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State of the Art

MINING OF WASTE FROM OLD LANDFILL SITES FOR RE-USE OR RECYCLING

RESULTS OF SOME SPECIFIC SEPARATION TECHNIQUES OF MATERIAL FROM LANDFILL SITES (FLANDERS)

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Management

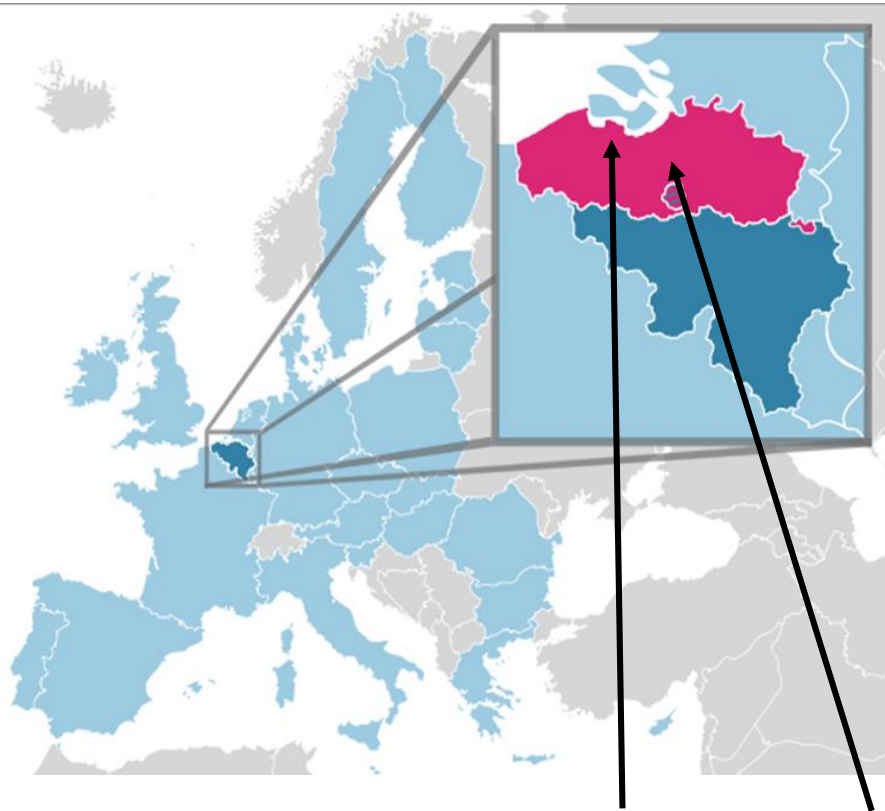
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MINING OF WASTE FROM OLD LANDFILL SITES FOR RE-USE OR RECYCLING

- ▶ Flanders
- ▶ OVAM
- ▶ ELFM -> General ELFM² approach
- ▶ Cases
 - Zuienkerke
 - Bornem
 - Vlierzele

Flanders



Ghent

Mechelen

General information :

- Population : 6,4 M inhabitants
- Surface : 13.599 Km²
- Densely populated : 472 inhab./Km²
- Highly industrialised
- Regional policies
- Important harbours (connections to NW- and central Europe)
- Limited natural resources

Mechelen

33,71 Km²

82.000 inhab.

2.400 inh/Km²

Ghent

156

260.000

1650



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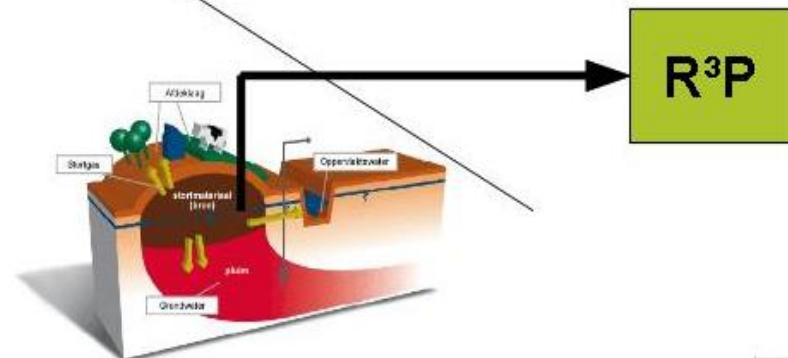
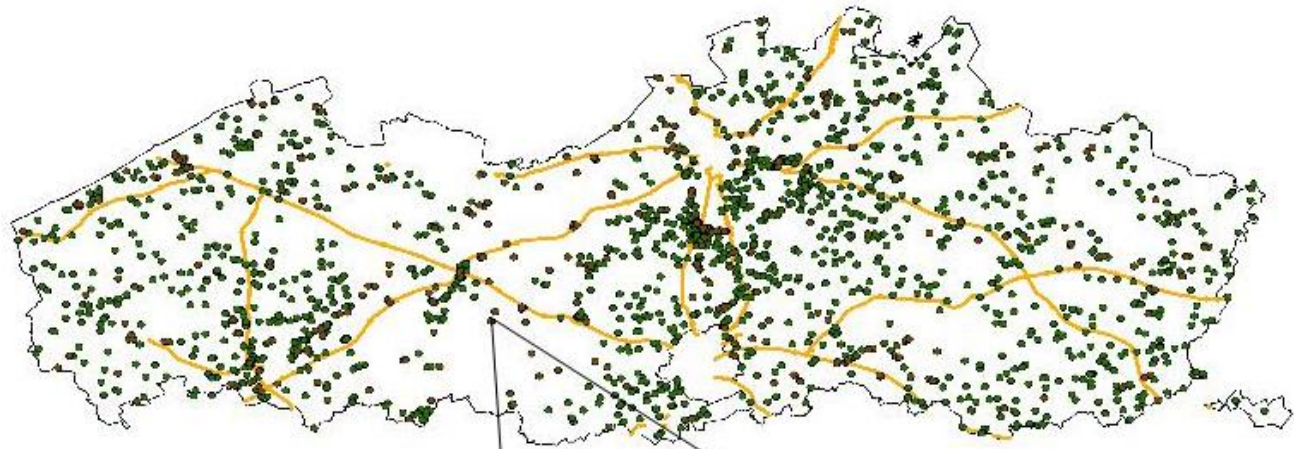
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OVAM

- Public Waste Agency of Flanders
- Environmental Agency headed by the Flemish Minister of Environmental Affairs
- Established in 1981 (State reform of 1980)
- Competent Authority for:
 - Waste Management;
 - Sustainable Material Management;
 - Soil Remediation.
- Staff: approx. 310 FTE
- Offices : Mechelen – Belgium
- www.ovam.be



Mapping – Surveying – Mining



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ELFM –cases : Zuienkerke

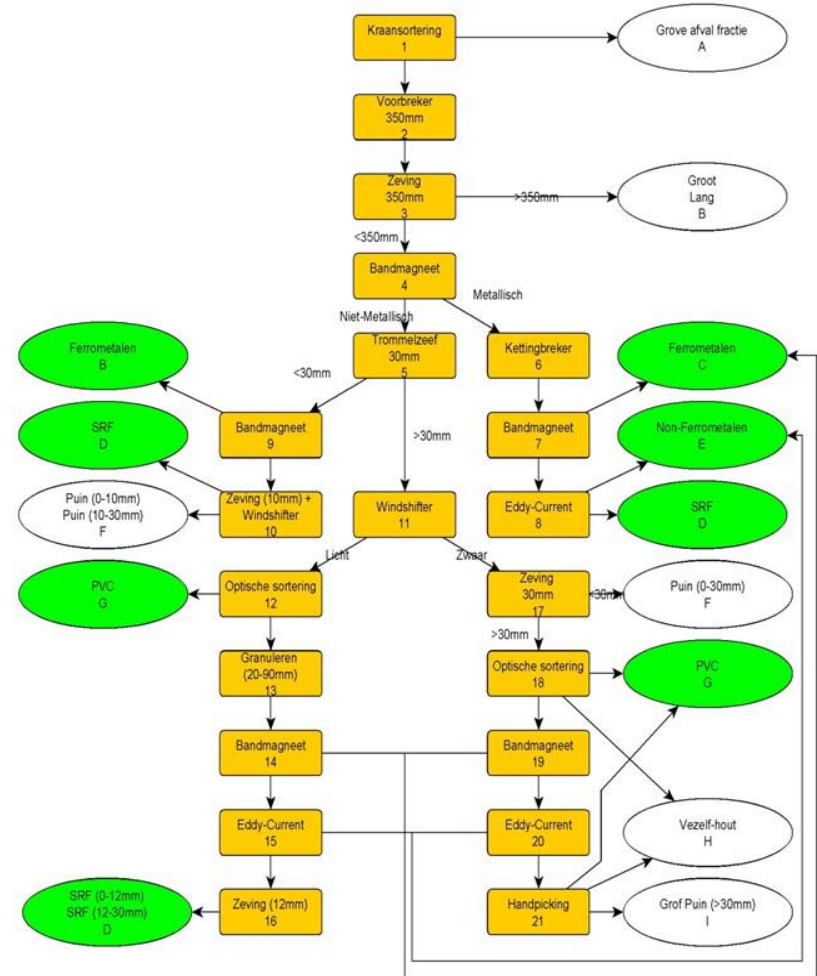
- ▶ Old clay mining pit
- ▶ Used as municipal waste dumping site 1957-1967 (2,5 m depth)
- ▶ Need for remediation – heavy metals , PAH's, EOX and mineral oil
- ▶ Potential human risk due to heavy metals
- ▶ Remediation project : 30 cm excavation of all area, geotextile and 60 cm new clean toplayer



ELFM –cases : Zuierenkerke

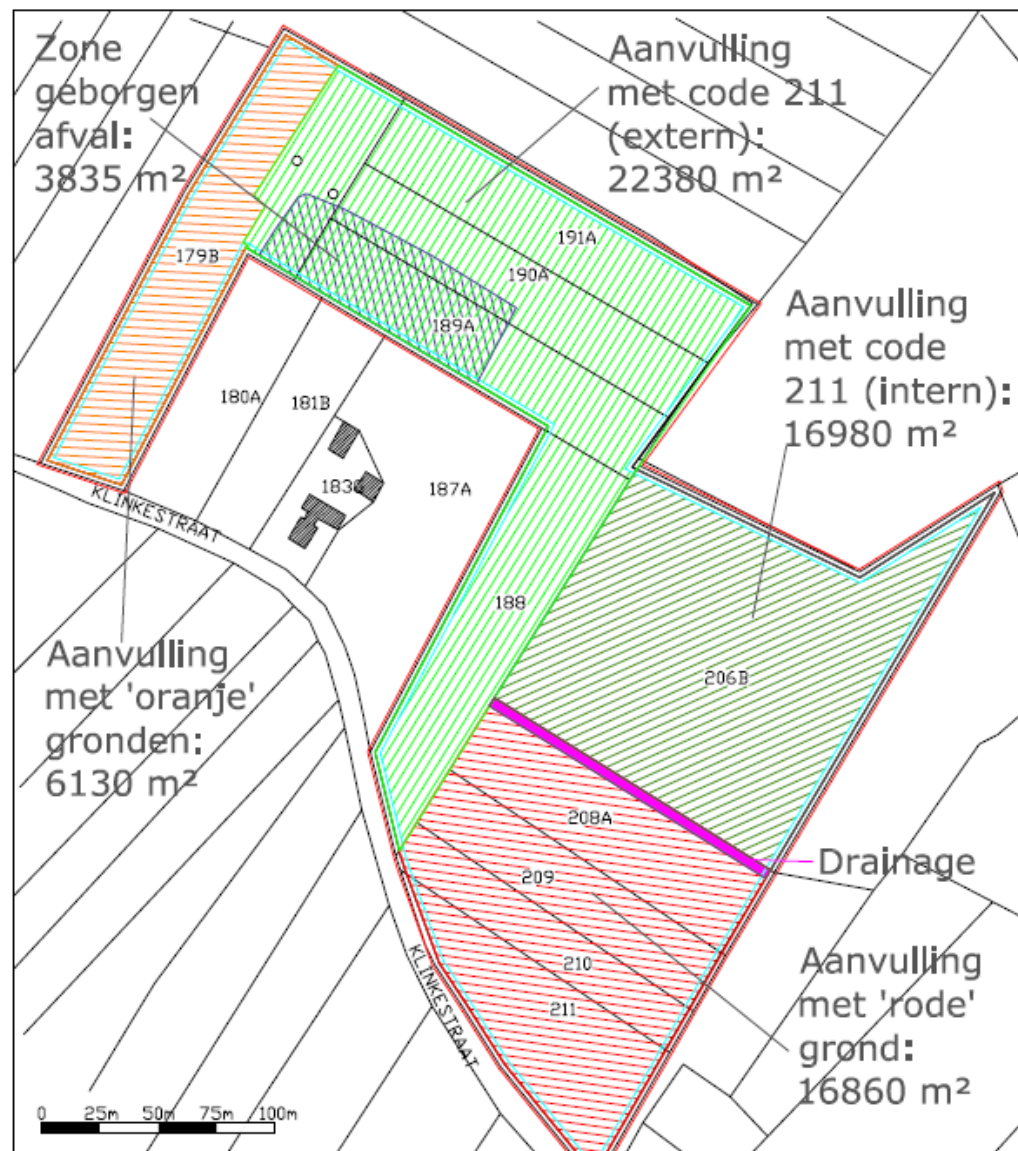
► ELFM experiment :

- 5 combinations of soil remediation and waste treatment techniques
- On site / off site
- 100 tonnes each
- Basic cost-benefit



ELFM –cases : Zuienkerke

- ▶ Area excavated till 60cm under ground level; permeable foil, clean layer of topsoil
- ▶ Waste separated in different fractions
 - “clean” soil : reused on site
 - Rough component (mainly waste): underneath 60 cm
 - Debris: broken and concentrated on 1 location near the pilot project area
 - Fine component (mainly soil fraction): Pb and Cd contaminated; concentrated on a specific location where pilot project on phytoremediation is planned
- ▶ Advantage of this approach : transport of waste on local roads is limited; > 65 % of the remediated area could be reused
- ▶ Disadvantage : use of part of the area is still limited to non-food applications

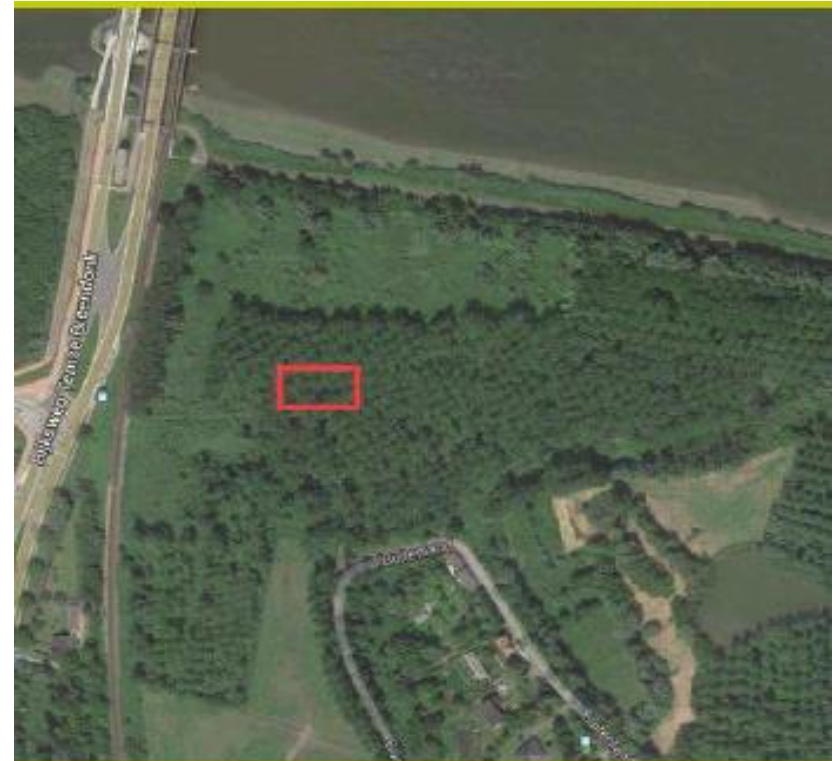


BSW OVAM ZUIENKERKE

DATUM	GETEKEND	PROJECTBEHEERDER	PROJECTNUMMER	LOCATIE
2015	DAN	SST	EB1205/035	Zuilenkerke
Eenheid	FORMAAT	ONDERWERP :		ENVIROSOIL NV
Meters	A4	Afwerking		

ELFM –cases : Bornem

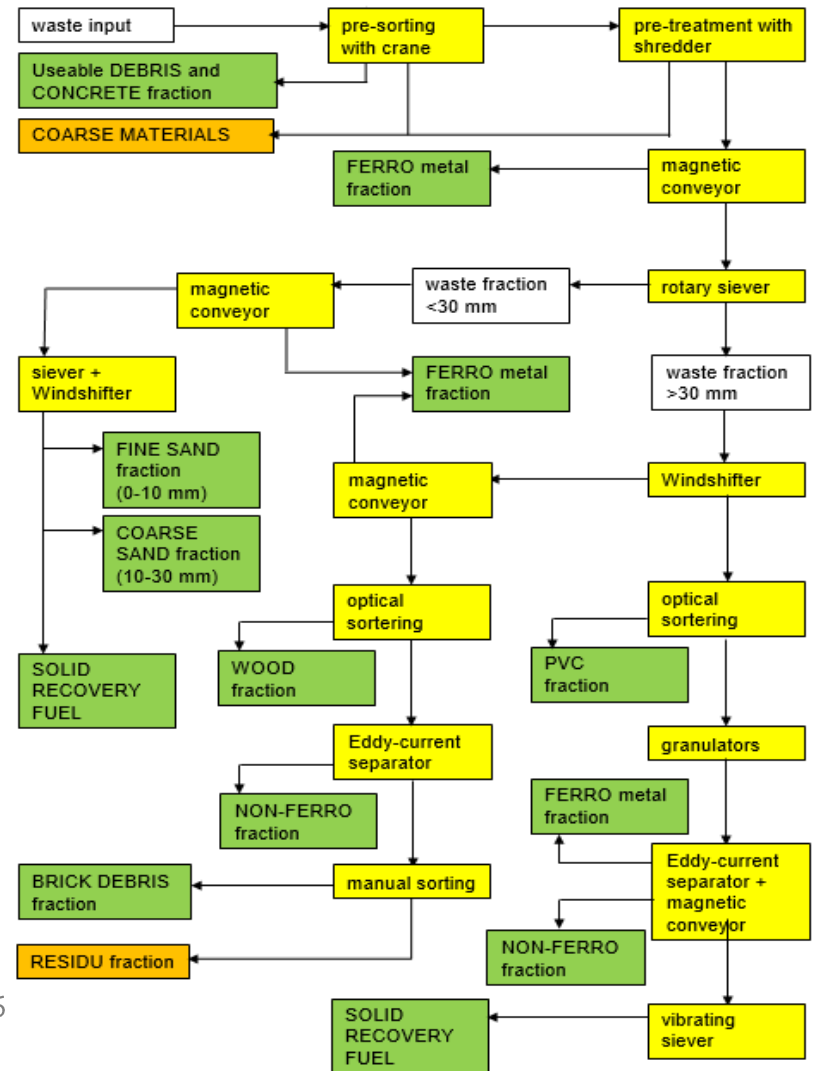
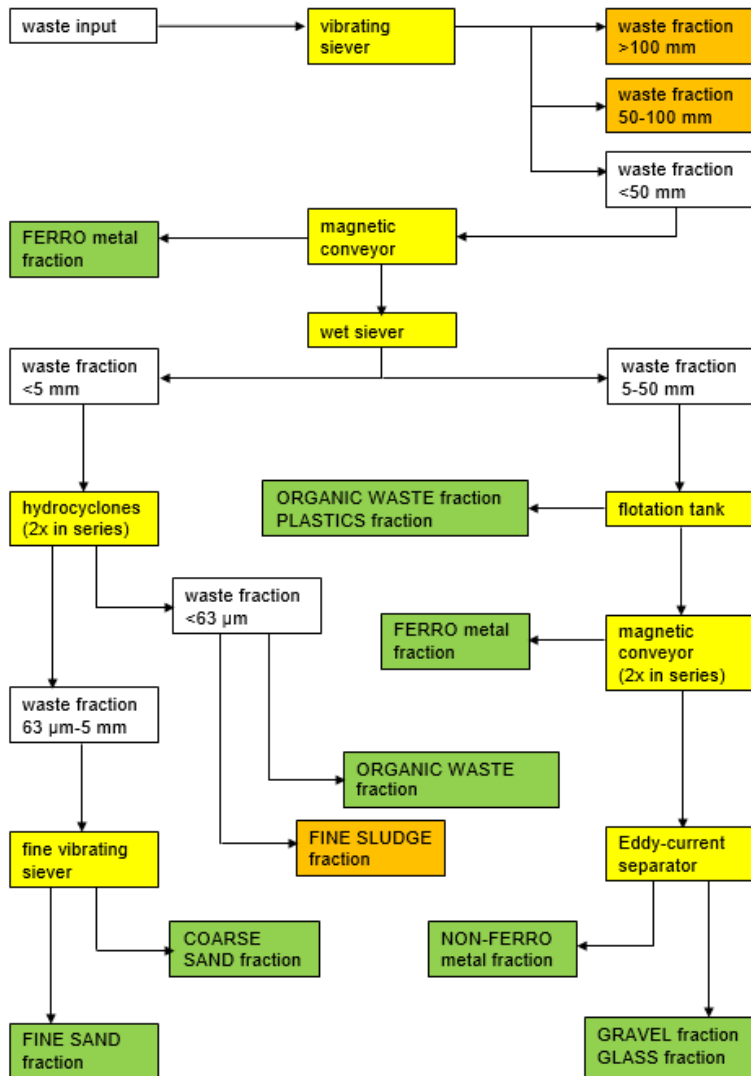
- ▶ **Near river Schelde**
- ▶ **Used as landfill site late '70s**
- ▶ **Municipal waste – industrial waste**
- ▶ **After closing, partially covered with clay layer; partially overgrown by trees**
- ▶ **Waste package 5 m**
- ▶ **8 m above ground level**
- ▶ **Need for remediation – heavy metals , PAH's, mineral oil**



ELFM –cases : Bornem



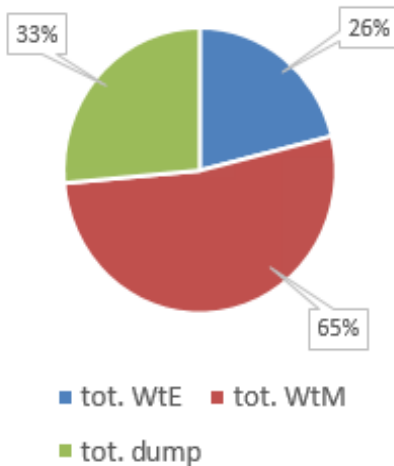
ELFM –cases : Bornem



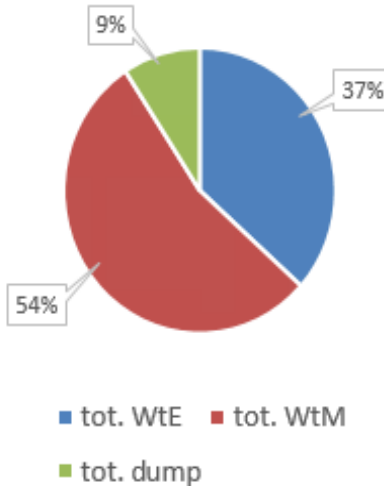
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ELFM –cases : BornemMJ/

Usage of fractions
contractor A



Usage of fractions
contractor B



► Contractor A

- Soil (50%); 20% organics and plastics; 15 % glass & gravel; 0,5% metals; others...
- Total amount (100%->125%)
- Wet technology : sludge
- Cal value 5,7MJ/kg

► Contractor B

- Dry technology
- Soil fraction 52 %; debris; 30% RDF (dirty);
- Cal value 8,35 – 13,7MJ/kg
- Waste separation (different fractions)

ELFM –cases : Bornem

▶ ELFM experiment :

- 2 combinations of soil and waste treatment techniques
- 500 tonnes each
- Basic cost-benefit

▶ Conclusions

- No visual presence of asbestos
- Organic fraction could be prepared for SRF
- Wet separation : Sludges have to be landfilled
- Ferrous Metal en non ferrous – recycling
- Technological: Gravel and glass could be separated;
- Sand, gravel – recycling if material would comply with legal standards

ELFM –cases : Vlierzele

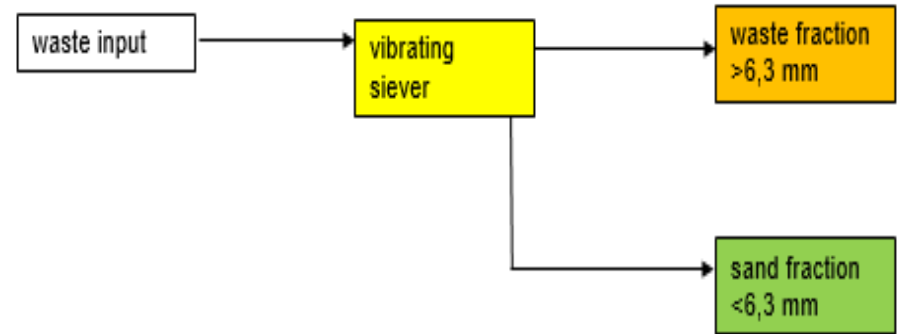
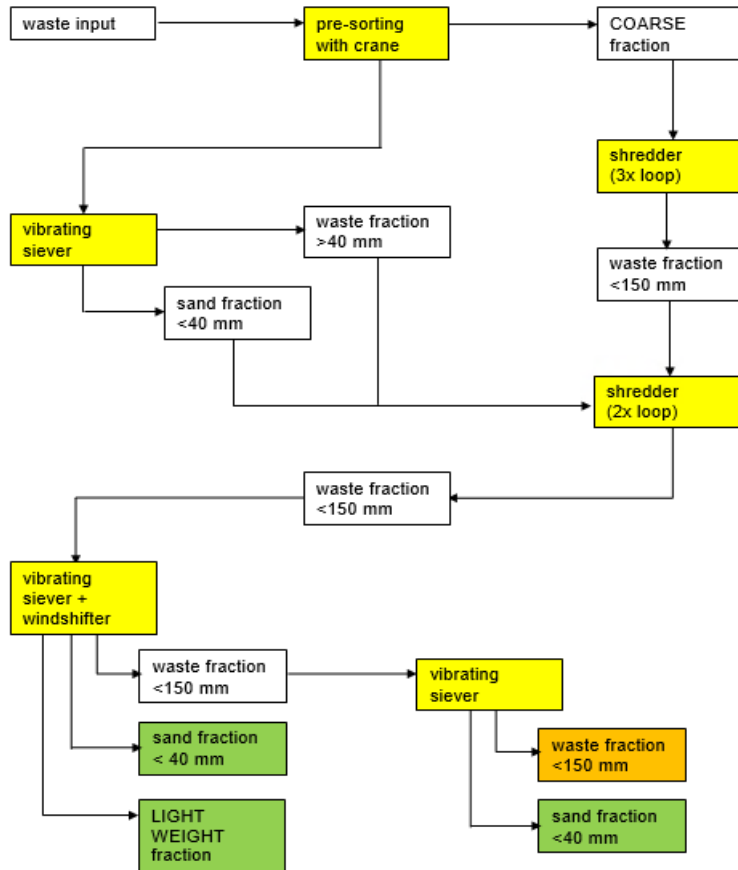
- ▶ **“constructed” around 1970 (old sand pit)**
- ▶ **contained more industrial materials (i.e. wires, glass, plastics, foam,...) and asbestos.**
- ▶ **Because of these industrial-like materials, soil and groundwater around the landfill site is polluted**
- ▶ **Waste package 7-8 m**
- ▶ **Need for remediation – asbestos, cyanide, heavy metals , phthalates...**



ELFM-case : Vlierzele

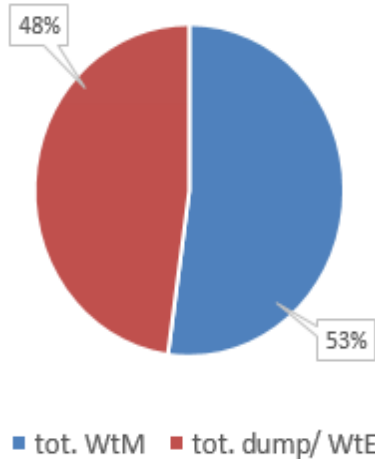


ELFM –cases : Vlierzele

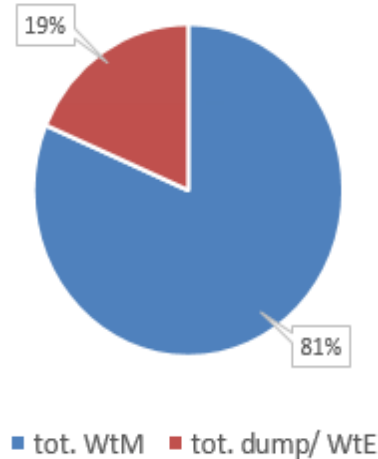


ELFM –cases : Vlierzele

Usage of fractions
contractor C



Usage of fractions
contractor D



► Contractor C

- Soilfraction (53%) ->landfilling
- Waste : heavy & light fractions
- Light fraction (plastics, but physically similar to heavy fr)
- Cal value 6,96 MJ/Kg

► Contractor D

- 81 % “soil” fraction
- 19 %
 - × carpet debris, plastics (18,6 %)
 - × Glass, stones (1,47 %)
 - × Metals (0,22%)

ELFM –cases : Vlierzele

- ▶ ELFM experiment :
 - 2 combinations of soil and waste treatment techniques
 - 500 tonnes each
 - Basic cost-benefit
- ▶ Conclusions
 - Sticky clay material
 - Heterogenous material
 - Separation tests were less advanced as case Bornem
 - No visual presence of asbestos
 - Ferrous Metal en non ferrous – recycling
 - Technological: challenge : glass and asbestos;
 - Sand, gravel – recycling if material would comply with legal standards

Thanks for your attention

Are there any questions?

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