Using sediment as a resource

RENOVATION OF A CONTROLLED FLOOD AREA IN THE SCHELDT ESTUARY USING DREDGED MATERIAL FROM THE DURME RIVER

11th International SedNet Conference, April 3-5, 2019, Dubrovnik, Croatia

Hans Quaeylehaegens MSc.
Peter Van den bossche MSc.
Herman Brangers MSc.
Content

- USAR-project and partners
- Project area Durme
- Investigation of sediments
- Design
- Project execution and planning
USAR - Using Sediment As a Resource
River Scheldt basin

River Durme valley
Project area: river Durme
Using Sediment As A Resource

Problem: severe floods in winter time (2010)
Urgent need to dredge the river Durme
Urgent need to dredge the river Durme

• 265,000 m³ of sediment to be removed
• increase the discharge capacity of the river
• improve flood defense at high water levels (storm events, storm tide)
• create new fresh water marshes
Historical and current industrial activities

Former factories rabbit skins
Former gasification plant
Textile industry

Using Sediment As A Resource
Fieldwork: taking samples
Environmental assessment of the sediment quality

> limits construction material (TPH, heavy metals)
< limits construction material
Increased levels PFAS and BFR
Geotechnical assessment of the sediment quality

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>dry matter content</td>
<td>40-65</td>
<td>%</td>
</tr>
<tr>
<td>plasticity index</td>
<td>15-50</td>
<td>-</td>
</tr>
<tr>
<td>organic matter</td>
<td>2.0-5.0</td>
<td>%DM</td>
</tr>
<tr>
<td>particle size distribution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sand (63 µm - 2 mm)</td>
<td>10-80</td>
<td>%</td>
</tr>
<tr>
<td>silt (2 µm - 63 µm)</td>
<td>10-55</td>
<td>%</td>
</tr>
<tr>
<td>clay (&lt; 2 µm)</td>
<td>10-25</td>
<td>%</td>
</tr>
<tr>
<td>TOC</td>
<td>1.9-5.8</td>
<td>%DM</td>
</tr>
</tbody>
</table>
Design infrastructure works

Core material (sand): stable
Cover material (clay) Impermeable
Soil cover / vegetation

Treated dredged material Impermeable + stable
Soil cover / vegetation
Using sediment as a resource for embankment construction: benefits and challenges

Benefits
- Sediment is used beneficially instead of dumped in landfill site
- Local use of dredged sediments: less transport!
- Double improvement of flood defense: river is dredged + embankments are reinforced

Challenges
- 26,000 m³ of sediment is contaminated and needs to be treated
- The geotechnical quality of the sediment needs to be improved
Design infrastructure works

Using Sediment As A Resource
Example of on site treatment of sediments
Planning

Completed:
- Design of dredging and embankment works
- Geotechnical and environmental assessment of the sediment
- Environmental impact assessment
- Construction and environmental permits
- Tendering procedure

In progress (2019-2023)
- Preliminary testing
- Execution of dredging and embankment works
USAR-team: Thanks for your attention!
USAR - Using Sediment As a Resource

Hans.Quaeyhaegens@vlaamsewaterweg.be