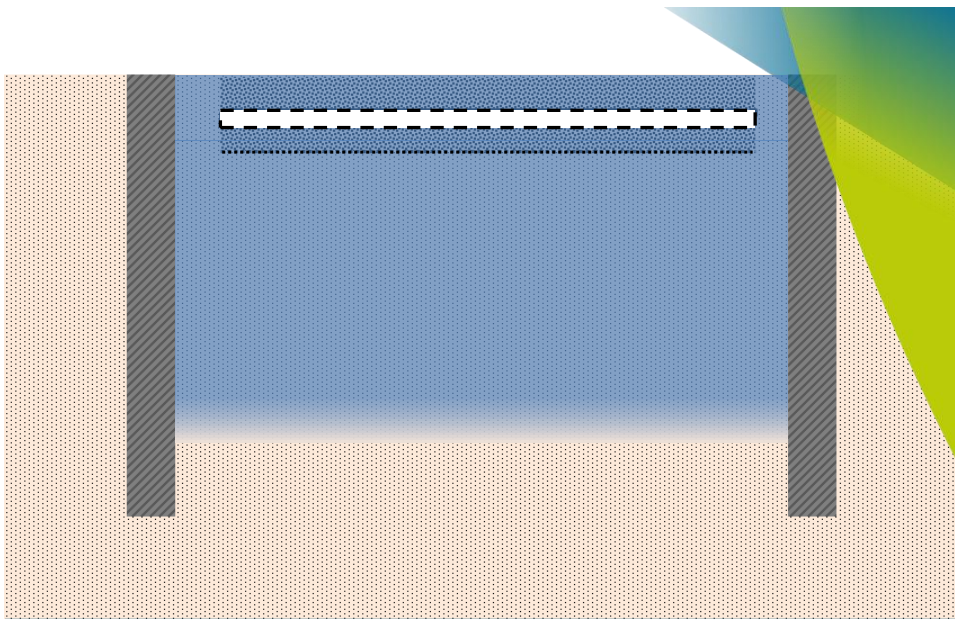
- Prevention of aerobic conditions
- Regular flushing
- Mixing
 - Limit mixing with a homogeneous soil
- Density stratification
 - Limit spreading with walls
 - Limit buoyancy by layering



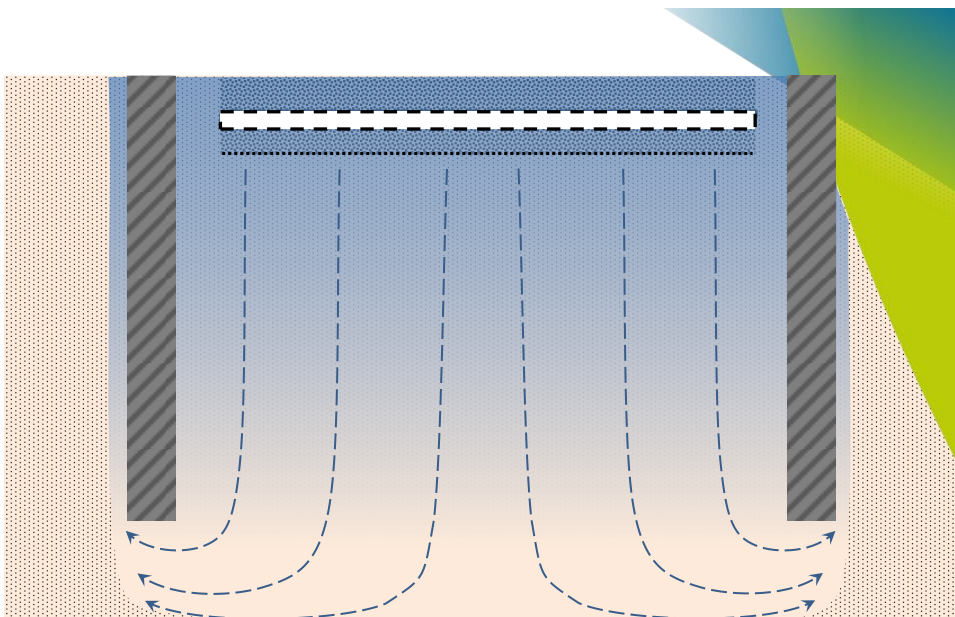
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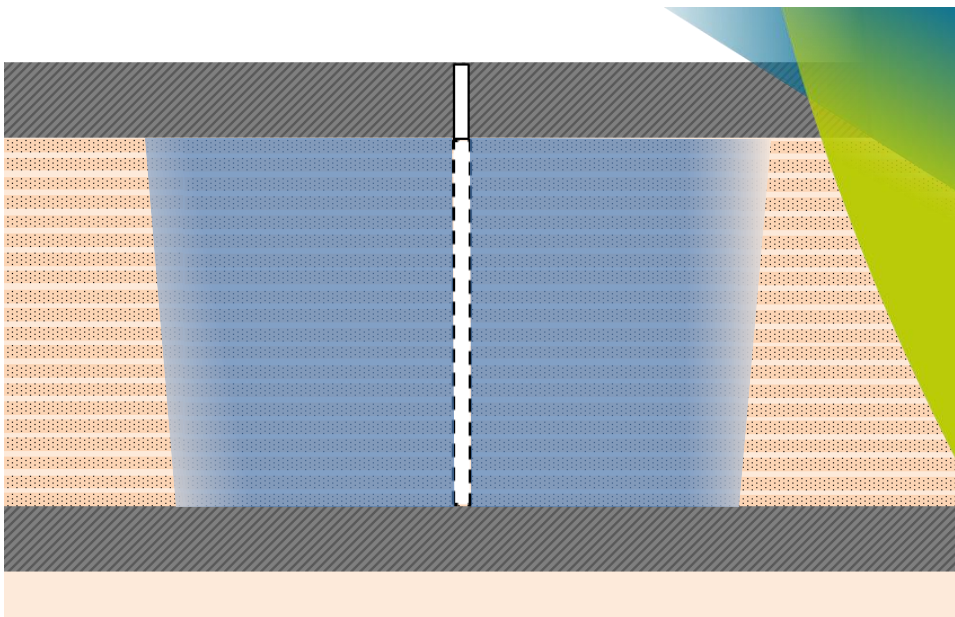


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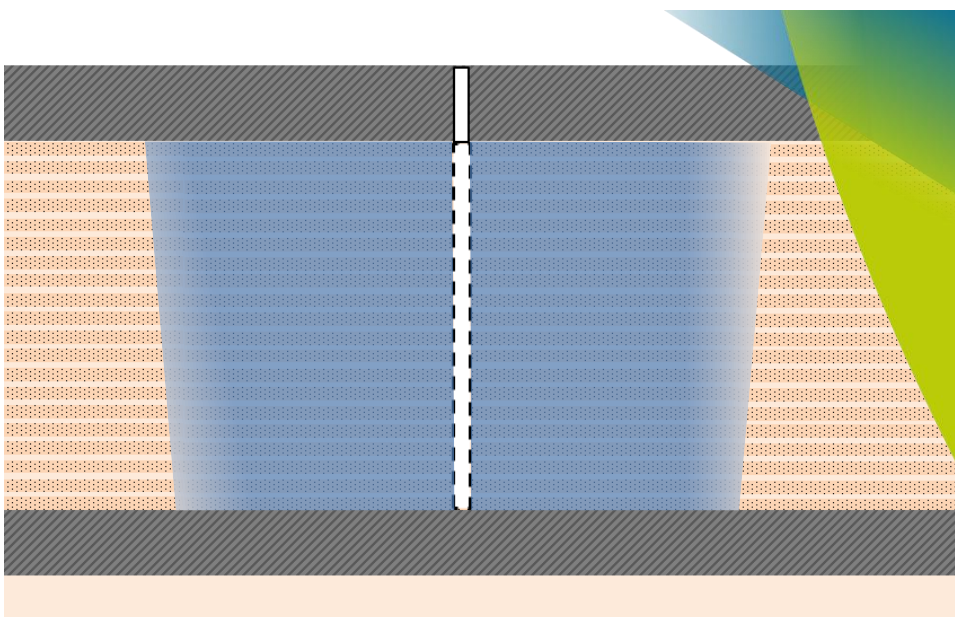


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Take Home Messages

- Artificial islands provide opportunities for water storage
- Building with nature to create optimal storage conditions

Contact me for more information
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Or visit our stand



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