New pilots of stormwater treatment solutions

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TAL TECH SCHOOL OF ENGINEERING URBAN WATER SYSTEMS

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Storm Water Systems in the Context of Climate Change Adaptation, November 9-10, 2022, Viimsi

Objective

- Improve stormwater management around the Baltic Sea
- Develop and test **new stormwater treatment solutions**
    - Clean & retain stormwater
    - Monitor water quality in real time

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VIIMSI VALD

KTH VETENSKAP OCH KONST

TAL TECH
DEPARTMENT OF CIVIL ENGINEERING AND ARCHITECTURE

TURKU

LIETO

RIGA CITY COUNCIL

TURKU AMK
TURKU UNIVERSITY OF APPLIED SCIENCES

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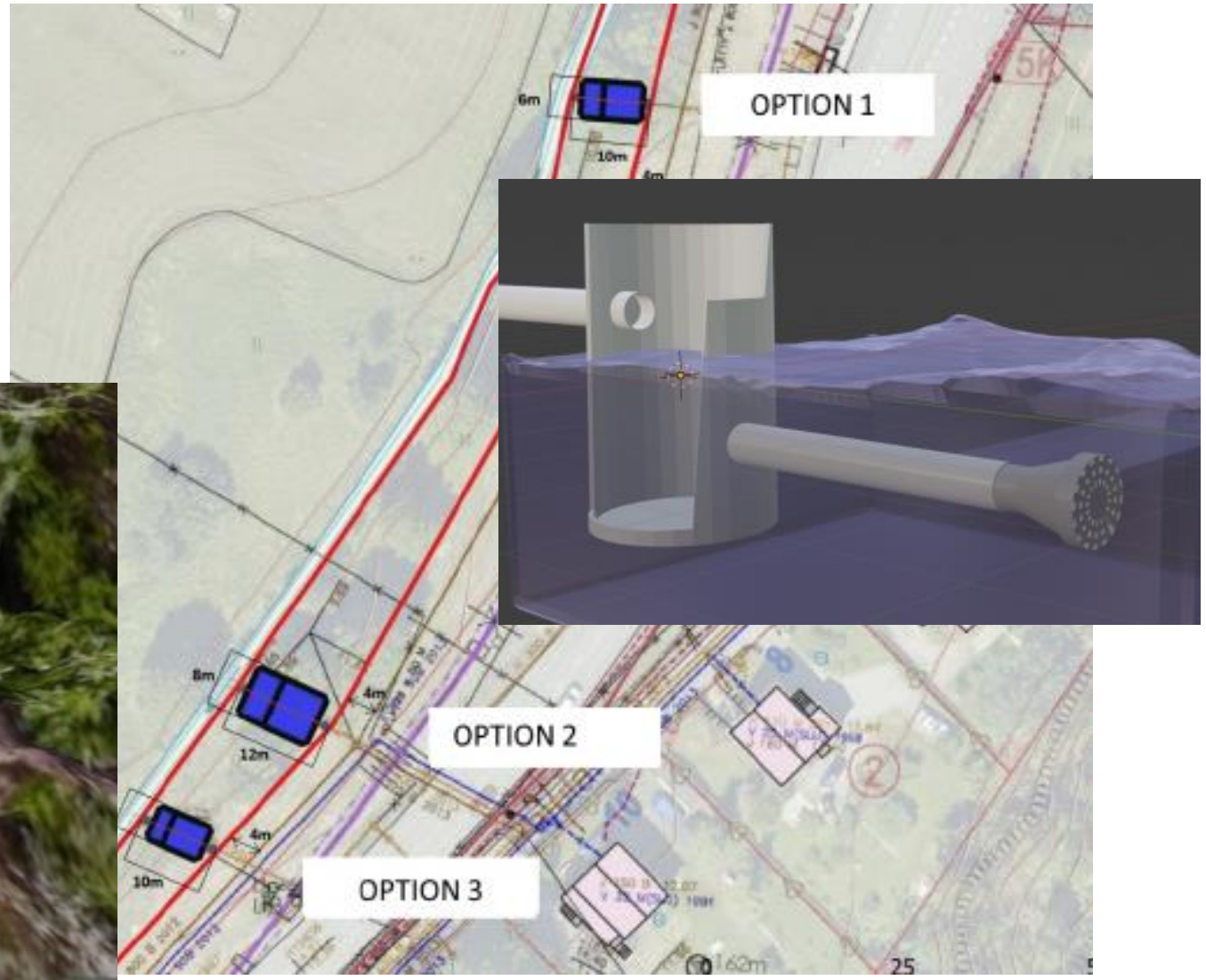
From ideas to pilots

- Driven by academies
- Site and technology selection



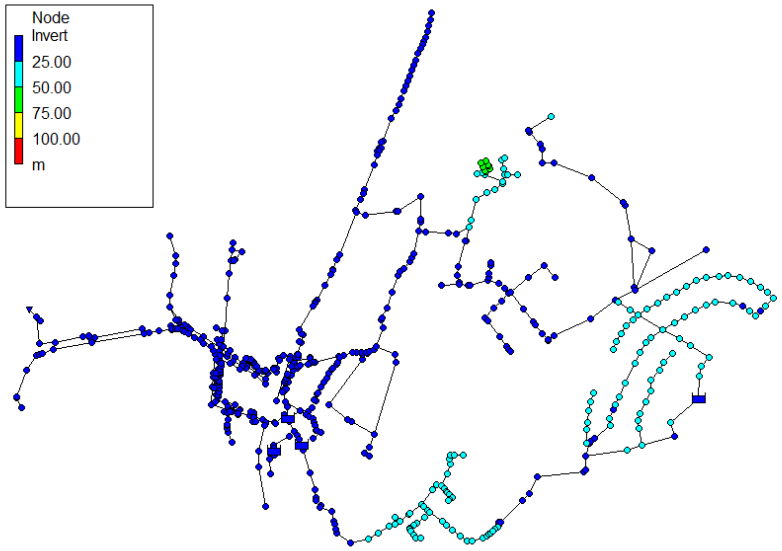
Surveys and investigations

—Water quality analysis

—Geodetic surveys

—Flow measurements

—Modelling



And then it started

—Brainstorming ca 1 year

—Design 1 year

—Construction 1 year

—Implementation was driven by

… municipalities (Riga, Viimsi)

… or academies (Turku)

Pilot sites

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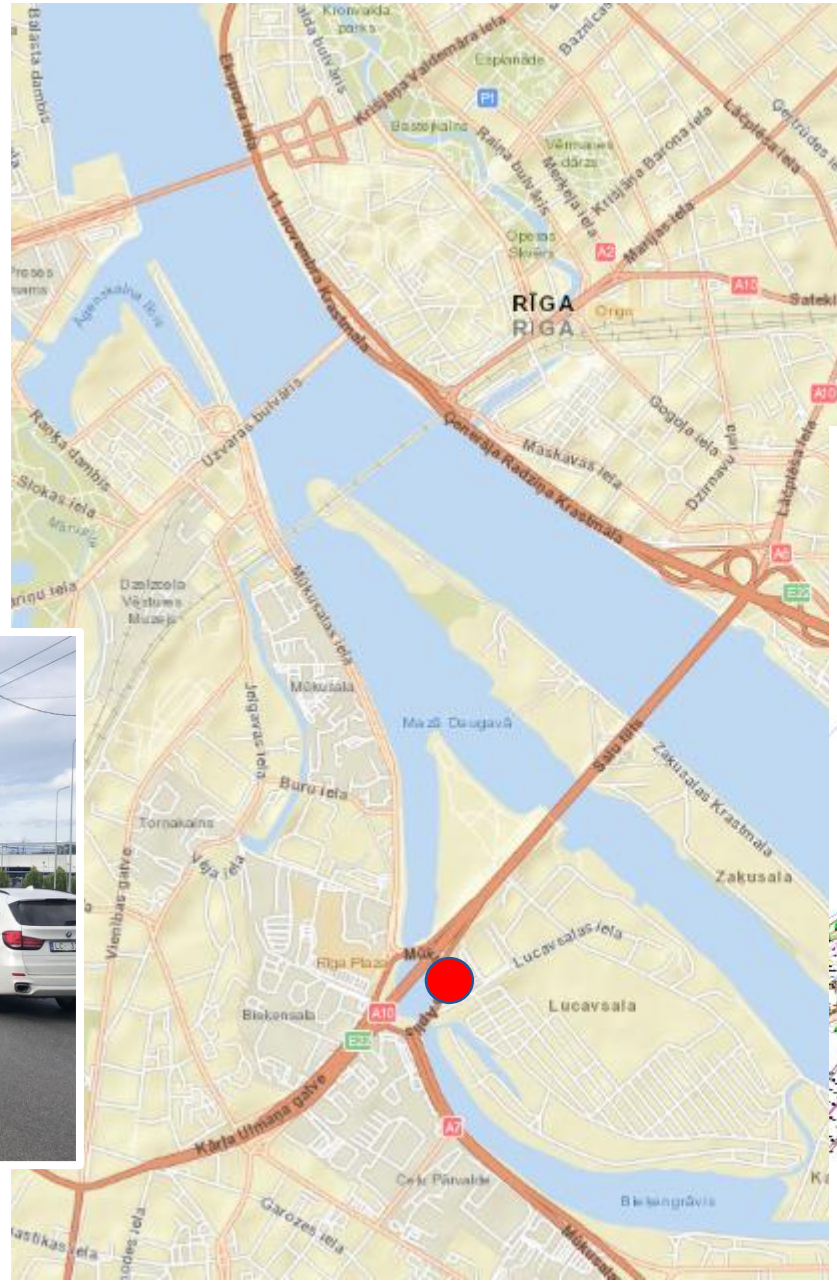
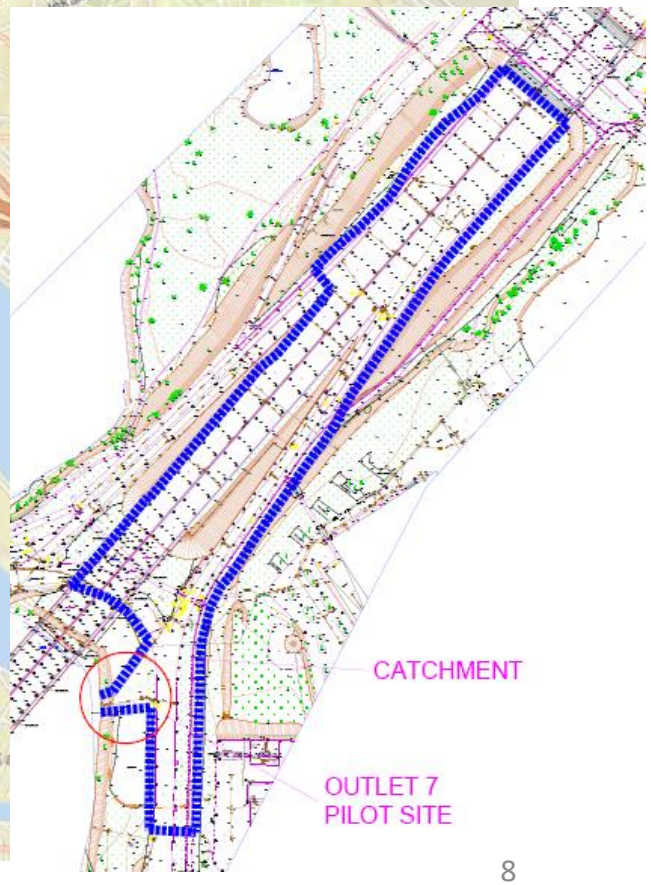
Riga – Lucavsala island

—Catchment 1.9ha

—Runoff from roads

—Direct outflow to Daugava

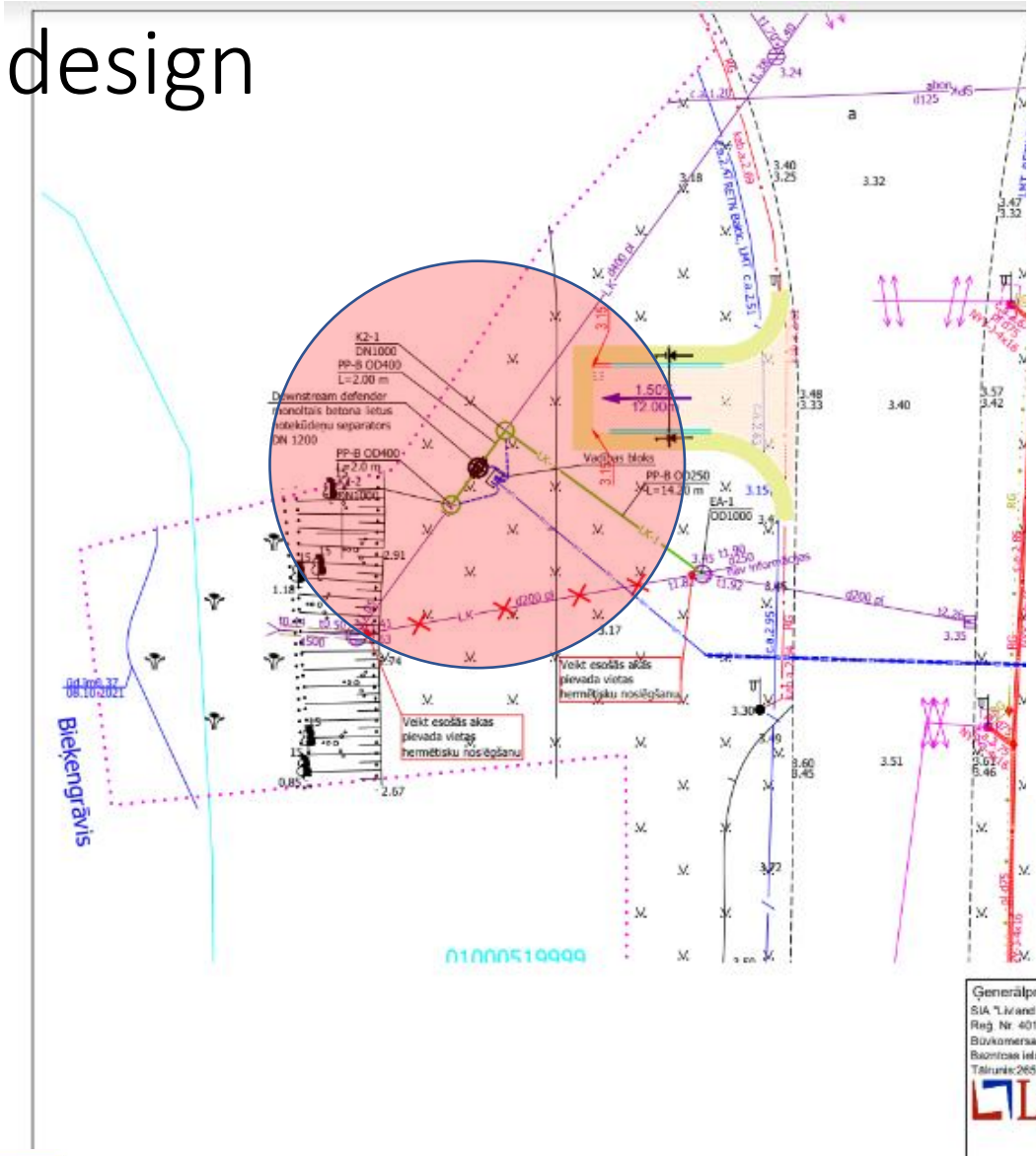


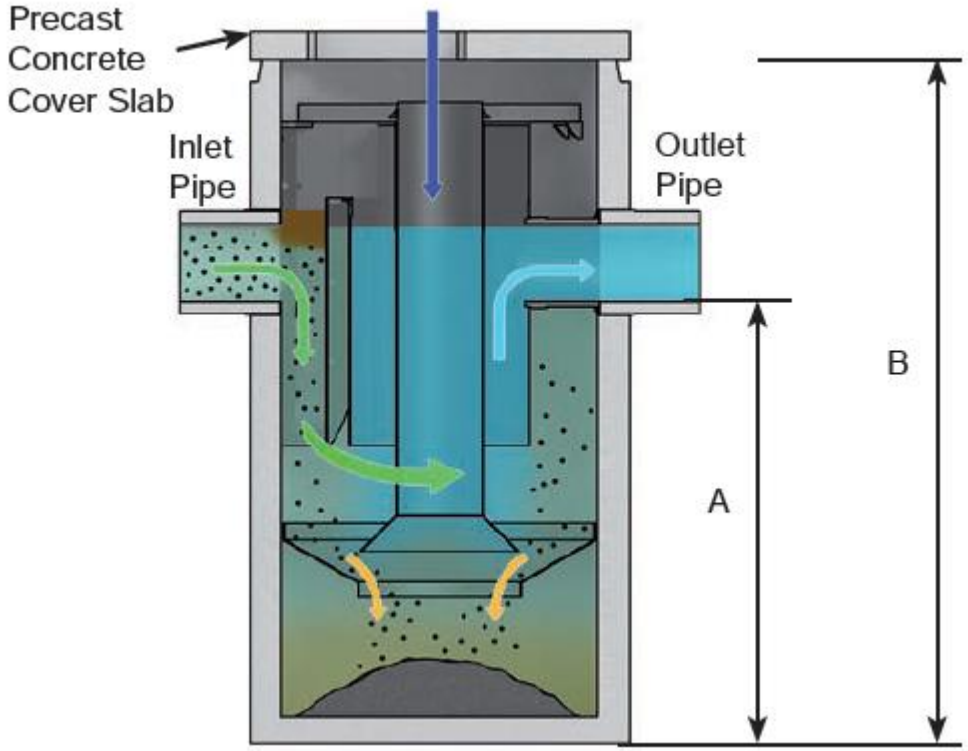


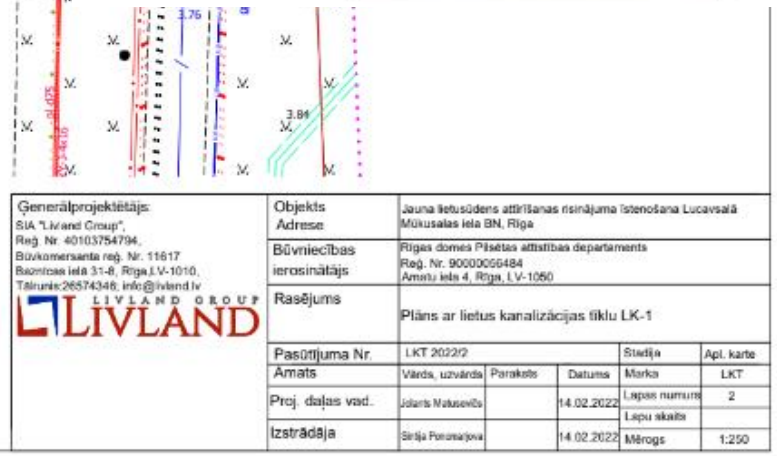
Riga – Lucavsala island

- Limited space
- Intervene existing system
- Rapid runoff

Riga – design







Ģenerālprojektētājs: SIA "Livland Group", Reģ. Nr. 40103754794, Būvkomersanta reģ. Nr. 11617 Baznīcas iela 31-8, Rīga,LV-1010, Tālrunis:26574346, info@livland.lv LIVLAND GROUP LIVLAND	Objekts Adrese	Jauna lietusūdens attīrīšanas risinājuma īstenošana Lucavsalā Mūkusalas iela BN, Rīga			
	Būvniecības ierosinātājs	Rīgas domes Pilsētas attīstības departaments Reģ. Nr. 90000056484 Amatu iela 4, Rīga, LV-1050			
	Rasējums	Plāns ar lietus kanalizācijas tīklu LK-1			
	Pasūtījuma Nr.	LKT 2022/2		Stadija	Apl. karte
	Amats	Vārds, uzvārds	Paraksts	Datums	Marka	LKT
	Proj. daļas vad.	Jānis Malusevičs		14.02.2022	Lapas numurs	2
					Lapu skaits	
	Izstrādāja	Sintija Ponomarjova		14.02.2022	Mērogs	1:250

Riga – construction

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Riga – final site

Design – 23,000 EUR

Construction – 113,000 EUR

E-monitoring – 10,000 EUR

Other – 13,000 EUR

<u>TOTAL 160,000 EUR</u>

Utö – constructed wetlands

Södra Fladen & Byviken
Forest areas 250 ha and 300 ha

https://scandinavianmind.com/feature/iniativ-uto-wants-to-save-the-baltic-sea-with-wetlands

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Utö – constructed wetlands

Södra Fladen 3 ha (2015) – 91k EUR
Byviken 1,5 ha (2021) – 88k EUR

Northern pike

wikipedia

Turku and Avanti - bioretention cells

Nature based stormwater treatment

Turku

Catchment 0.9 ha

Road area with outlet to ditch

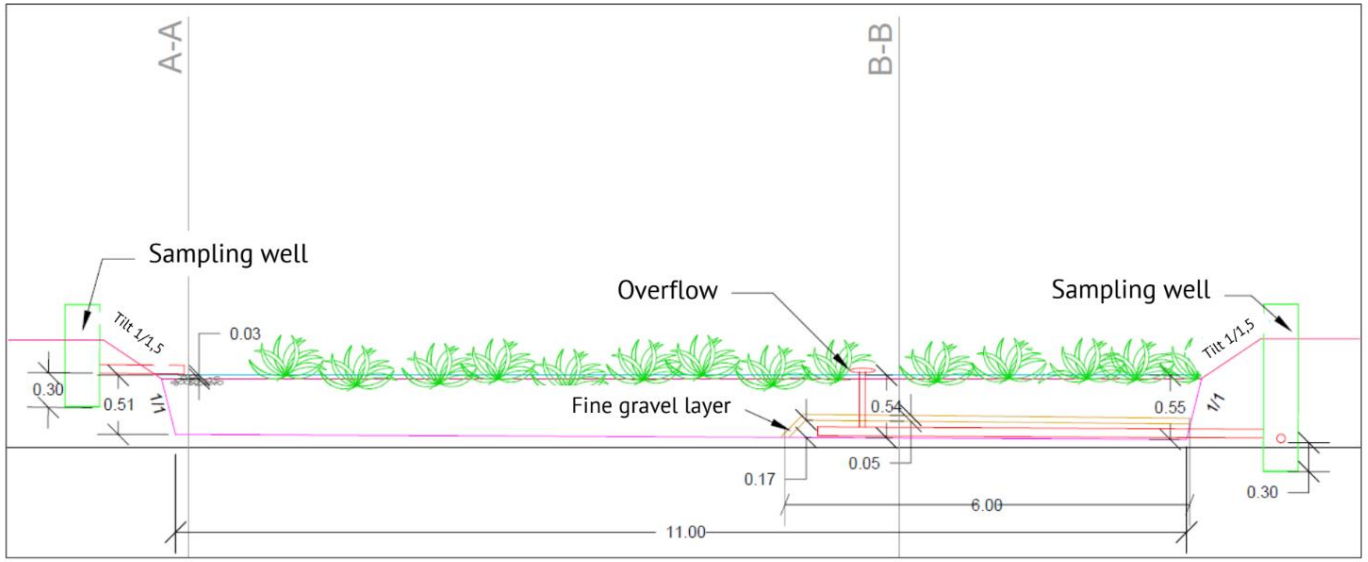
Avanti

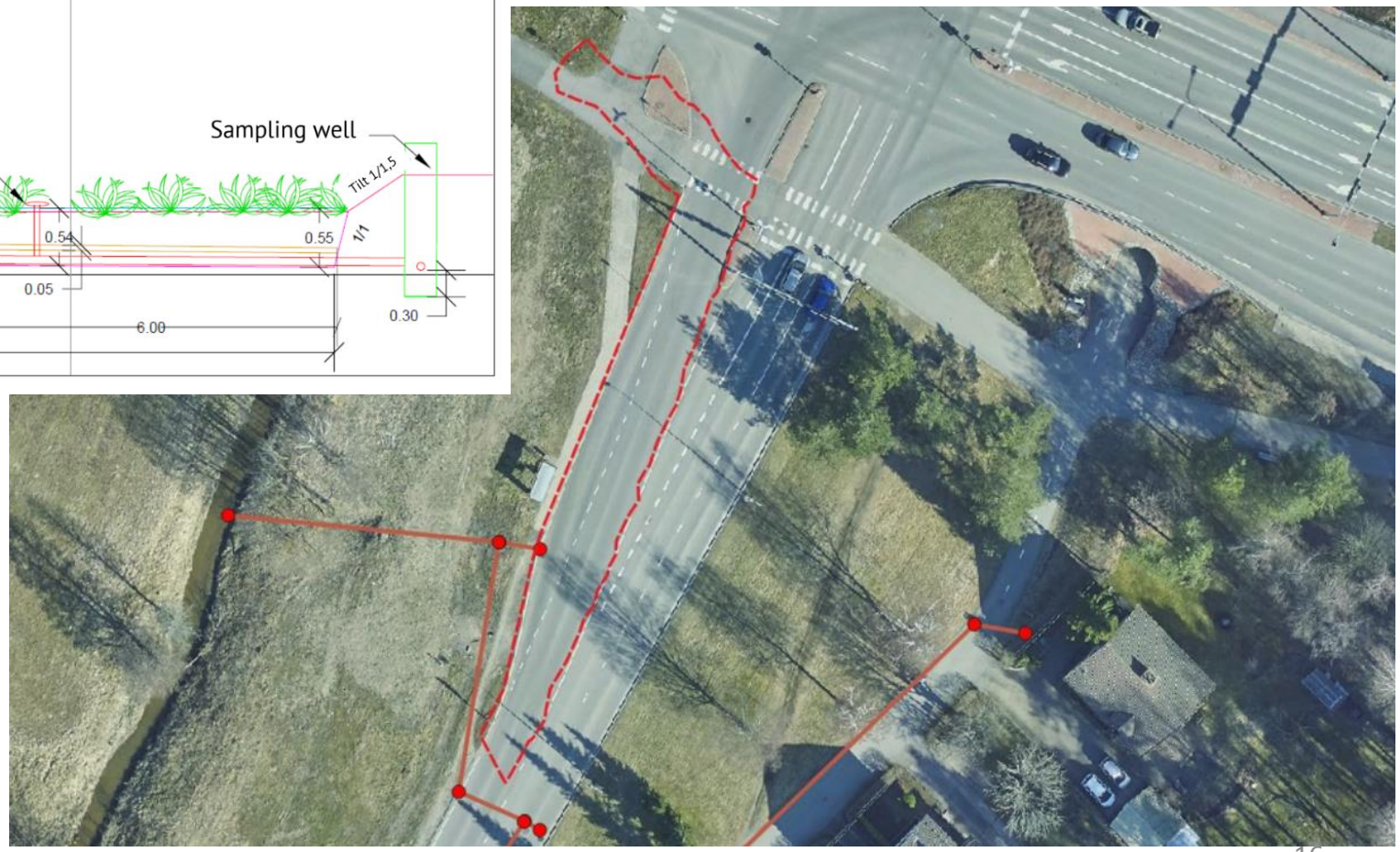
Catchment 3.4 ha

Outlet to the ditch

Industrial area under development

Turku - design





Area 3 x 11m
Depth 0.5m
Sealed
Inlet and outlet manholes

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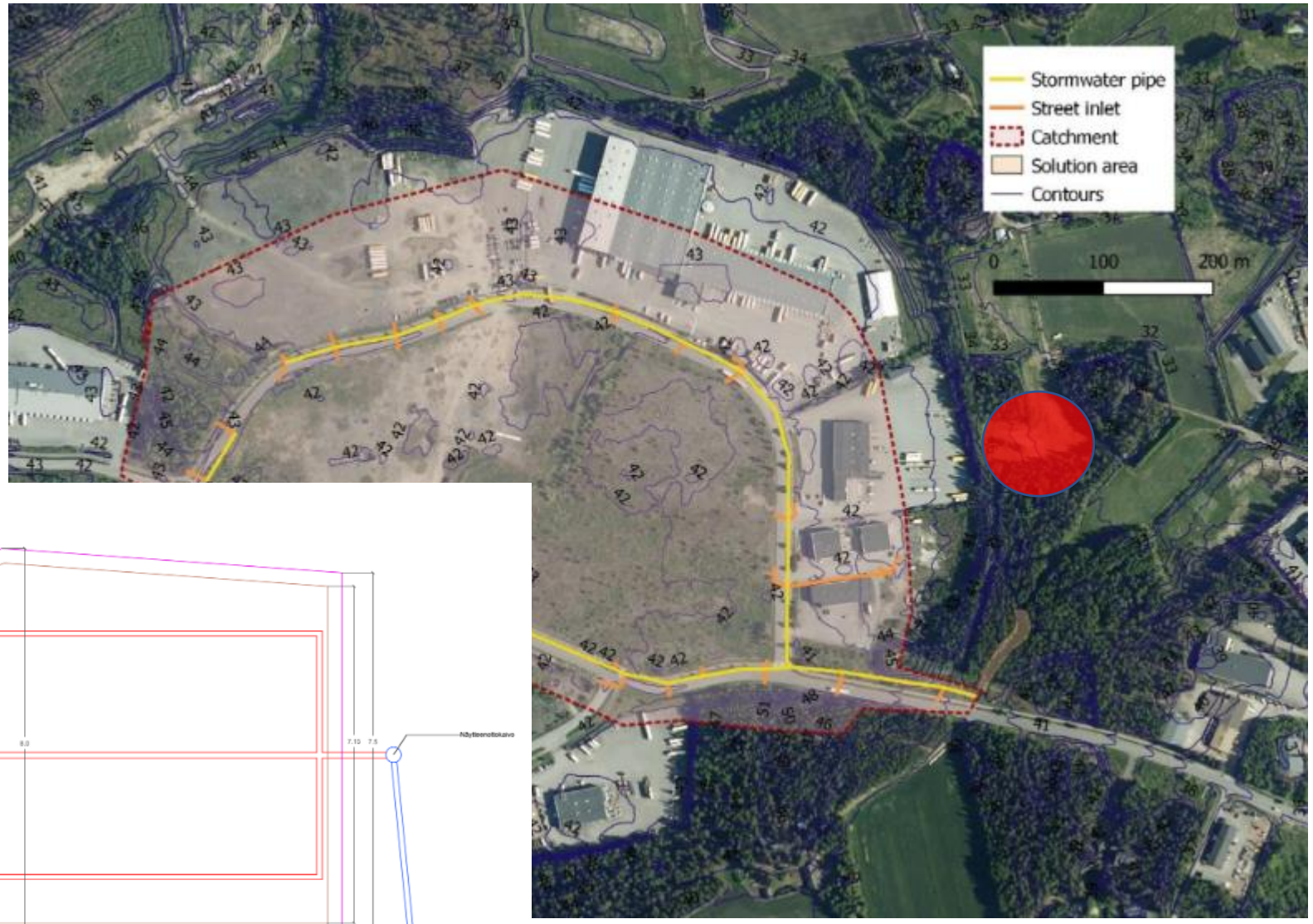
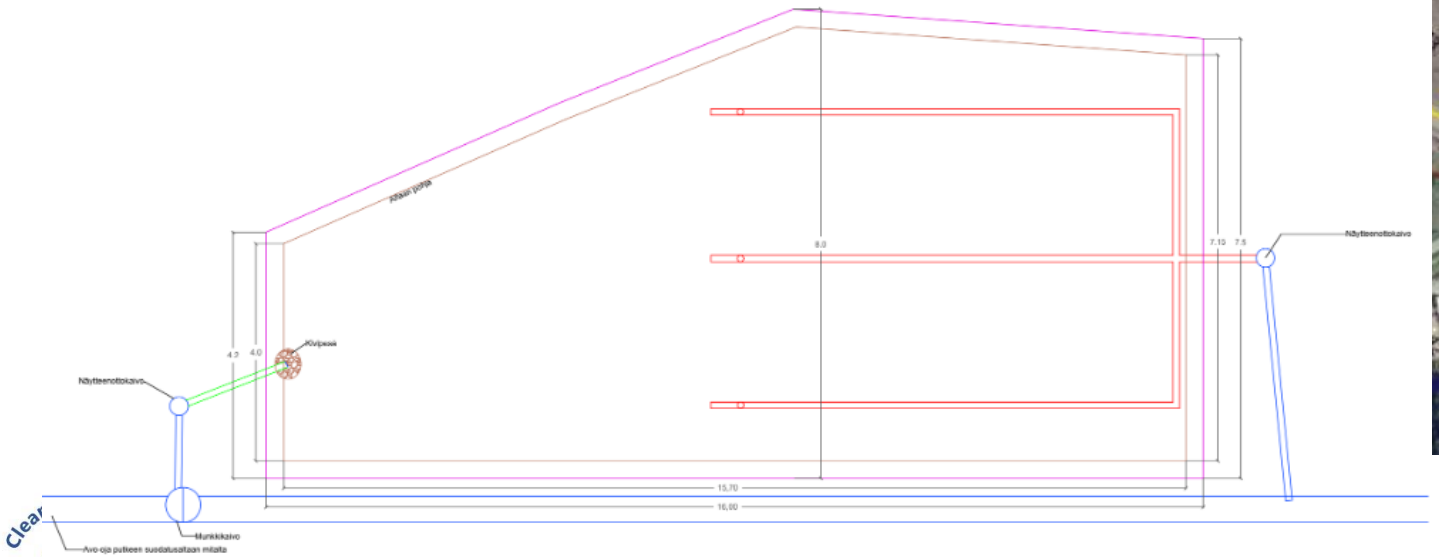
Turku - construction

Avanti - design

Area 8 x 16m
Depth 0.6m
Sealed & Bypass
Inlet and outlet manholes





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Avanti - construction

Tuku and Avanti – final sites

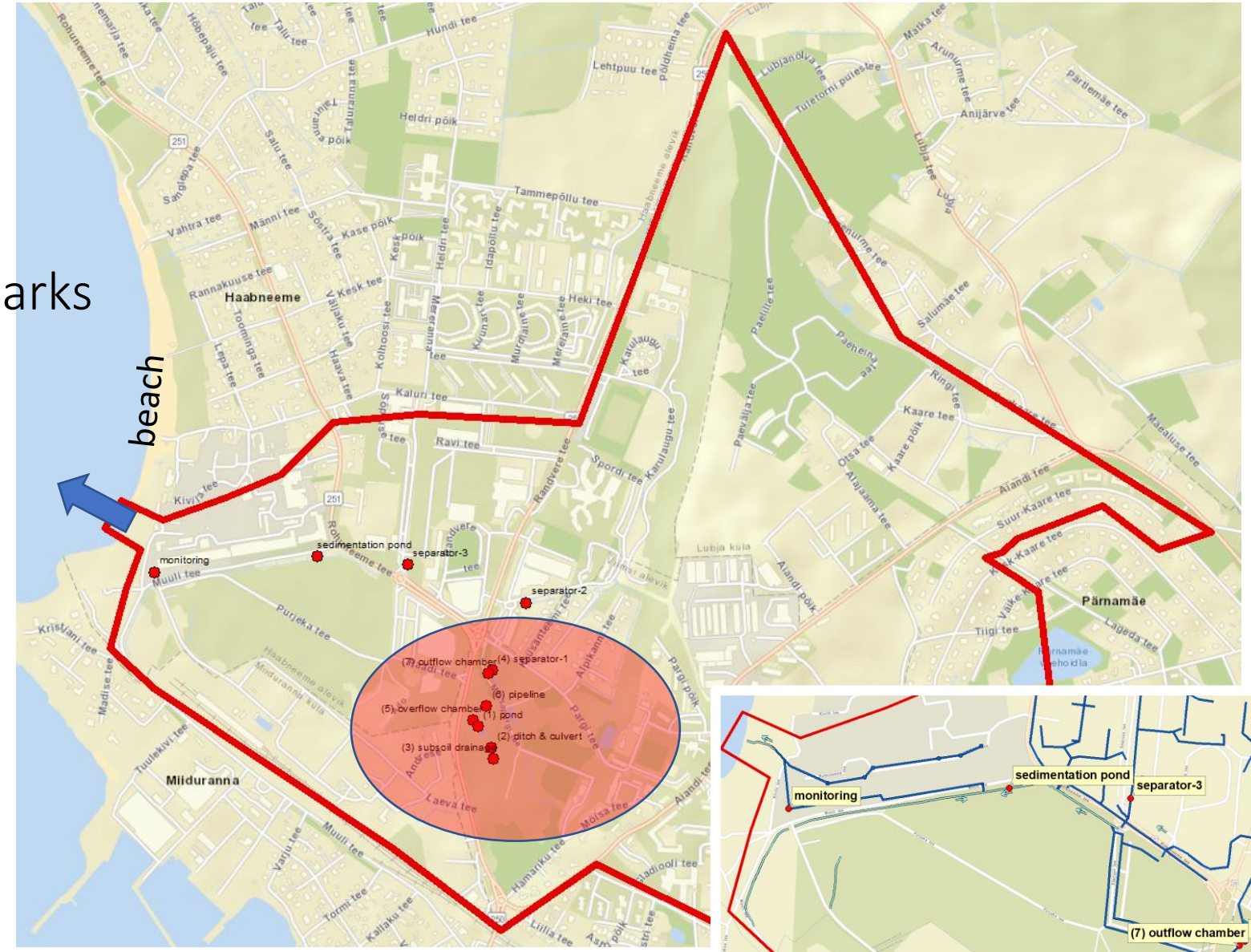
	TURKU	AVANTI
Excavations	6,300	5,300
Materials	5,700	14,400
Total	12,000	19,700

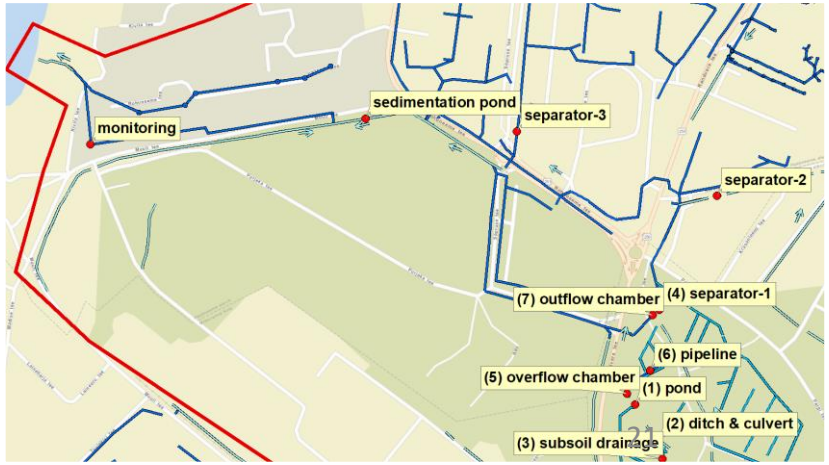
- No man-hours included
- Flow meter & water quality sensor 50,000 EUR per site

Viimsi – sites

Catchment 280 ha
Mixed type – roads and parks
Ditches and pipelines
One outlet

1) in-situ solutions
2) Real-time sensing





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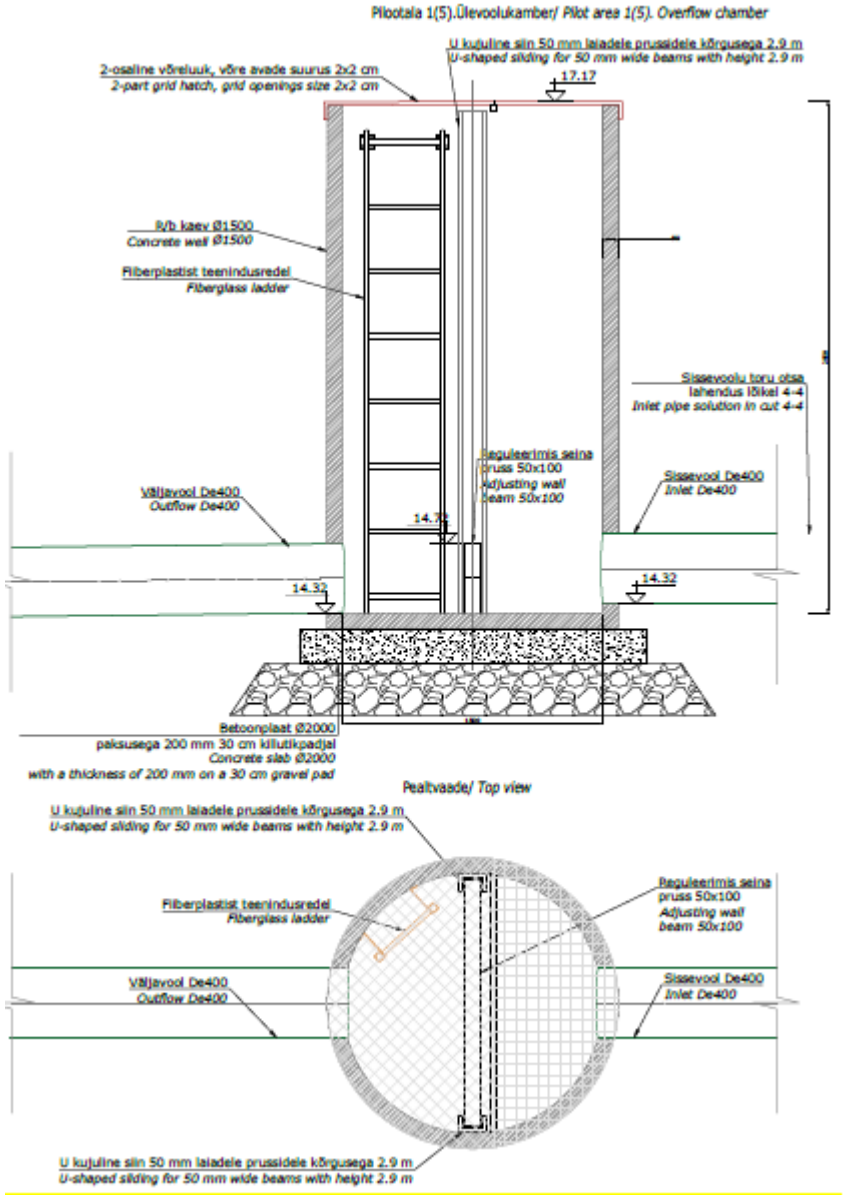
Viimsi – not realized dreams



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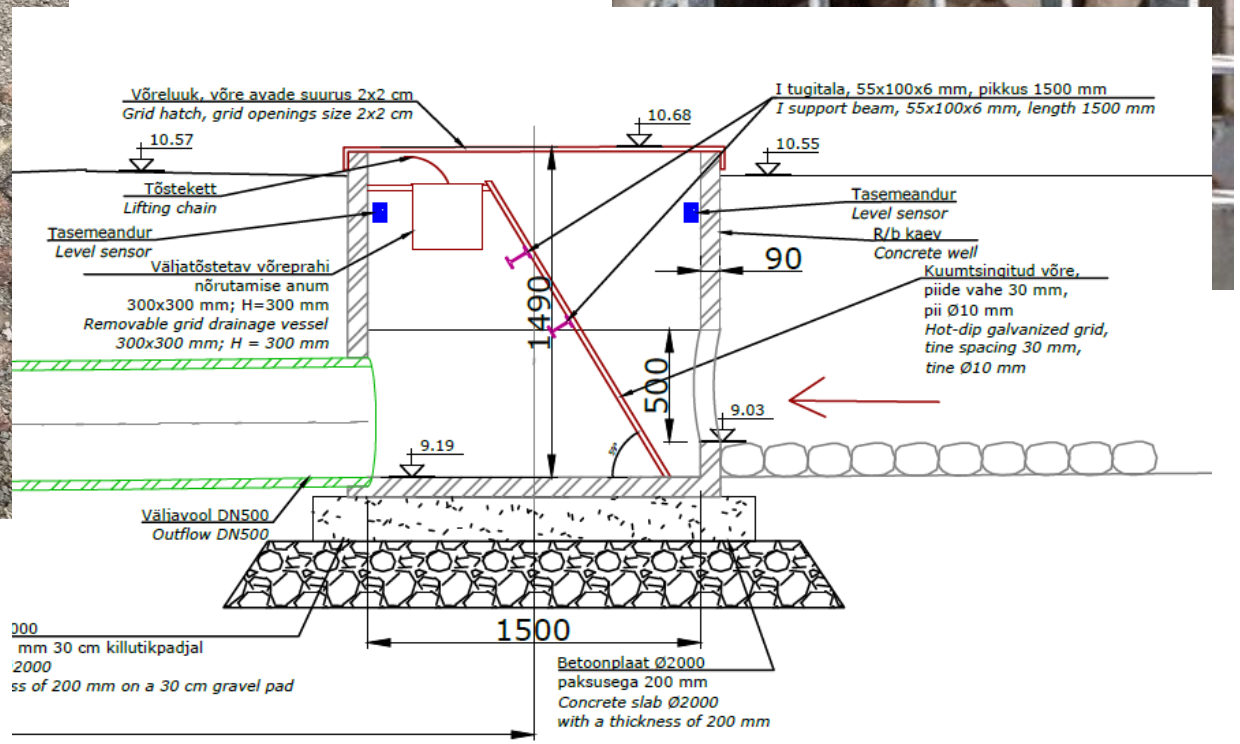
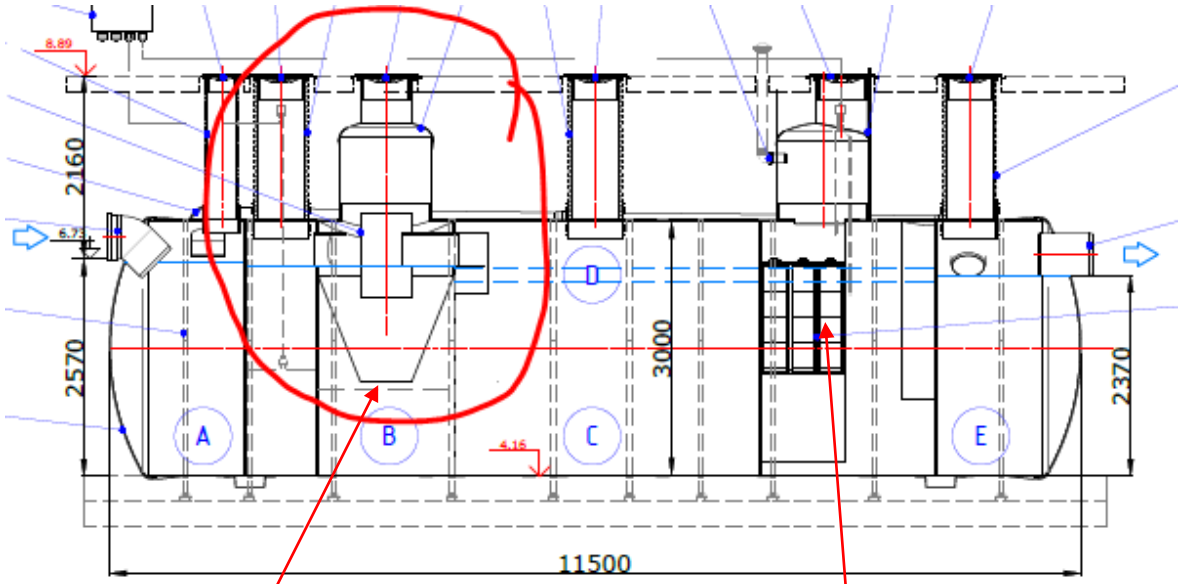
Viimsi – trash grid



Viimsi – separator

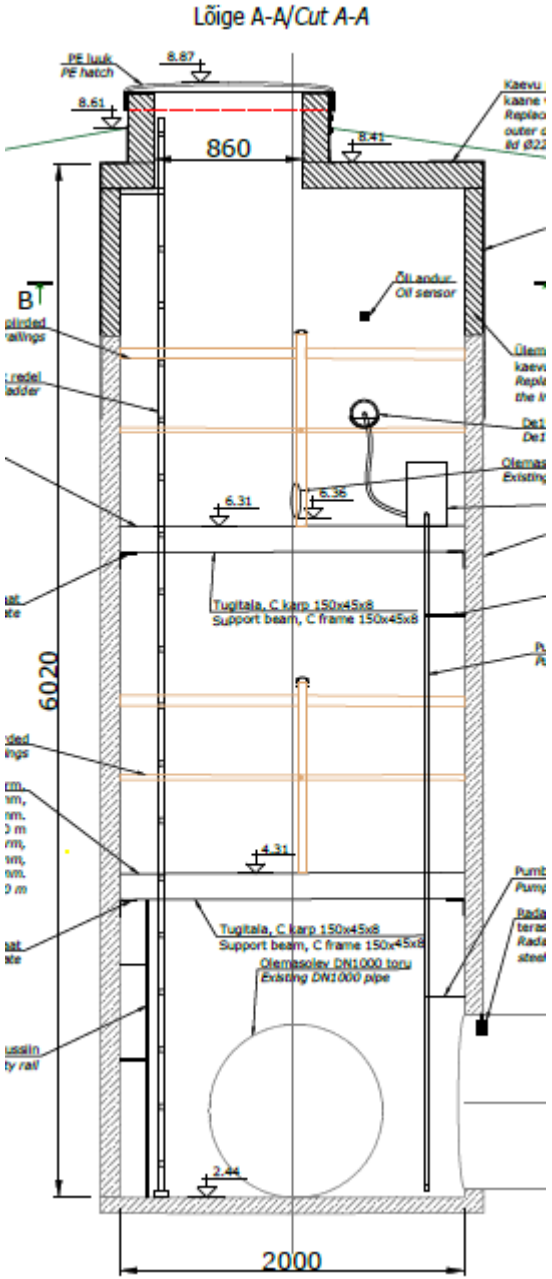


Vortex section

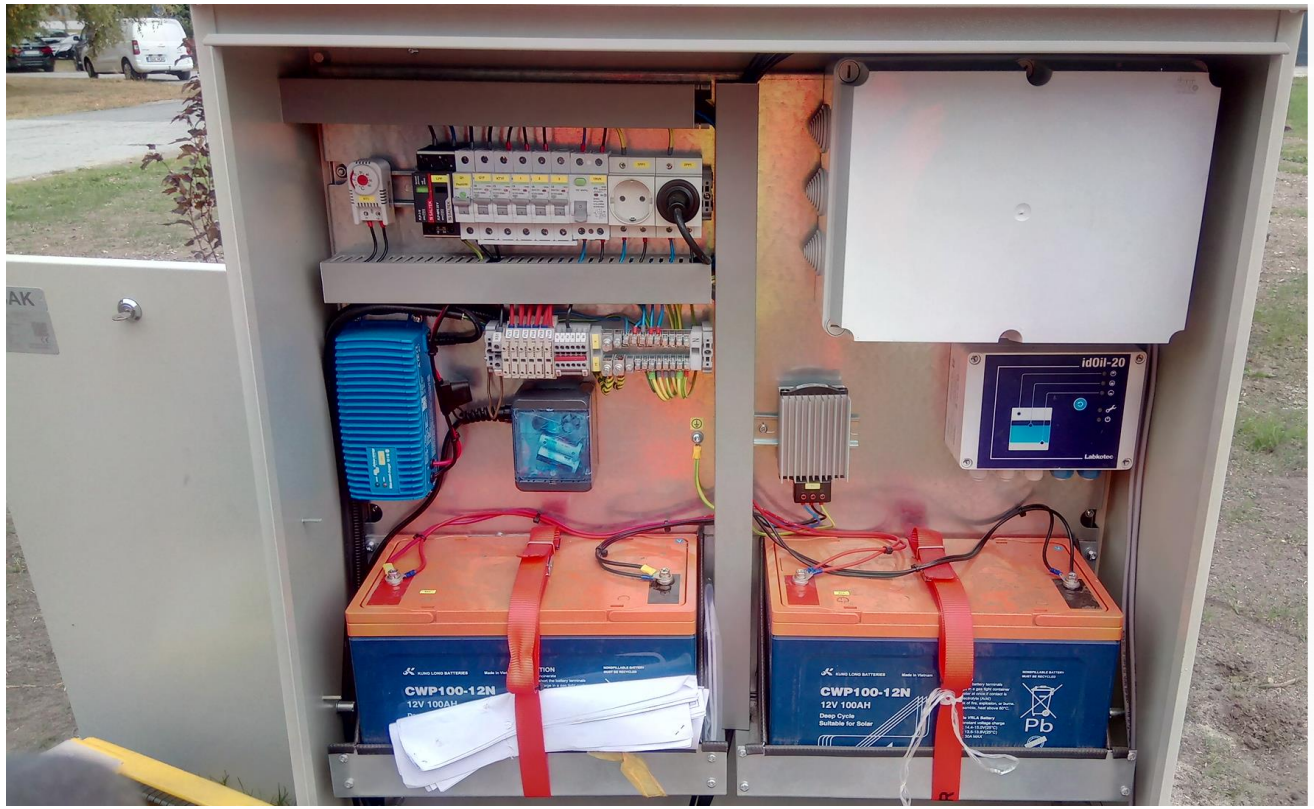
Oil filter

Viimsi – ditch

Viimsi – monitoring well



Viimsi – remote sensing



Viimsi – final sites

	Cost (EUR)
Design	34,560
(2) Trash grid	56,292
(3) Separator	113,112
(4) Ditch	16,429
(5) Monitoring manhole	78,126
TOTAL	**298,519**

Challenges & lessons learnt

- Planning
  - Limited space & construction constraints
  - Electricity supply
- Designing
  - Limited experience
- Procurements
  - “New” = bidders add risk surplus to the offers
  - High cost of plantation (80k EUR)
  - Splitting design into parts

Guidelines for CleanStormWater best practices

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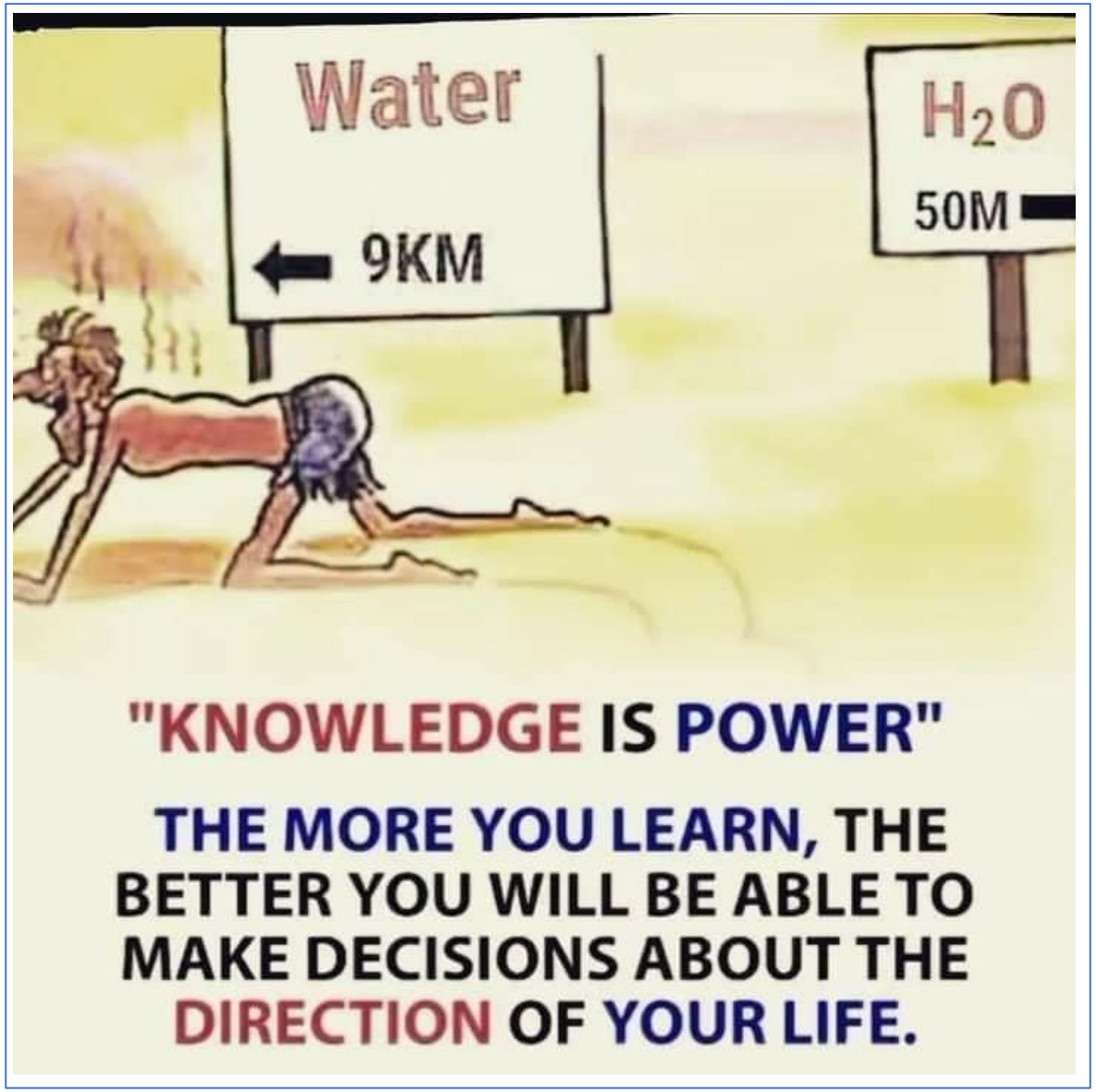

https://ifunny.co/picture/water-knowledge-is-power-the-more-you-learn-the-better-ih528aWw9