



**The Svartsjö project
Environmental dredging and dewatering
of pulp-and-paper sludges**

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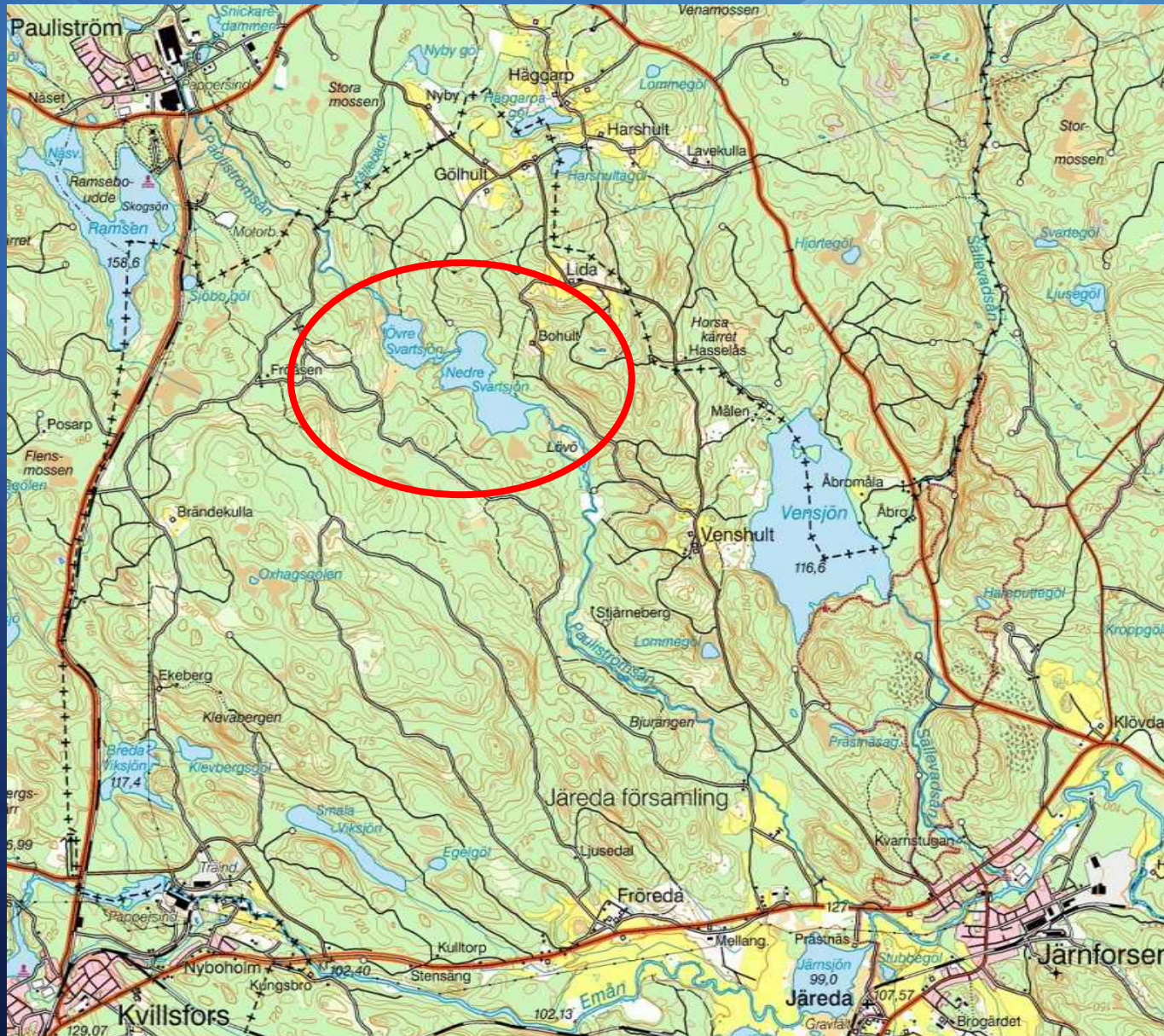
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1. Paper sludges have been discharged in the Pauliström for several decades by the local paper mill.
2. The sludges settled down in the lakes ‘Svartsjö’ (Black Lakes).
3. About 300,000 m³ of these sludges are polluted by mercury (up to 1 ppm), used as a biocide in the paper production.
4. Remediation of the lakes was triggered by the discovery of mercury accumulation in the aquatic fauna downstream.

Location of the lakes 'Svartsjö'





1. Environmental dredging of the contaminated sediments from both lakes.
2. Dewatering of the sediments in order to reduce their volume and achieve sufficient geotechnical stability.
3. Installation of the dewatered sediments in a controlled deponie near the lakes.
4. Treatment of the water from the dewatering action.



Dredging activities:

- Suspension of the sediments has to be avoided
=> dredge without spuds, dredging system, siltscreen.
- High accuracy of dredging.
- Accessibility to the lakes: only by road transport.

Deponie:

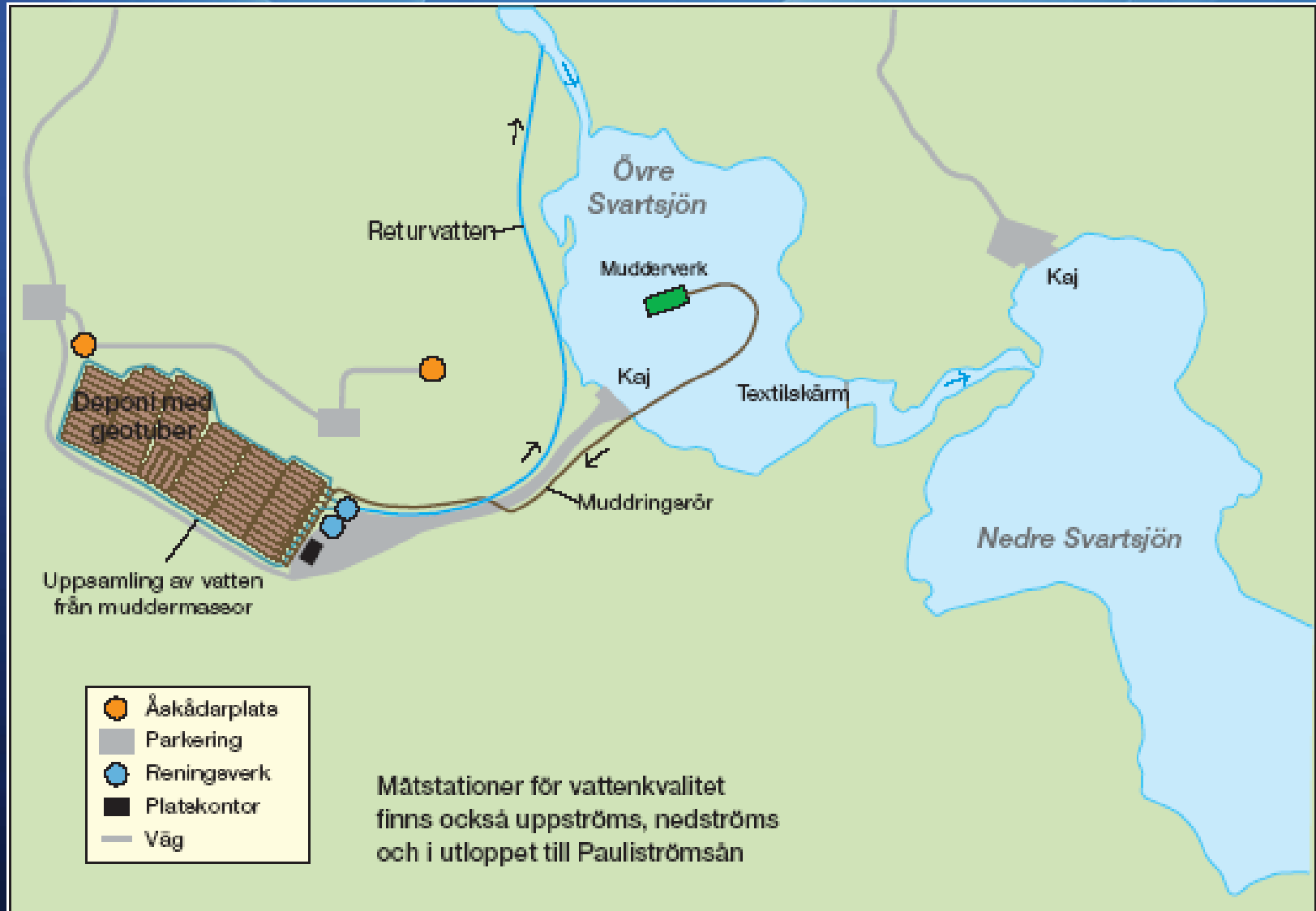
- Long-term stability of the deponie.

Discharge of water:

- Severe standards on suspended solids, COD, BOD and mercury (total & organic).



1. Dredging of the sediments with specially designed dismountable dredge 'The Pixie'.
2. In-line injection of flocculants
3. Dewatering of the flocculated sediments in Geotubes in the final deponie.
4. Treatment of the water from the sediments by an aerobic biological reactor.

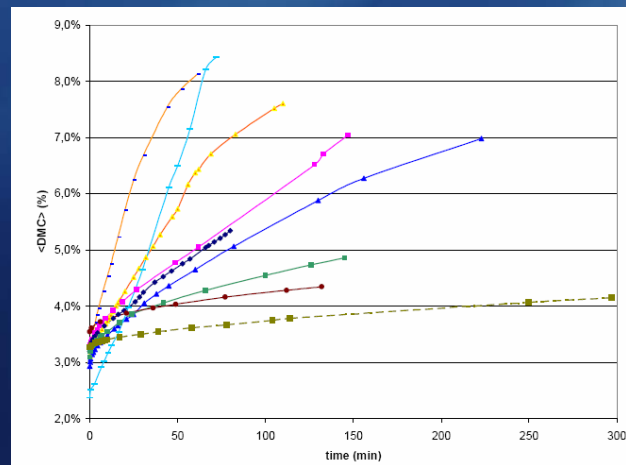




Main objectives of the design:

Determination of optimal dewatering rate

- Dredge dimensioning.
- Dimensioning of deponie.
- Dimensioning of water treatment plant





Mobilisation of the dredge – March 2006



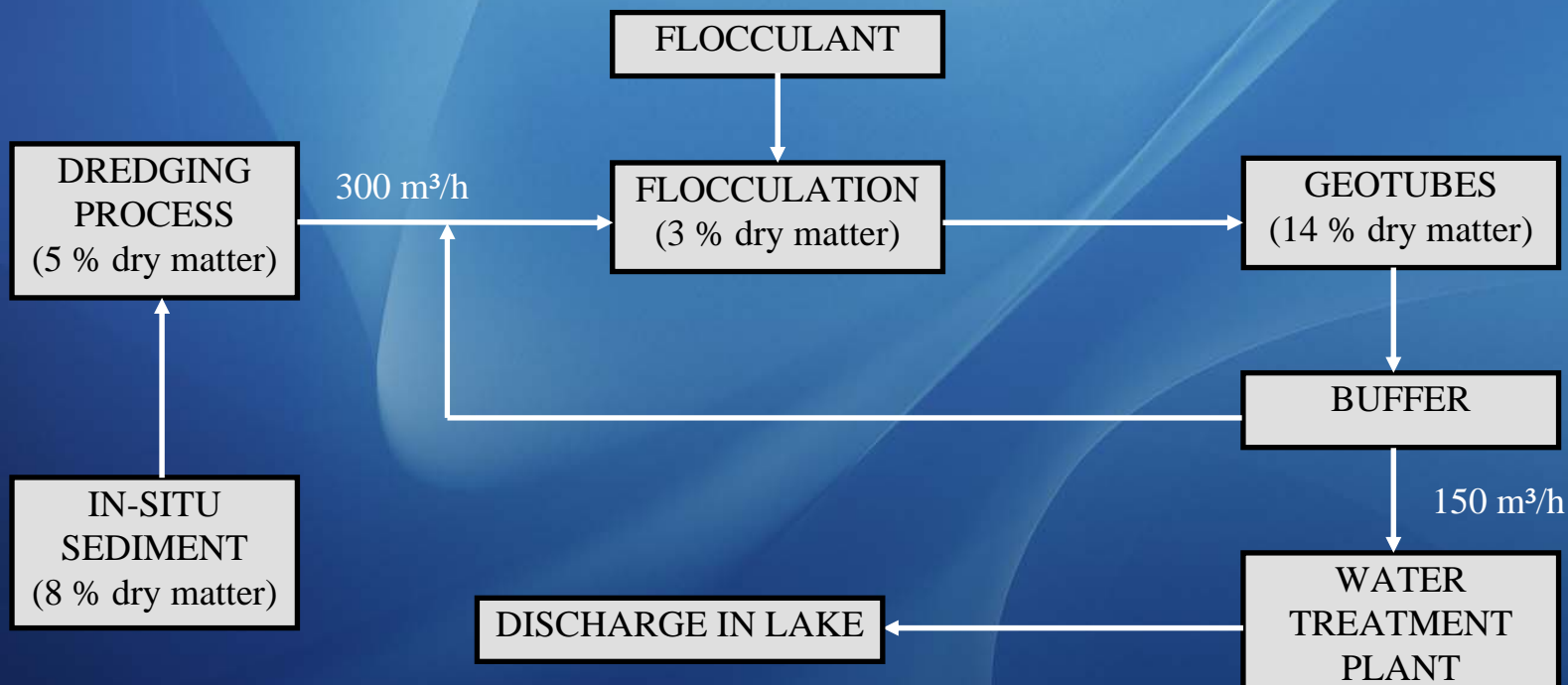


Dredge Pixie in the ice



The deponie

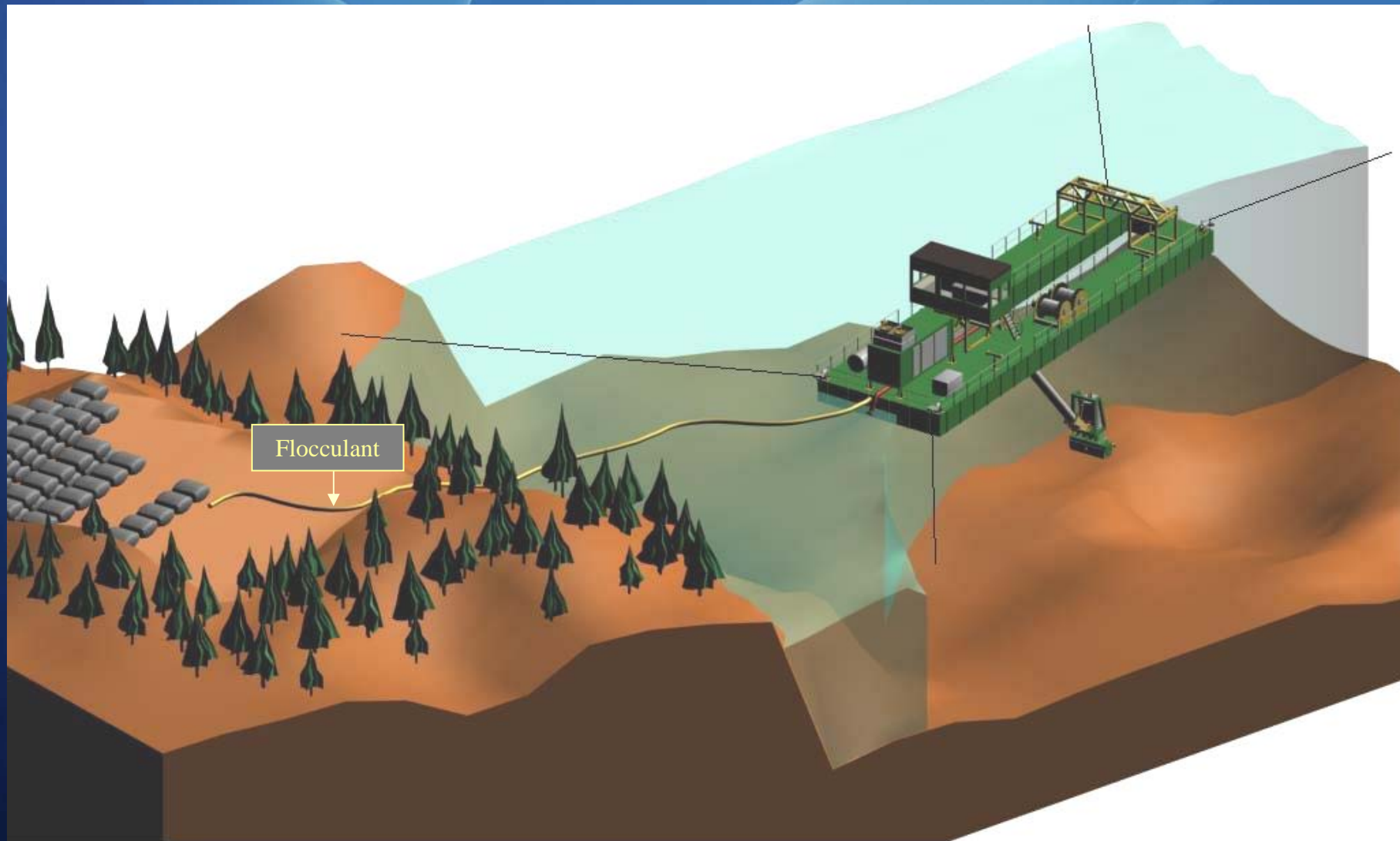
Final Process Overview

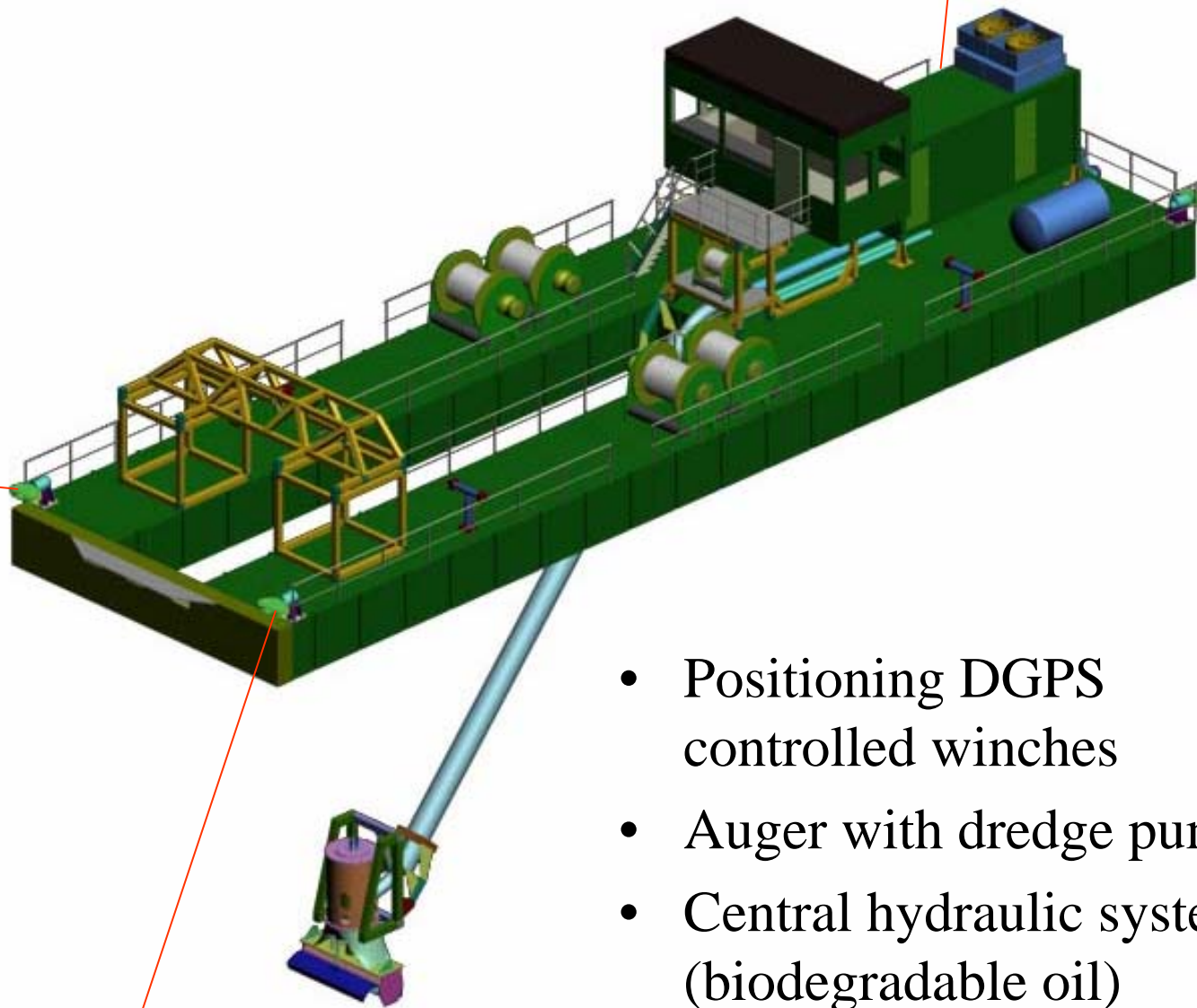




1. Dredging
2. Flocculation
3. Dewatering (geotubes)
4. Waste water treatment plant
5. Discharge

1. Dredging





- Positioning DGPS controlled winches
- Auger with dredge pump
- Central hydraulic system (biodegradable oil)

1. Dredging



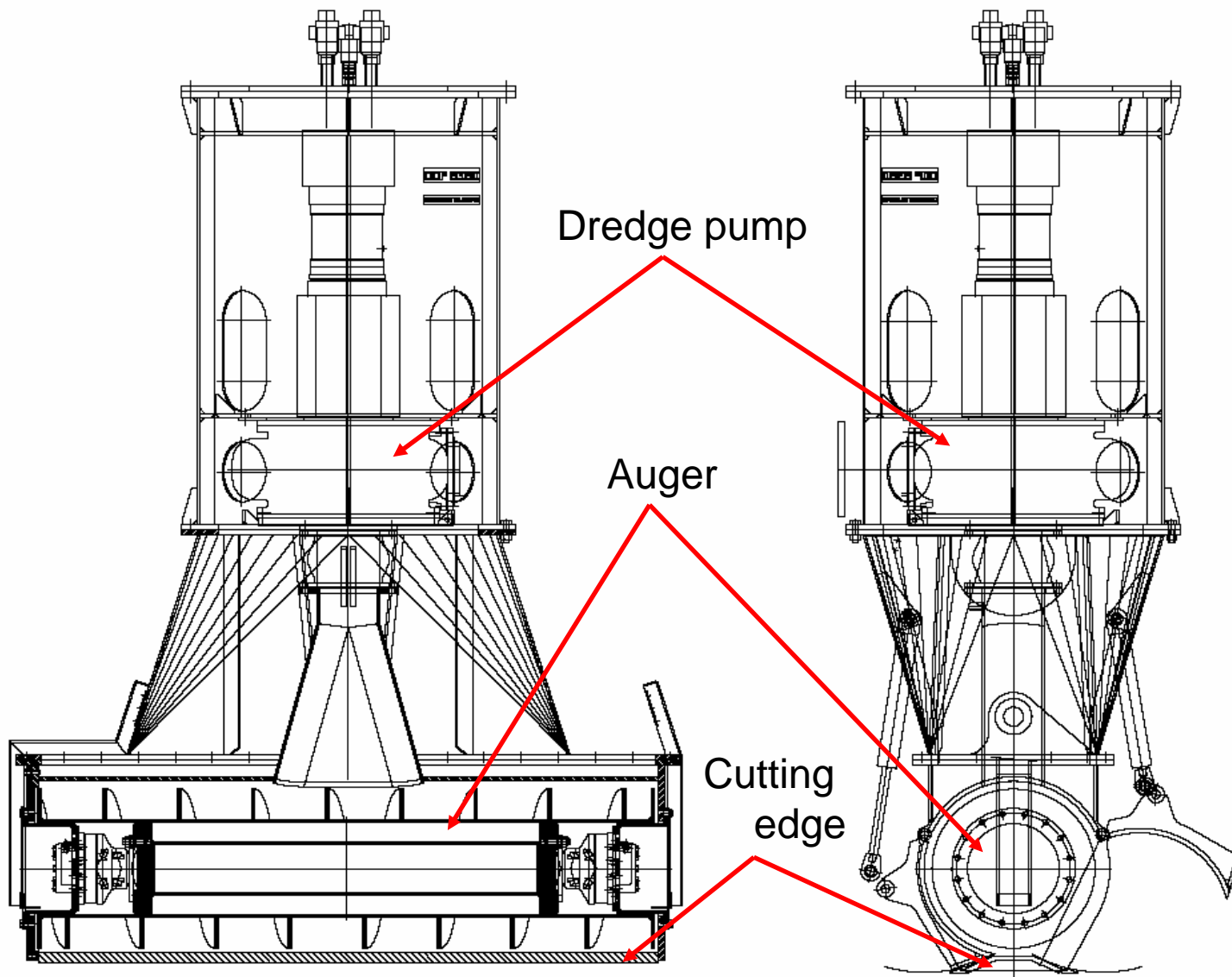
1. Dredging



- Chemical anchors in the rocks
- Soil anchors in the softer soil



1. Dredging



1. Dredging

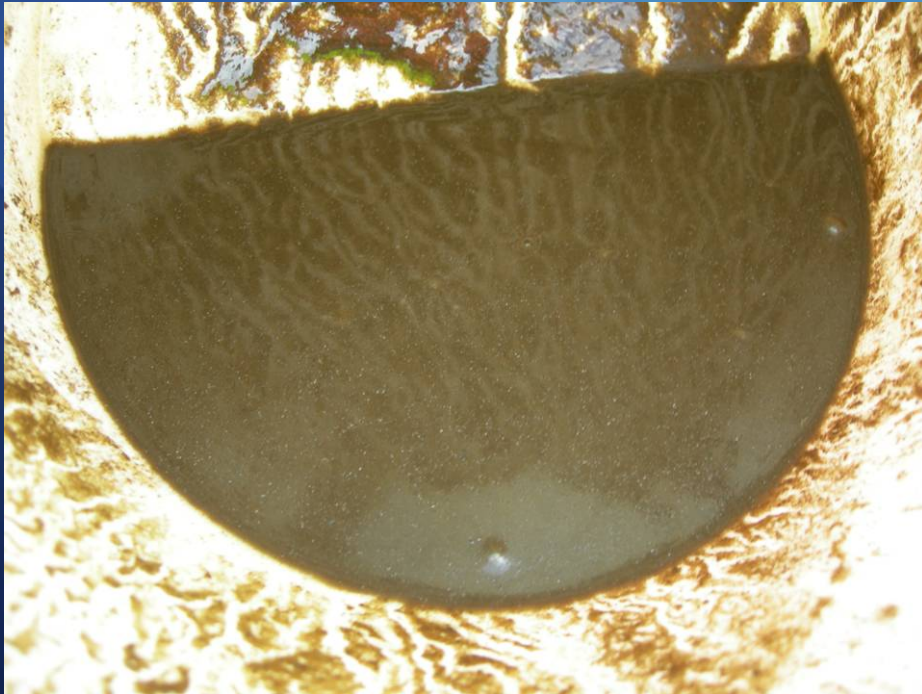


2. Flocculation



Before dosing flocculants

After dosing flocculants



2. Flocculation



3. Dewatering (geotubes)

- Deponie of 4.5 ha lined with HDPE.
- Geotubes of about 800 m³ each (during dewatering)
- 3 layers of geotubes



3. Dewatering (geotubes)



3. Dewatering (deponie)



3. Dewatering (deponie)



3. Dewatering (deponie)



4. Water Treatment Plant





1. The Svartsjö project proves that environmental dredging, dewatering and water treatment can be carried out by a synchronised process.
2. The process allows high throughput and ensures short execution periods.
3. Dewatering in geotubes has a double advantage: high throughput capacity and long-term reinforcement of the dewatered sediments in the deponie.



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