

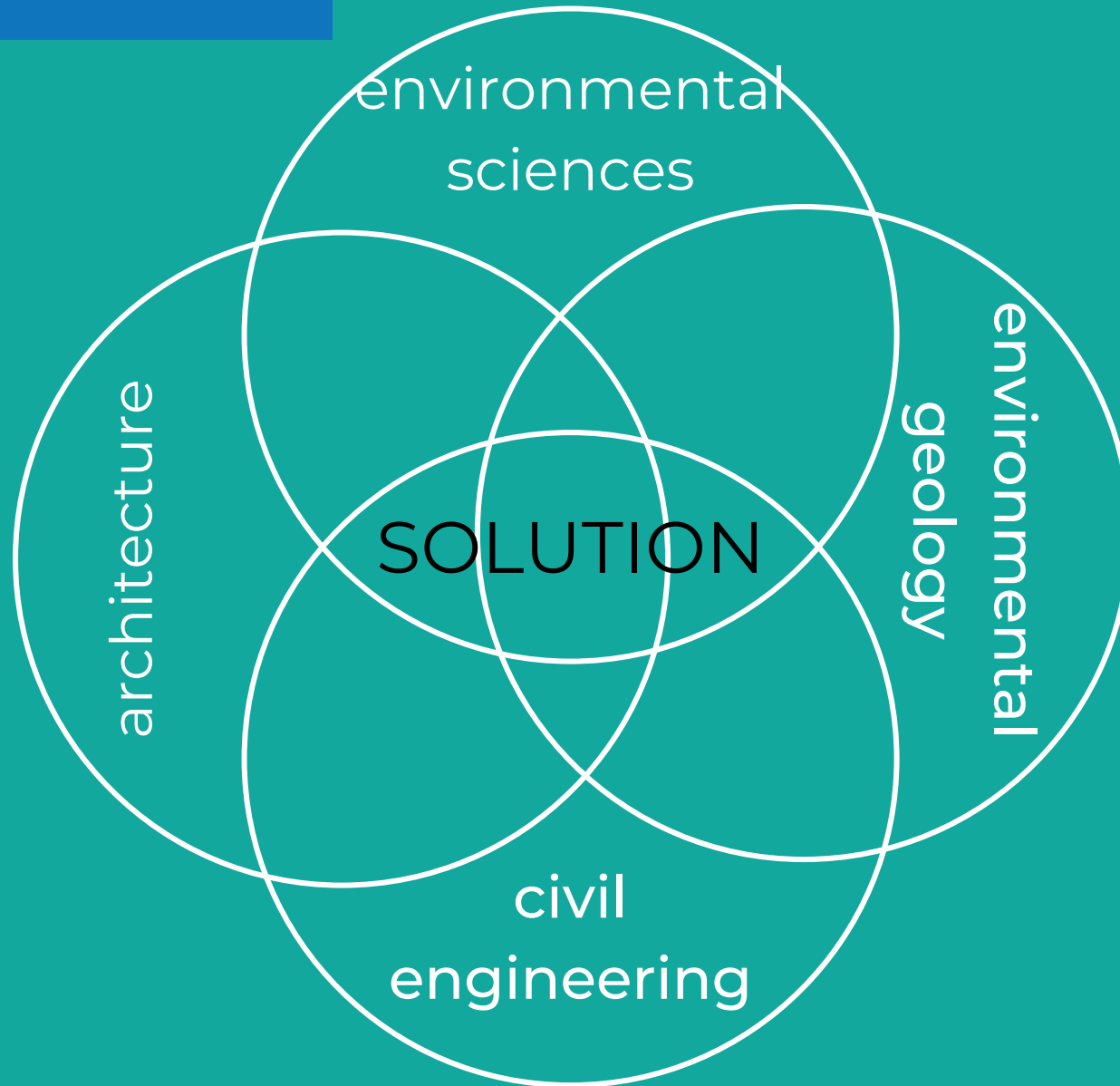
Case study Dugi Rat

Solution of the CBR Consulting Team

Anamarija Šuštić
Dorotea Orišković
Paola Karabogdan
Vedrana Filipović
Viktor Kolčić

Dugi Rat, 18 October 2023

Interdisciplinary approach



Content

01

solution
description

02

technical
approach

03

ecological
sustainability

04

social
sustainability

05

economic
sustainability

Solution description

- low density
- expansion of the city centre
- infrastructure, business and tourism-oriented
- tech hub - job openings
- marine
- parks
- recreation

1 - infrastructure

2 - mixed use

3 - parks

4 - commercial

5 - tourism

6 - buffer

7 - industrial

8 - recreation



Solution description

- buildings of smaller height to keep the views from the D8 road
- walk-friendly
- profit generating - tourism
- solar panels
- boat reparation
- tech hub - business hotspot



Technical approach

- carrying out tests on a minimum of 200 samples taken from the entire area
- filling the artificial lake with slag and old factory debris



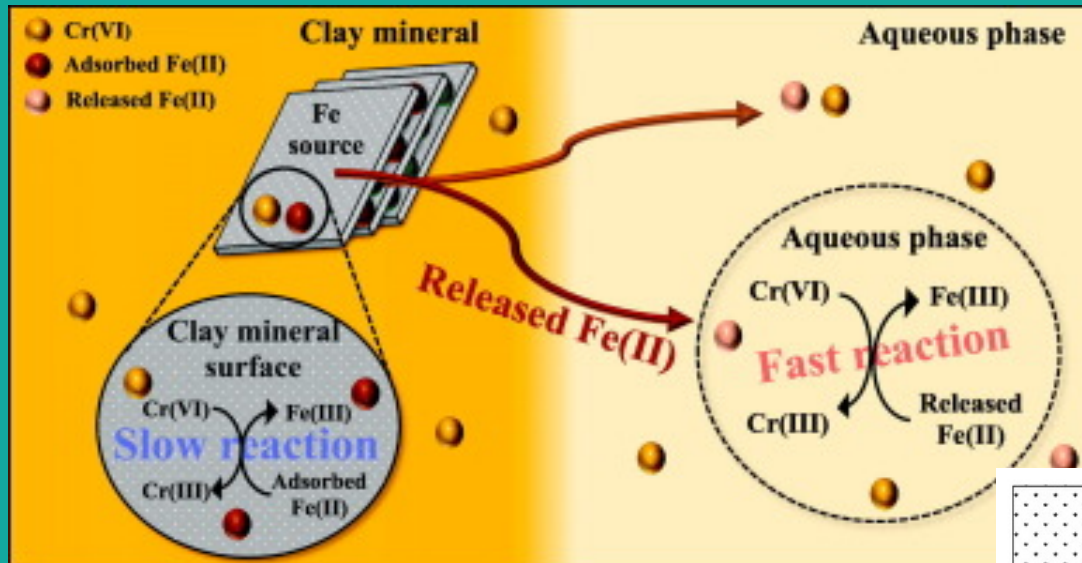
- any excess of old factory debris would be used to make terraced slope on the eastern side of the site



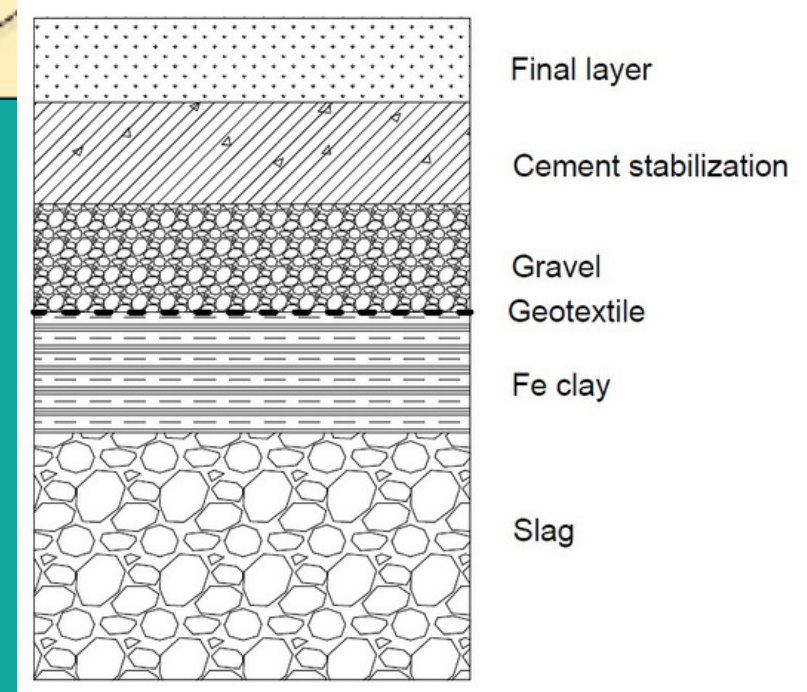
- any excess of slag would be used as aggregate for concrete walkway on the site (Zelić, 2005) - additional tests required

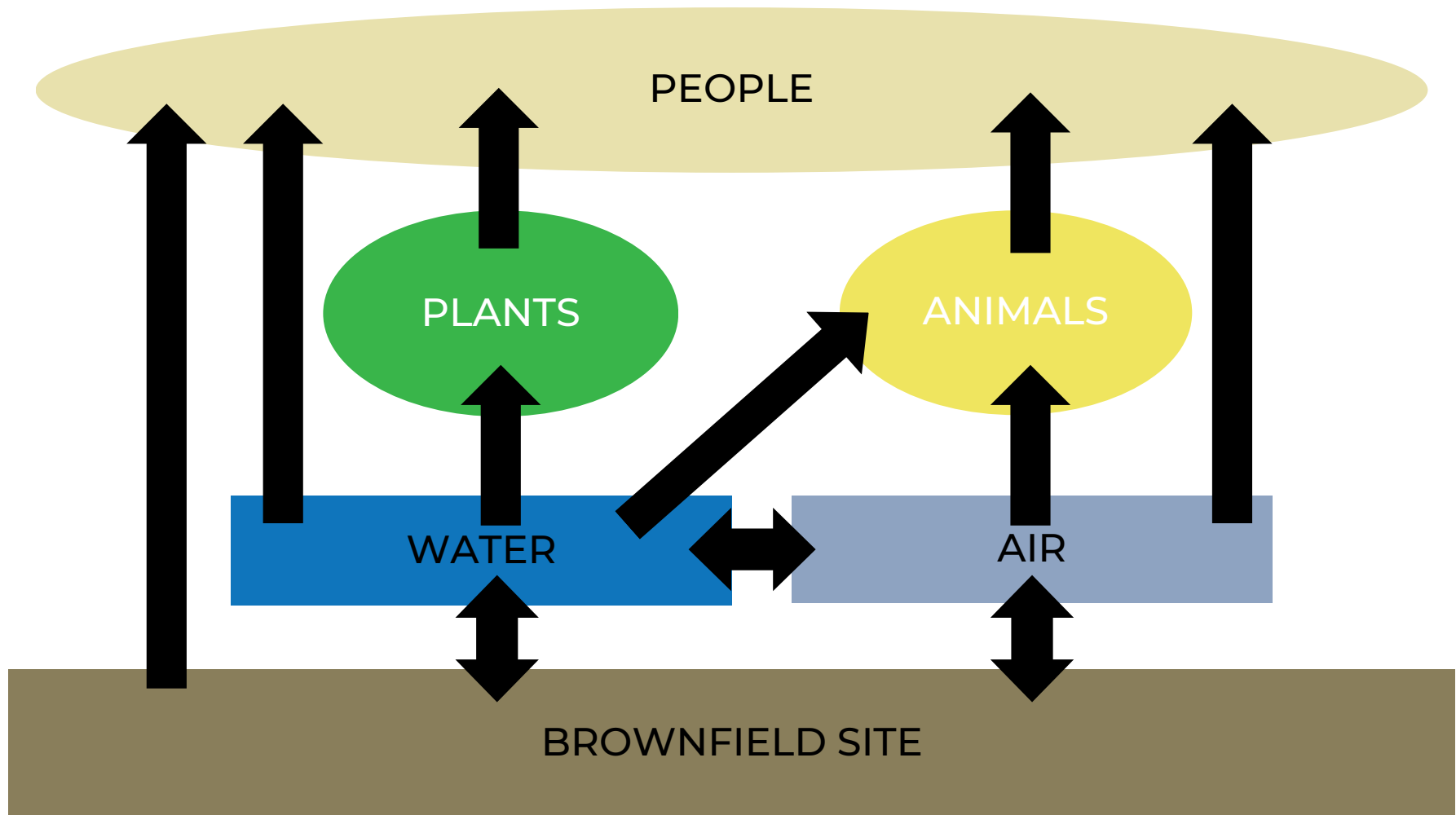


- Fe-clay layer used as a barrier over slag
- reduction of Cr(VI) by Fe(II) released from the surface of the clay minerals in the aqueous phase (Kwak et al., 2018)



- gravel and geotextile over clay layer
- cement stabilization
- soil or concrete over that layers



RISK ASSESSMENT

Ecological sustainability

- direct impact-reducing the amount of potentially toxic elements from the sea and stopping the speed of airborne particulate matter (PM)



Ecological sustainability

- biocenosis will improve
- not exploiting green surfaces
- no deforestation
- locals are not commuting
- solar pannels



BENEFITS



Social sustainability

- new jobs in the local community
- motivating community revitalization by including local people in the early stages of planning and development
- growth of the local tax base by increasing area property values
- infrastructure needed for development is already nearby
- social areas, playing fields, sitting areas, walkways



SWOT ANALYSIS

Strengths

- industrial heritage
- accessible and attractive location
- non-existing urban planning
- urban regeneration

Weaknesses

- negative effects on the environment, pollution
- negative scene next to the tourist site
- ownership

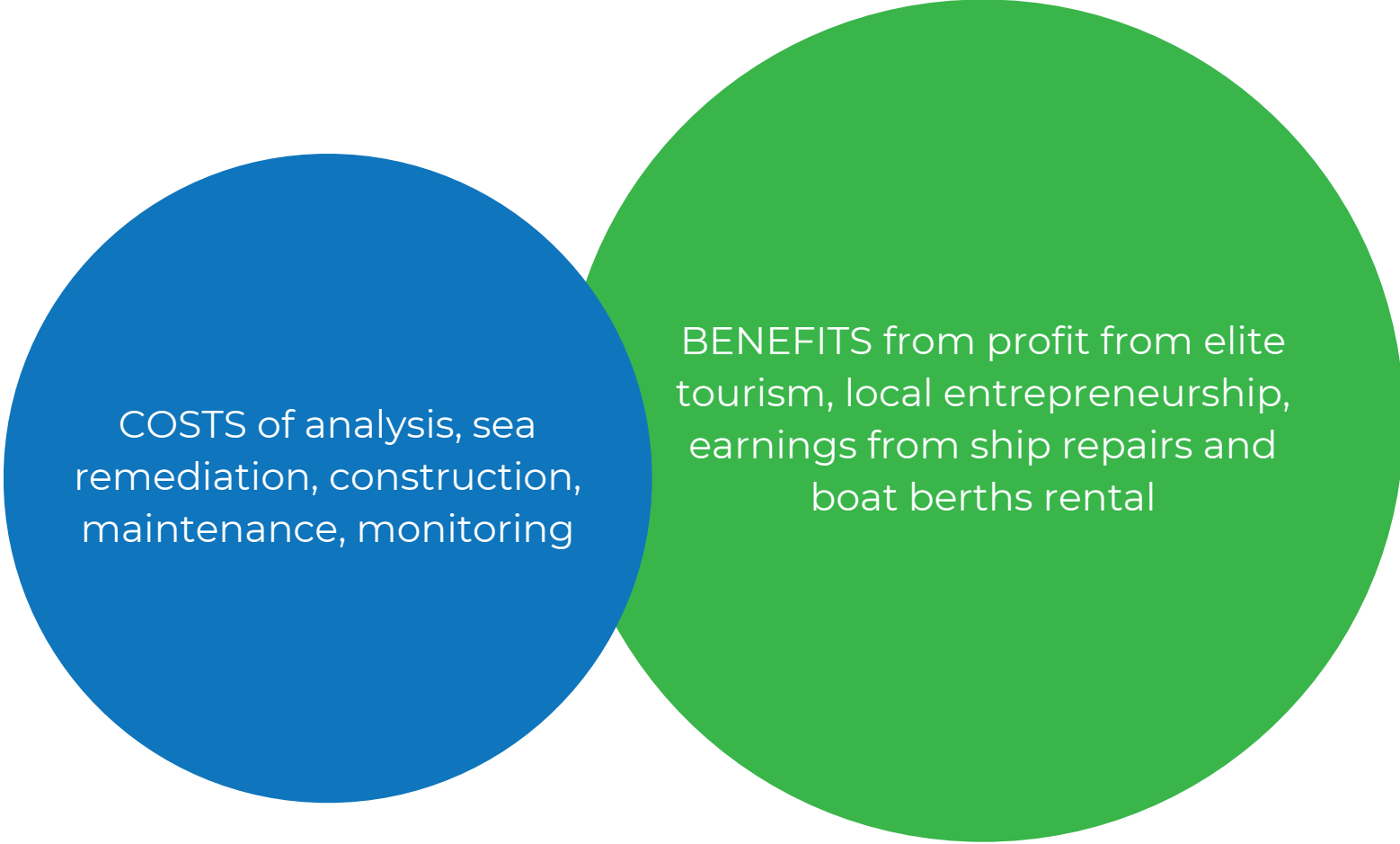
Opportunities

- employment
- mostly public open space
- financing of investment from the European funds

Threats

- no interest shown by locals or tourists
- illegal landfills

COST BENEFIT ANALYSIS



COSTS of analysis, sea remediation, construction, maintenance, monitoring

BENEFITS from profit from elite tourism, local entrepreneurship, earnings from ship repairs and boat berths rental

REFERENCES

- Al-Jabri, K.S. (2018). Research on the use of Ferro-Chrome slag in civil engineering applications. MATEC Web of Conferences, [online] 149
- Andlar, K. (2016). Metode uklanjanja teških metala iz otpadnih voda. [online] repozitorij.fkit.unizg.hr.
- Krčelić, I. (2021). Primjena bioremedijacije u sanaciji onečišćenih tala. [online] repozitorij.agr.unizg.hr.
- Kwak, S., Yoo, J.-C., Moon, D.H. and Baek, K. (2018). Role of clay minerals on reduction of Cr(VI). Geoderma, [online] 312, pp.1–5.
- Okeke, B.C. (2008). Bioremoval of hexavalent chromium from water by a salt tolerant bacterium, *Exiguobacterium* sp. GS1. Journal of Industrial Microbiology & Biotechnology, [online] 35(12), pp.1571–1579.
- Patil, A.V. and Pande, A.M. (2011). Behaviour of Silico Manganese Slag Manufactured Aggregate as Material for Road and Rail Track Construction. Advanced Materials Research, 255-260, pp.3258–3262.
- Szewczuk-Karpisz, K., Fijałkowska, G., Wiśniewska, M. and Wójcik, G. (2020). Chromium(VI) reduction and accumulation on the kaolinite surface in the presence of cationic soil flocculant. Journal of Soils and Sediments, 20(10), pp.3688–3697.

- www.epa.gov/brownfields/ (18.10.2023.)
- Zelić, J. (2005). Properties of concrete pavements prepared with ferrochromium slag as concrete aggregate. Cement and Concrete



CBR Consulting Team

Thank you for your attention!