

Closure of Bakoteh Dumpsite Proposal

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Zoning



EcoForward Consulting proposes the reclamation of Zones 1 and 2 by moving the waste in these zones into Zone 3, for the Bakoteh Dumpsite zoning.

Closure Timeline

A conservative timeline for closure is presented:

- 2021 Q2 : Site selected
- 2021-2025: Securing funding for new site and closure
- 2021-2025: Phase 1.A of closing Bakoteh dumpsite - start reclaiming/closing Zone 1 (the pond) and surrounding areas in Zone 2
- 2021-2030: Phase 1.B - implementing exclusive organized dumping in Zone 3 (middle)
- 2025-2030: Building new site
- 2030: New Site ready for use
- 2030-2040: Bakoteh Dumpsite cover and closure; closing of the site. First, placement of intermediate cap which needs to settle for 5-10 years, then final cover can be placed.

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Daily and Final Covers

- Organics collected are used as daily covers (> 5 cm deep) due to the lack of available soil material nearby.
- Once finalized, an intermediate cover must be placed (25-50 cm) that can be also made of compost and can be left for 5-20 years.
- The final cover consists of a clay liner of 50 cm and above, a soil layer > 50 cm. It must have a slope greater than 5% and plants must be planted in the soil layer to reduce erosion.

Gas Collection

Landfill gas venting trench on the eastern side (slopes down) to prevent gas from going inside the houses

Post - Closure

- The site is to be used as a resource recovery and waste transfer facility
- Once the final cover is placed, trees and grasses must be planted to prevent erosion
- An office should be built with necessary amenities and a composting area to prepare it from people's food scraps

Site Design

- EcoForward consulting is proposing the new landfill to be built using the "trench" method. Careful grading of the site prior to installing the barrier system will be required, the base of the site should have a slope of at least 2% (2%-5% is possible)
- The possible maximum height of the landfill is 30 m, in order to minimize the risk of landfill slides and erosion the slope must not exceed 25%. If the height is higher than 30 m, the maximum slope angle should be reduced or a benching should be installed

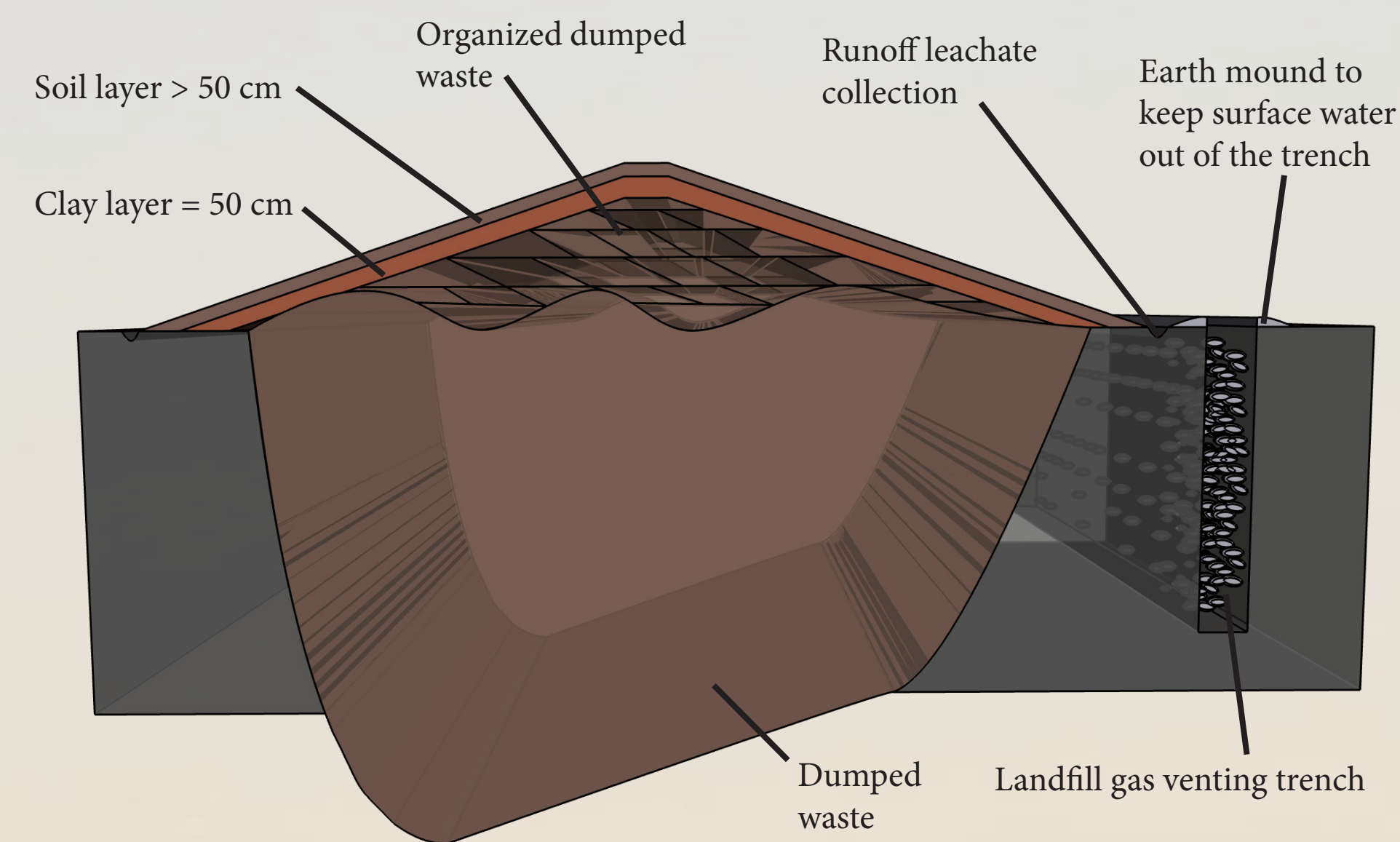
Base Liner

EcoForward Consulting proposes a base liner composed of clay soil to a depth of 30 cm compacted.

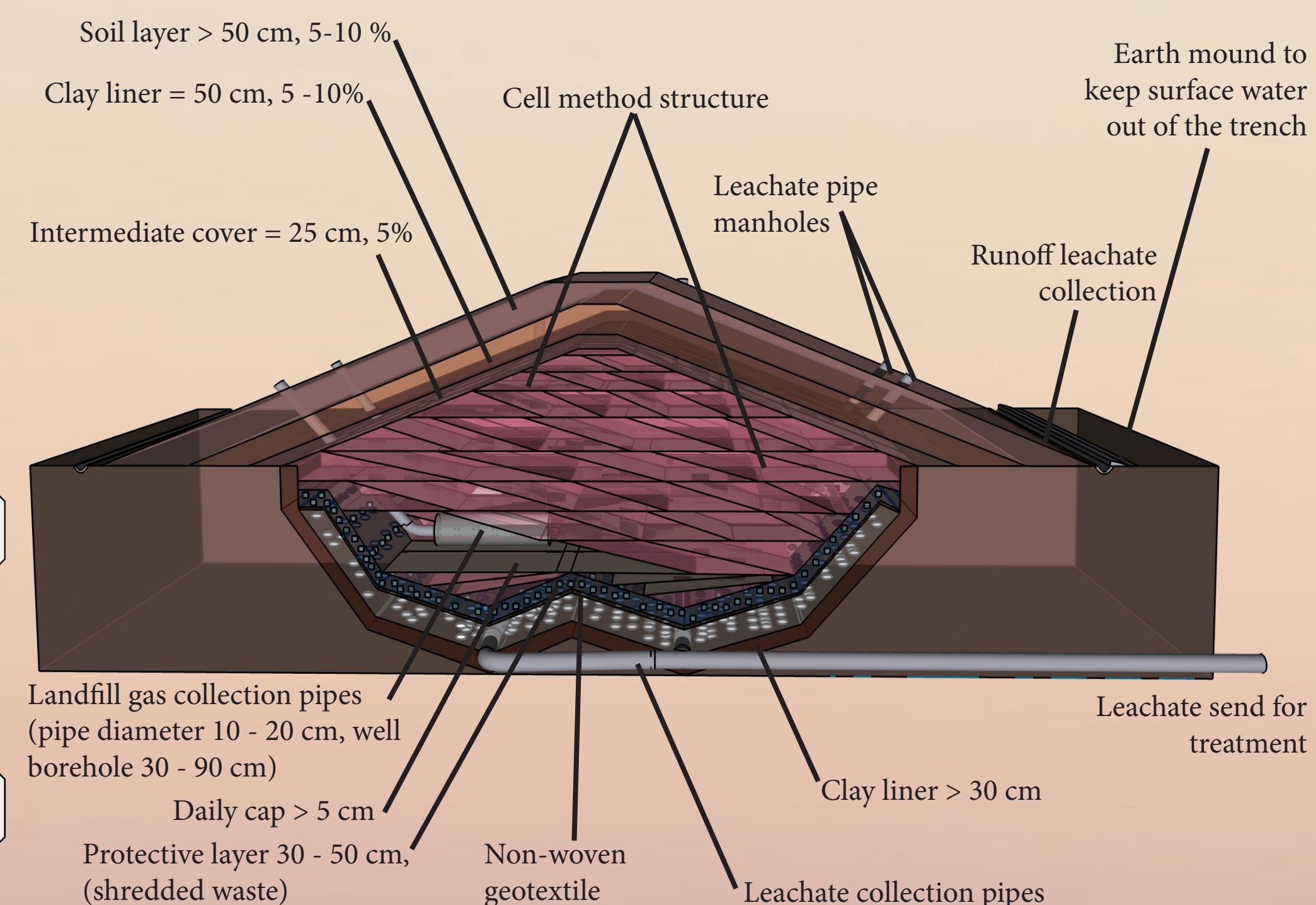
Waste Layer

For the waste layer, within a working face, a cellular structure is proposed

Dumpsite



New Landfill



Pond Closure

EcoForward recommends closing the pond by means of pumping the water out and filling it with soil and compacting it in layers of 30-50 cm with 3-5 passes with heavy equipment to prevent further leachates from reaching the groundwater table

Leachate Control

- Implementation of a waste segregation system from home, in which wet (organics) are separated from dry (inorganics) to reduce amount of leachate formed
- Collection of runoff from landfill
- Extent of leachate treatment will be limited due to space available and difficulty to extract leachate

Recommendations

Municipality to pass legislation and enforce waste segregation (into wet/organics and dry/inorganics) from home. In addition, to adapting the infrastructure to collect segregated waste

Investigate a suitable location for leachate treatment ponds

Drainage and Leachate System

- Above the base liner, a non-woven geotextile should be placed to maintain the drainage system unclogged. Above the geotextile or base liner, a drainage layer made up of gravel to a depth 80 cm (min 50 cm) layer must be added.
- The collected leachate will be treated using a set of anaerobic and aerobic ponds, in addition to a constructed wetland or maturation pond.

Configuration

A "saw tooth" configuration is recommended for the leachate system, each set of two slopes and low point make a working face.

Landfill Gas

The landfill gas (LFG) collection system consists of extraction wells, a system of lateral and header (manifold) piping to convey the collected LFG, a condensate management system, a blower and flare system, monitoring devices, and system controls.