



Foothills Regional Landfill and Resource Recovery Centre

Evapotranspiration Biocover Project

Michel Lefebvre

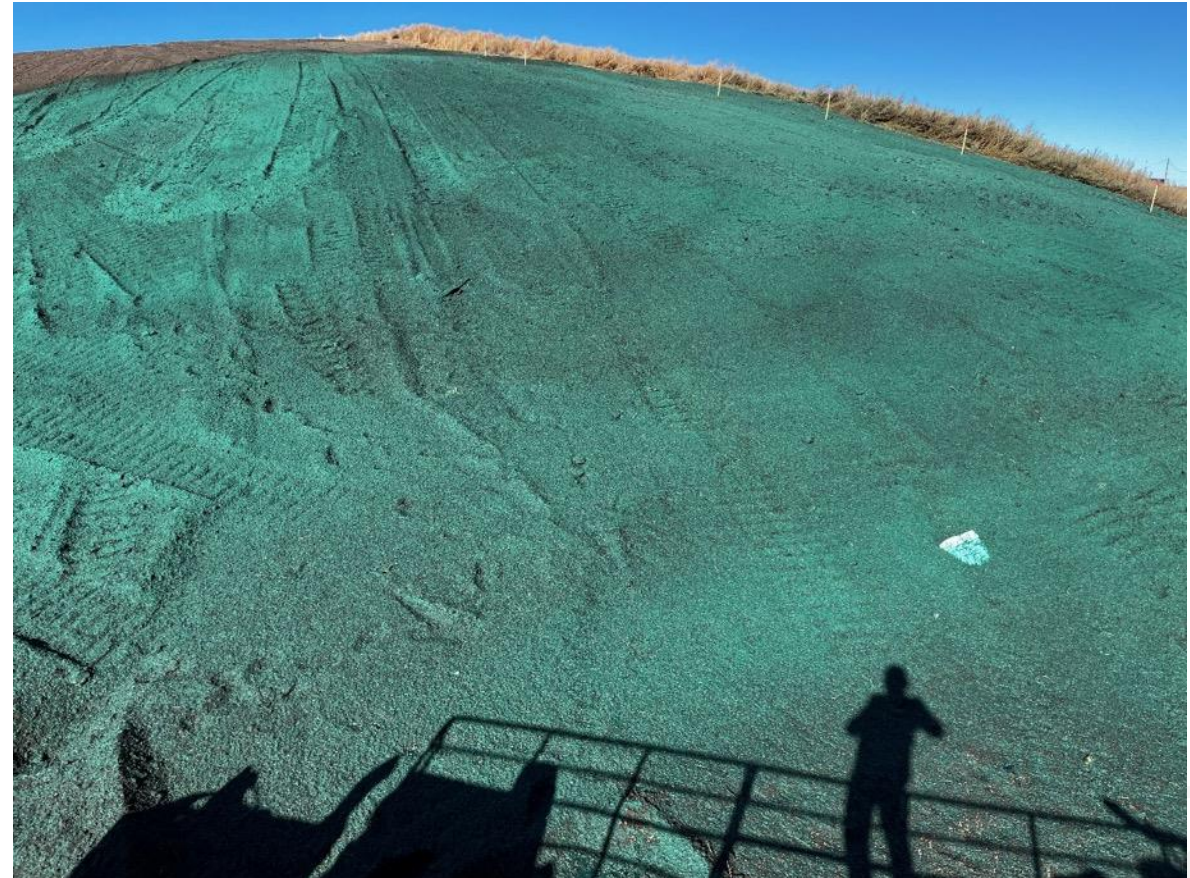
Joe Angevine

April 24, 2026

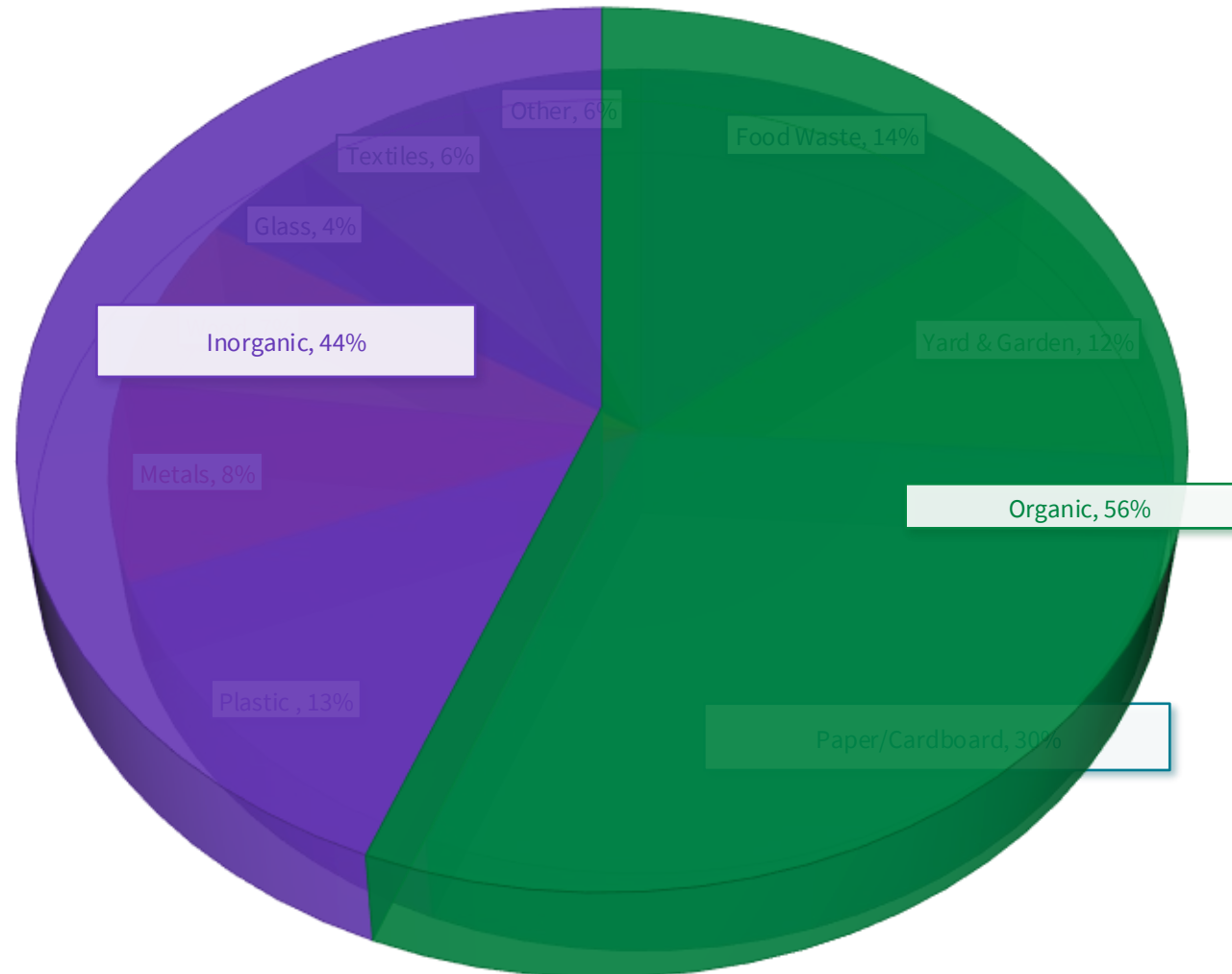


Overview

- Evapotranspiration Landfill Biocover
- Feasibility and Design
- Regulatory
- Procurement
- Construction

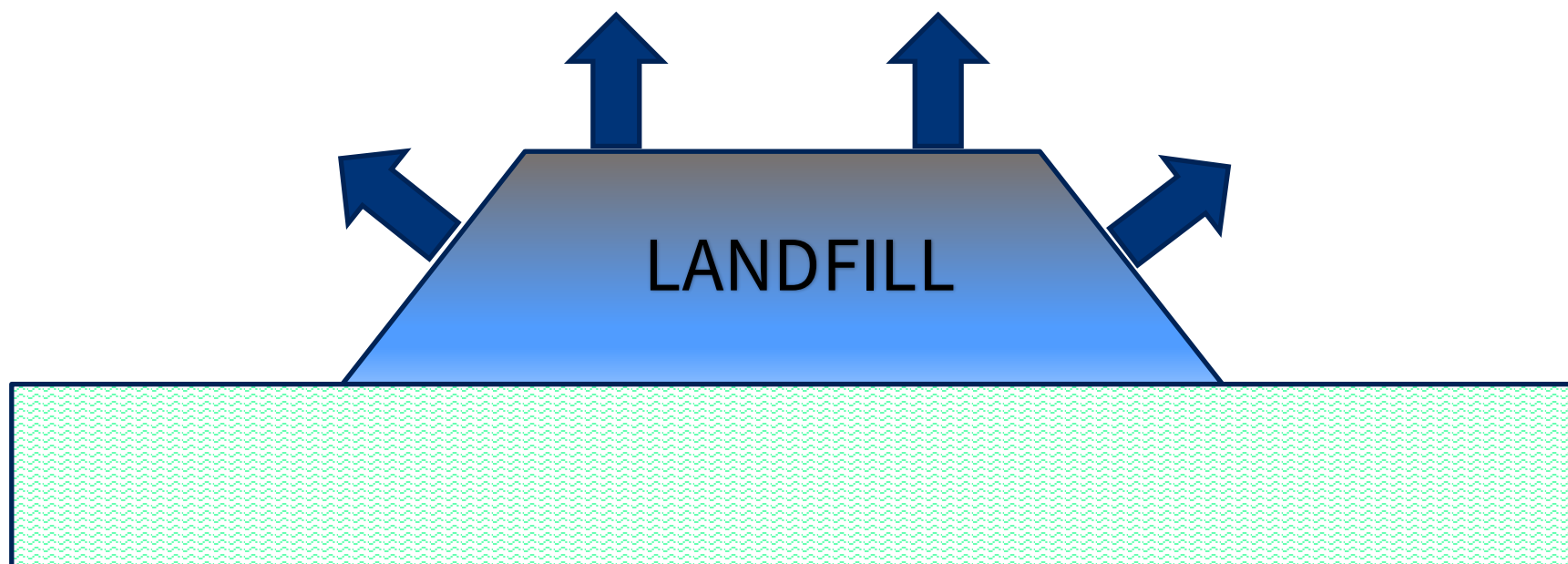


Where Does Landfill Gas Come From?



Methane is a
Potent GHG with
Global Warming
Potential 28 x CO₂

Methane
LANDFILL GAS
Carbon Dioxide



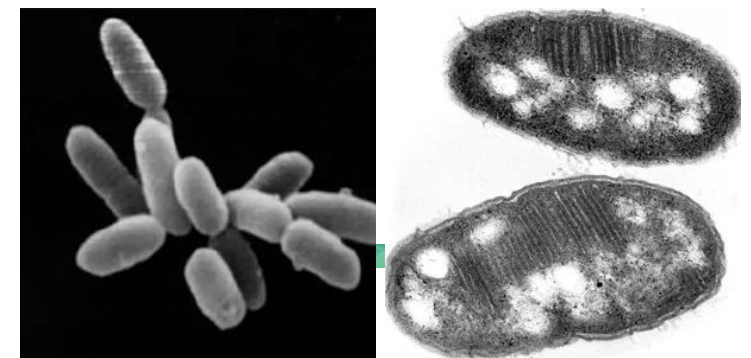
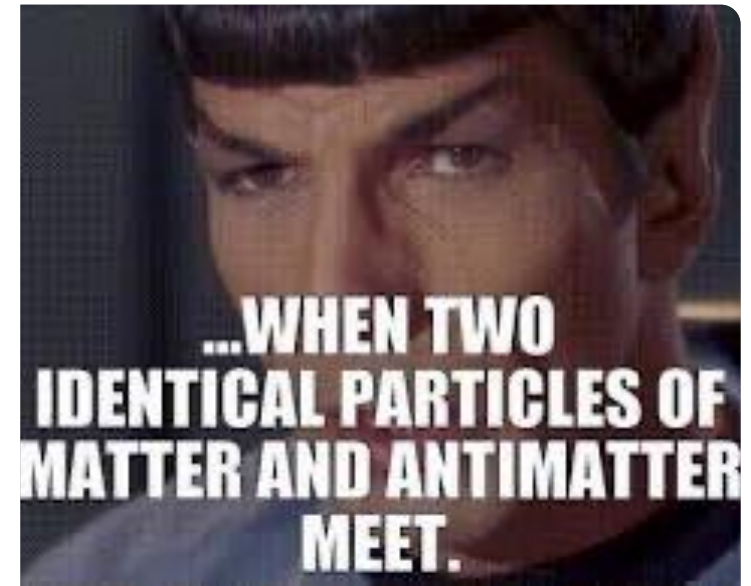
Traditional LFG Management

- Active Gas Collection
 - Typically only suitable for large landfills.
 - Very expensive to construct, operate and maintain.
 - Utility connections required.
 - Collection efficiencies range from 50-70 percent.
 - Requires ongoing monitoring and maintenance.
 - Trained technical staff required.



Fortunately, there is a balance in the universe!!

- Methanogens create methane
- Methanotrophs consume them



Methane Emission Mitigation Strategies

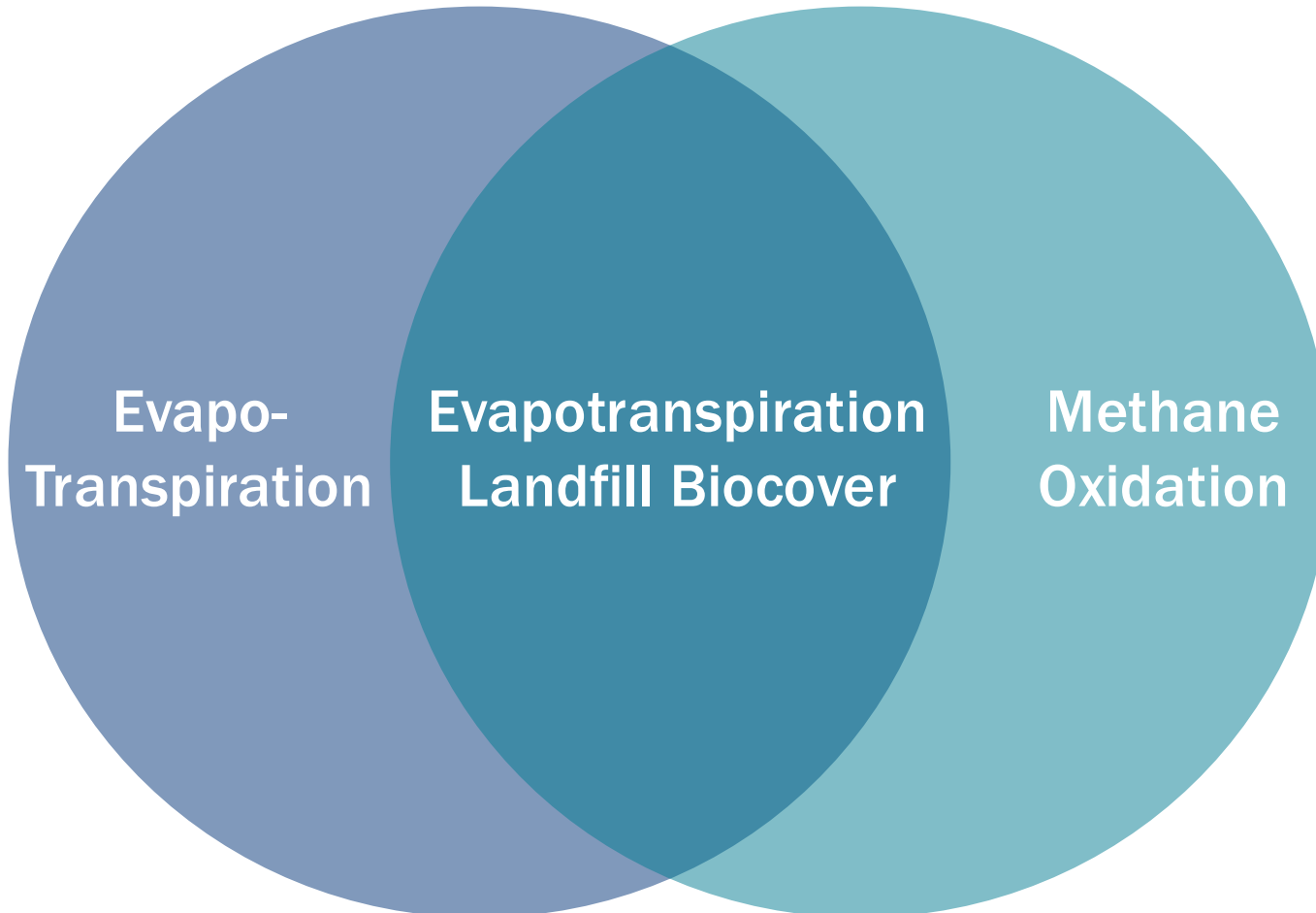
Passive ET-LBC



- ET-LBC technology can be an alternative or complementary to active LFG collection.
- Applicable to small landfill site where active collection either impractical or not feasible.

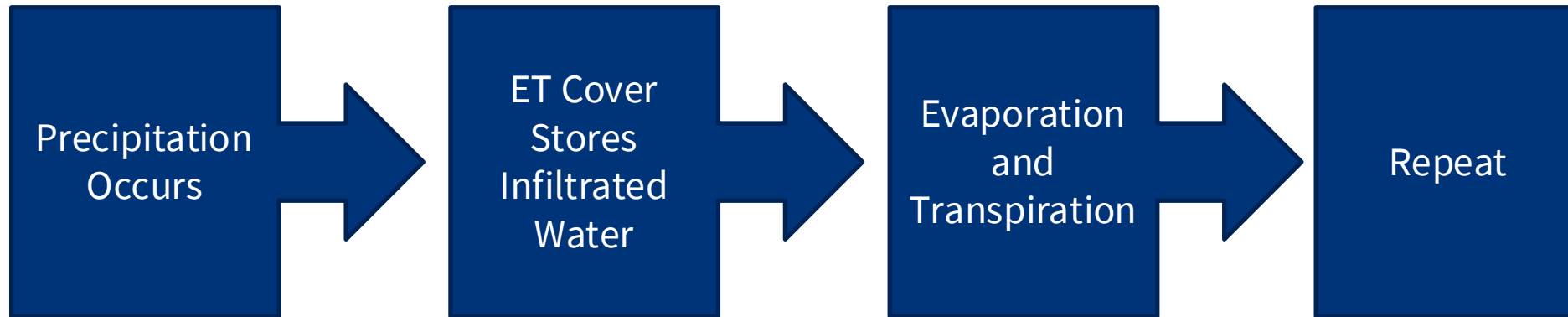


What is an Evapotranspiration Landfill Biocover?



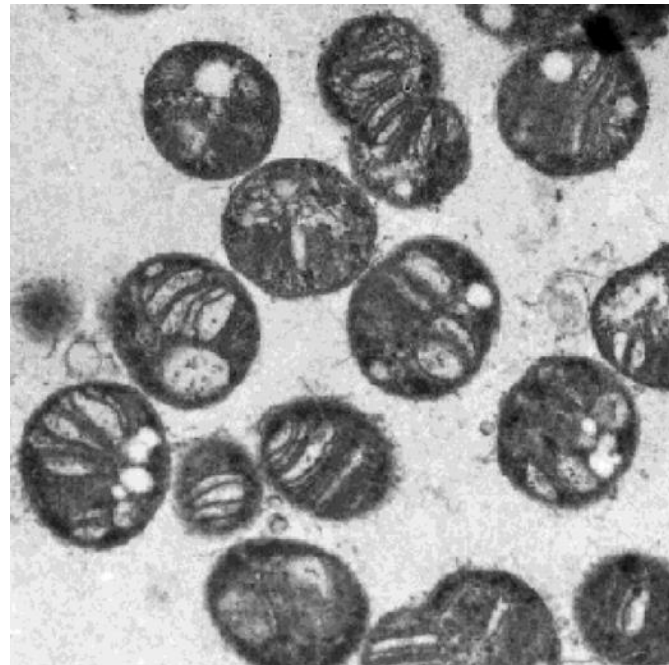
- Suitable for semi-arid regions.
- Acts like a sponge to store moisture.
- Can outperform clay caps in suitable environments.
- Provides a suitable habitat for bacteria to convert methane to carbon dioxide.

Evapotranspiration Cover Systems



Methane Oxidation

- Naturally occurring, aerobic organisms
- Methanotrophs convert CH_4 to CO_2



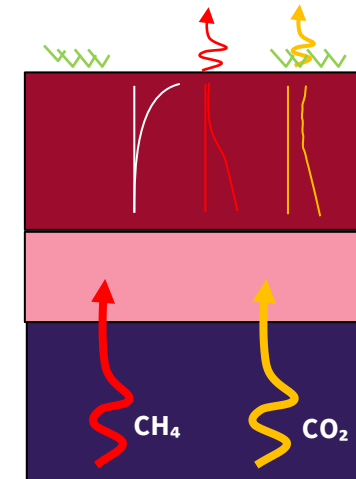
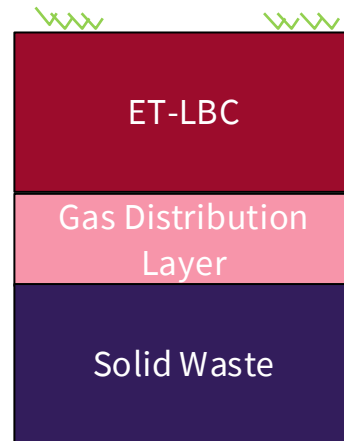
WE LOVE
METHANE!

ET Biocover Closure

- Suitable to semi-arid regions.
- Acts like a sponge to store moisture.
- Can outperform clay caps in suitable environments.
- Provides a suitable habitat for bacteria to convert methane to carbon dioxide.



How do We Apply this to Landfill Covers?



Leduc Demonstration Project

- Hypothesis – ET-LBC would work in Alberta’s climate
 - Performance equal to or better than a compacted clay cover
 - Methane oxidation rate of 60 percent
 - Not susceptible to significant depth of frost penetrations



Hat-Trick!

1. Organics diversion
2. Use for previously landfilled by-product
3. Reduced emissions



"I tell you this thing is a touchdown! It's a slam dunk!
A home run! And, consequently, a hat trick."



1. Organics Diversion

- Composting programs
- Reduce LFG emissions
- Reduce settlement, increase airspace opportunity



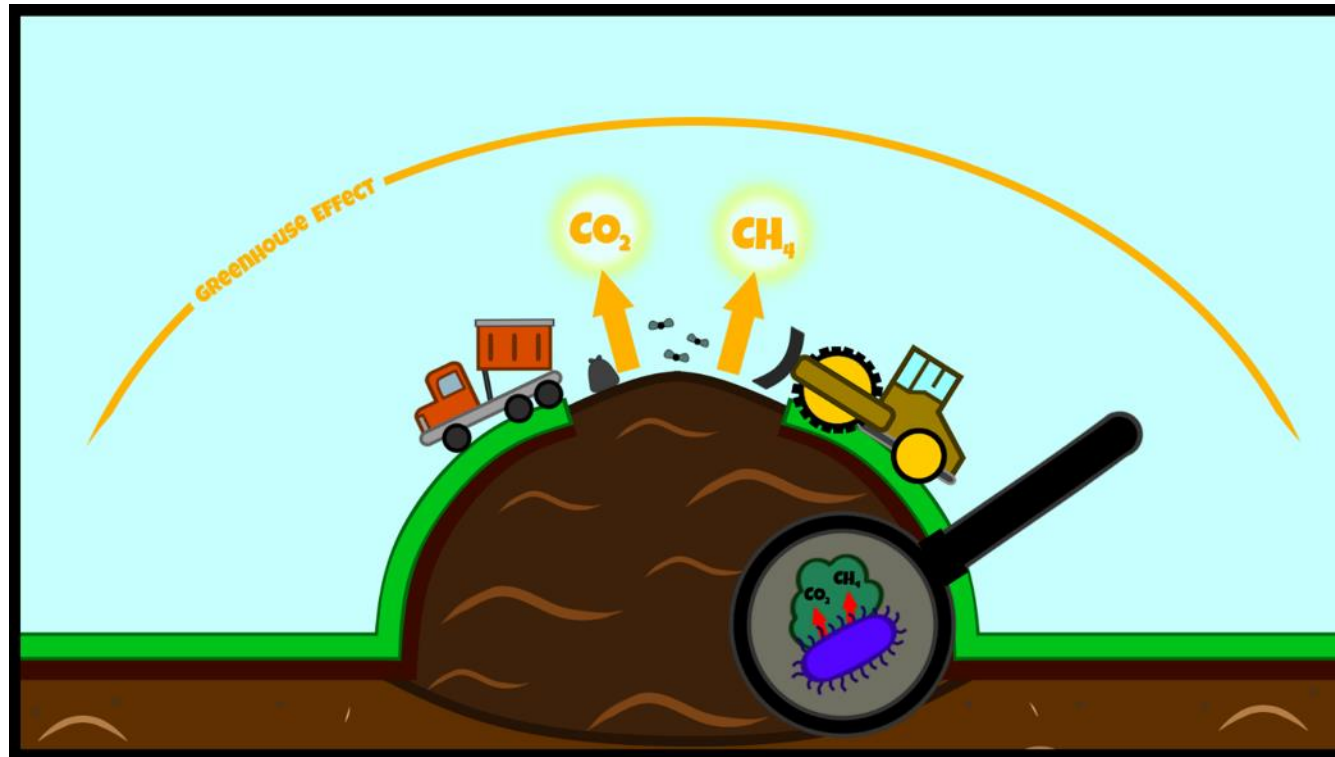
2. Previously Landfilled Byproduct

- Screenings from compost are typically landfilled
- Opportunity to use as soil amendment
- Nutrient supplement for methanotrophs



3. Reduced GHG Emissions

- Methanotrophic oxidation of methane
- Reduced GHG fugitive emissions



Foothills Regional Landfill & Resource Recovery Centre (LRRC)



Regulatory



- Landfill operating under Approval No. 47447-02-00
- The approval holder shall undertake final closure and reclamation of the individual landfill cells in accordance with the closure plan specified in the application, unless otherwise authorized in writing by the Director.
- The approval holder shall apply for an amendment to this approval for final landfill closure by submitting to the Director a:
 - Detailed Final Landfill Closure Plan; and
 - a Landfill Post-Closure Plan.



Installation Details



Eliminate Leachate Outbreaks

- Strip off old intermediate cover and expose leachate outbreaks
- Fixed outbreaks wherever possible
- Installed toe drain system



Mix Design

- 25% Compost
- 25% Topsoil
- 15% Topsoil/subsoil mix
- 35% Subsoil



Distribution Layer (Woodchip)

- Woodchip lets methane disperse evenly through the soil layer



Hauling Mixed Soil

Low ground pressure equipment only on the woodchip and soil

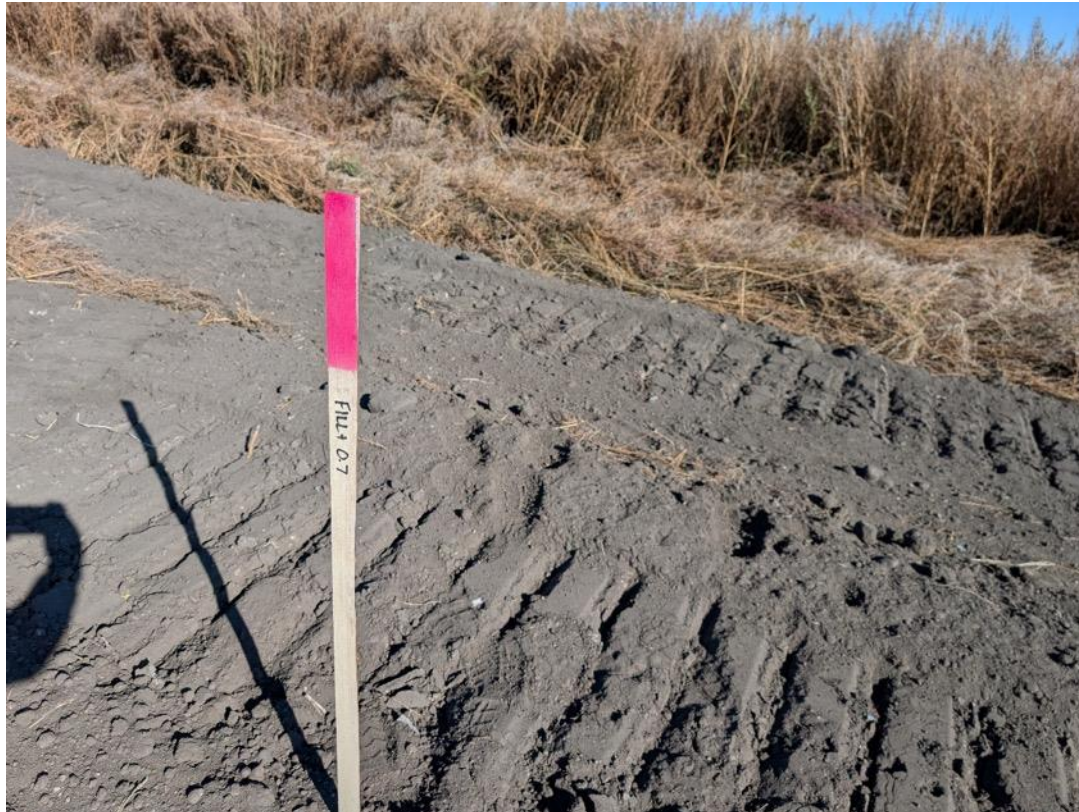


Spreading Mixed Soil

Low ground pressure equipment only on the woodchip and soil



Survey Confirmation

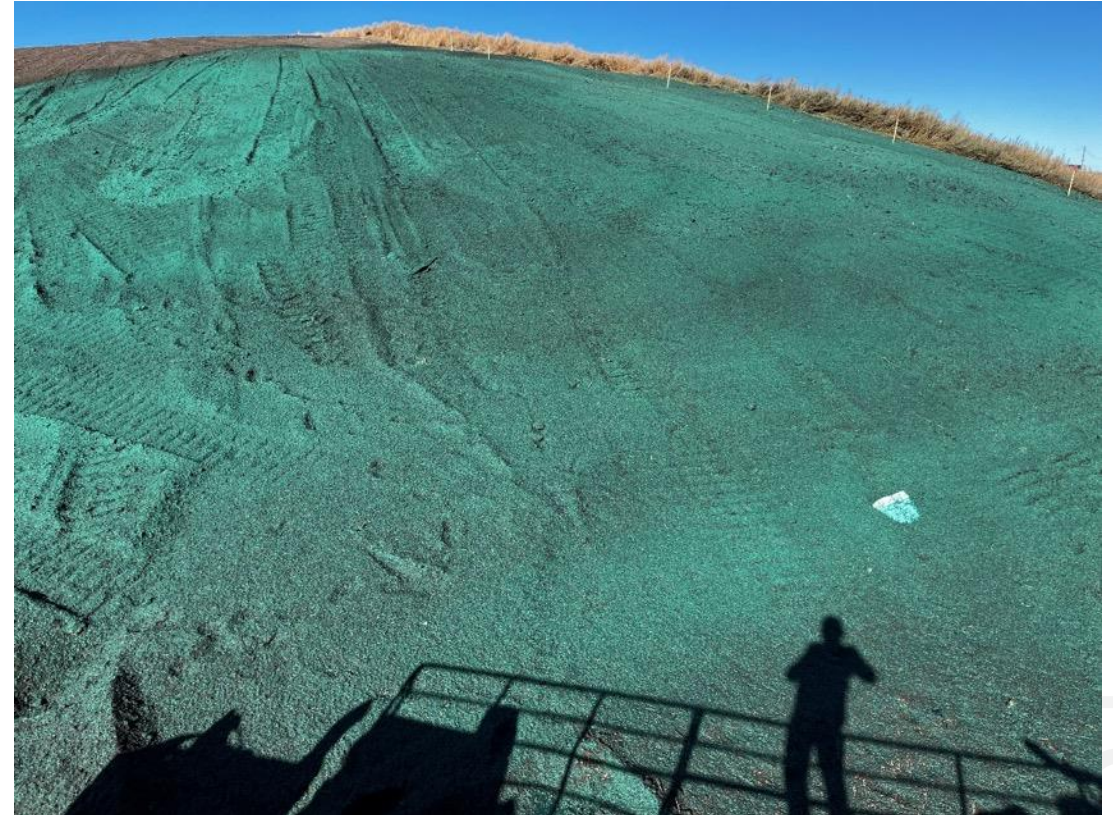


Erosion Control

Retaining Wall built in steep area



Hydroseeding



Final Cover Complete



Questions?