

Sustainable management of contaminated sites

Presentation 5.2 Phase 5 – Monitoring and Aftercare

Boudewijn Fokke
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Content

- Monitoring and Aftercare Plan
- Updated CSM
 - Residual contamination
 - Short-term risk reduction measures
 - Mid- and long-term risk reduction /containment measures
 - Sensitive objects
- Monitoring tasks
- Aftercare tasks



Monitoring & Aftercare Plan

- **Updated CSM with**
 - Residual contamination
 - Implemented risk reduction measures
 - ✓ Short-term
 - ✓ Mid-term
 - ✓ Long-term
- **Sensitive objects**
- The monitoring tasks of the different compartment
 - What must be measured
 - When must this be measured
- **The aftercare tasks of the different installations**
 - What must be maintained
 - When must this be maintained



Updated CSM Hon Tro

- **Residual contamination**

- Contained contaminated area $35 \times 50 = 1,750 \text{ m}^2$
- Soil till 1.0 – 1.5 meter below surface disturbed and contaminated with POP pesticides
- Concentration 5 – 500 mg/kg dry matter
- Pure lumps of POP may occur
- Groundwater vary from 1.0 – 4.0 below surface
- Groundwater contaminated on site



Short-term risk reduction measures

- **Stock of POP pesticides**

- Repacked
- Removed
- Destroyed

- **Hotspot in soil**

- Excavated
- Repacked
- Removed
- Destroyed

- **Contaminated building**

- Cleaned
- Sweepings treated as POP
- Contaminated part removed
- Landfilled



Updated CSM Hon Tro

Mid and long-term risk reduction /containment measures

- Runoff on-site drainage
 - Preventing surface run-off
 - Control erosion
 - Reduce infiltration
- Reactive permeable barrier
 - Preventing off-site migration of contaminated groundwater installed
- Trees
 - Contain the contaminated soil
 - Phyto-remediate the contaminated soil

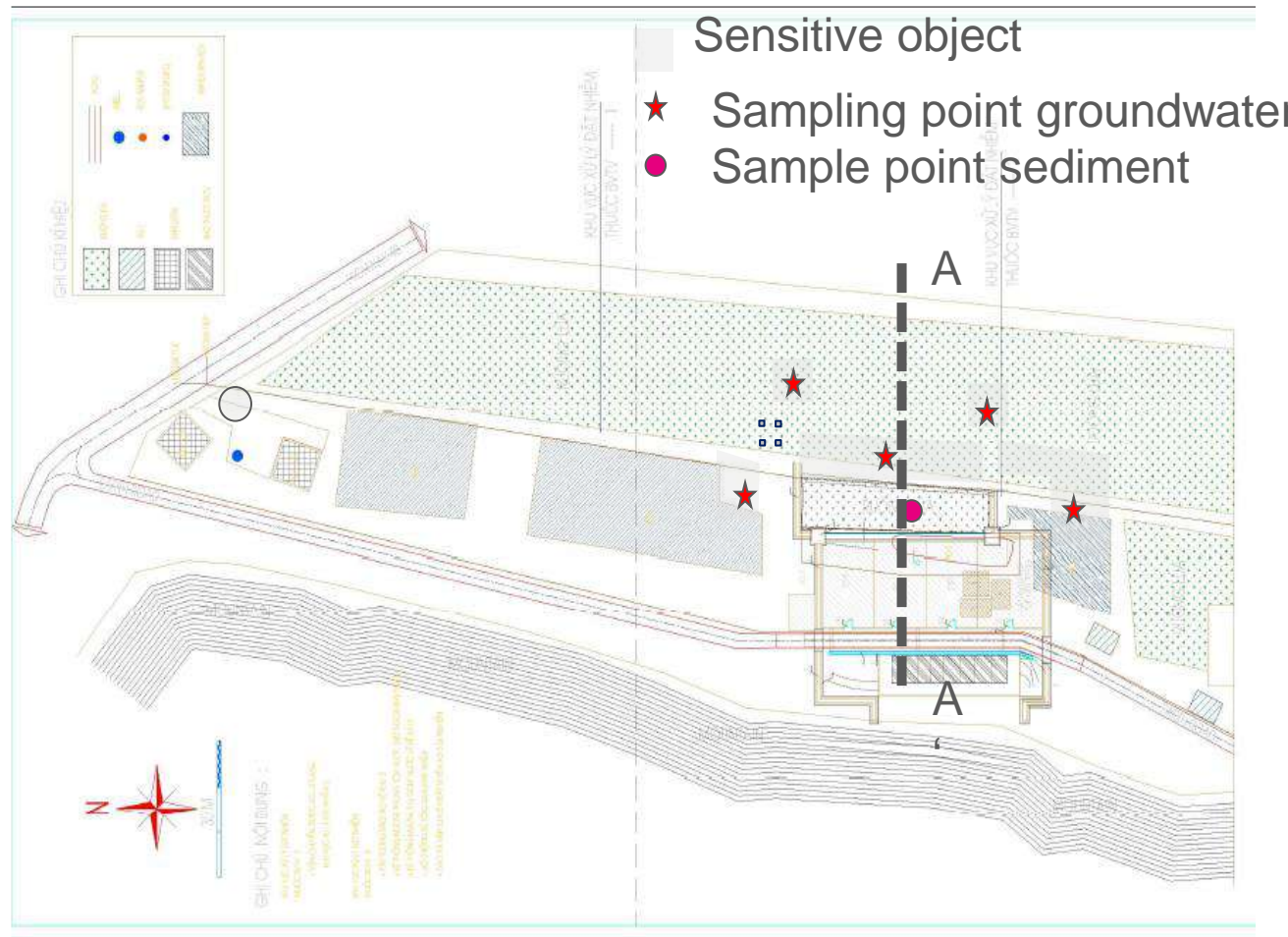


Updated CSM Hon Tro

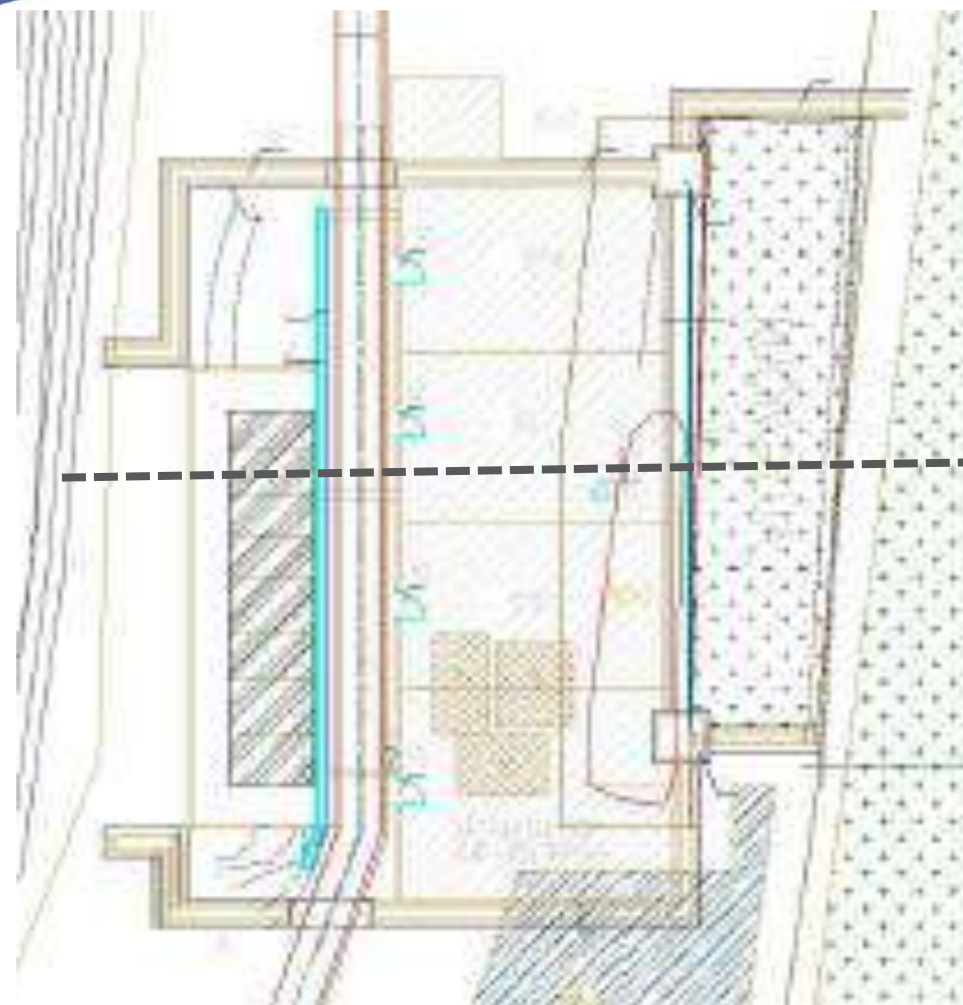
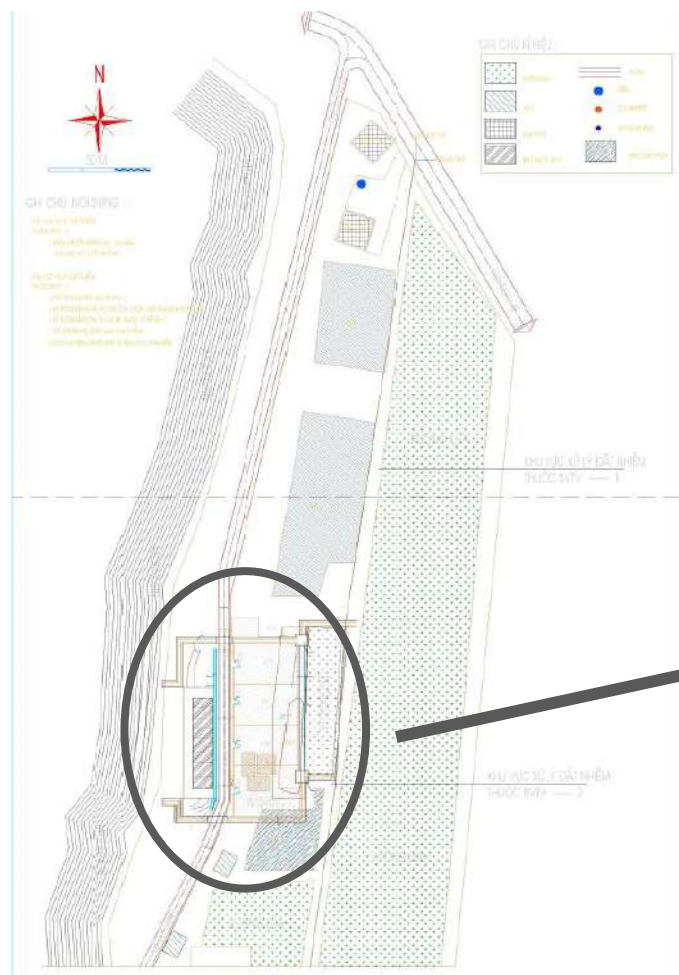
- Fencing
 - Preventing cattle and people to enter
- Road paved with a layer of clean soil
 - Preventing contact with contaminant
- Permeable reactive barrier
 - Prevent off-site migration of contaminated groundwater
- Vegetation cover
 - Control erosion
 - Enhance biological activity in the soil
 - Contain the groundwater



Updated CSM Hon Tro



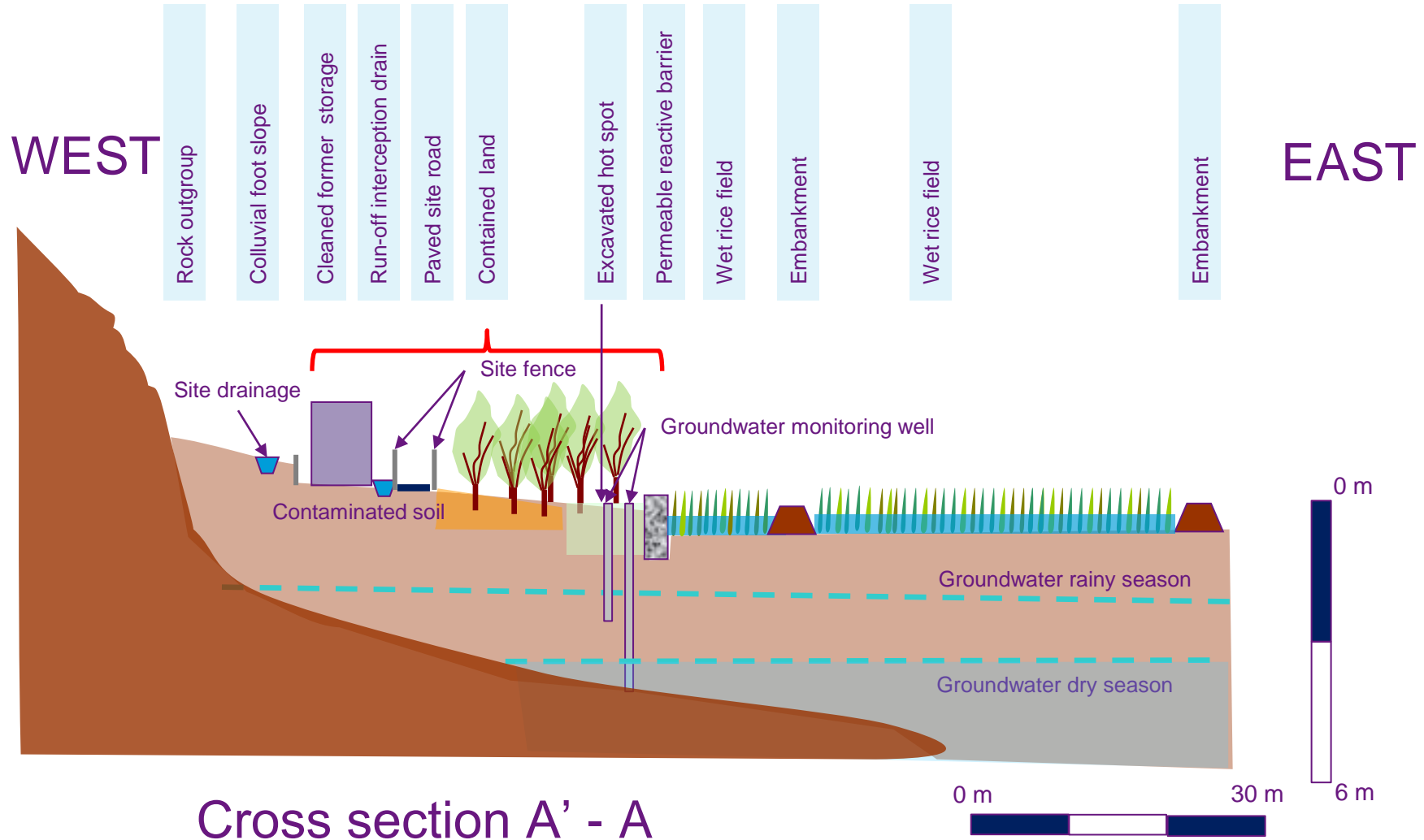
Updated CSM Hon Tro



0 m 30 m



Updated CSM Hon Tro



Monitoring tasks POP pesticides contaminated site

Residual soil contamination in soil

- POP pesticides analyses sample top-soil (0.0 – 0.5 m-mv) yearly
- POP pesticides analyses sample sub-soil (0.5 – 1.0 m-mv)
- POP pesticides analyses groundwater water till max 1.5 – 2.5 and 3 - 4 m-mv
 - At the site half yearly
 - Down stream the site half yearly
 - Sediments at the two effluent site drainage yearly
 - Groundwater well family house



Aftercare tasks

	Fencing	Drainage	PRB	Road	Stakeholders
Inspect	X	X	X	X	
Maintain	X		X	X	
Clean		X			
Repair when needed	X	X		X	
Replace when needed	X				
Inform					X



Aftercare drainage

1. Repair by back-filling gully with soil and compacting soil
2. Clean by removing all leaves and soil from drainage bottom
3. Prevent further subsidence of the drainage walls



Aftercare drainage

1. Clean by removing vegetation, leaves and soil from drainage bottom
2. Improve drainage by connecting drainage to periphery drain and close discharge to contaminated part
3. Improve the two influent to avoid piping and of the introduce instability of the drain



Aftercare fence

1. Repair fence poles
2. Install proper the barbed wire fencing
3. Prevent cattle to enter the site



Questions?

