

# Biofilters Lessons learned

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# Frankham and Ridge

## 5 lessons

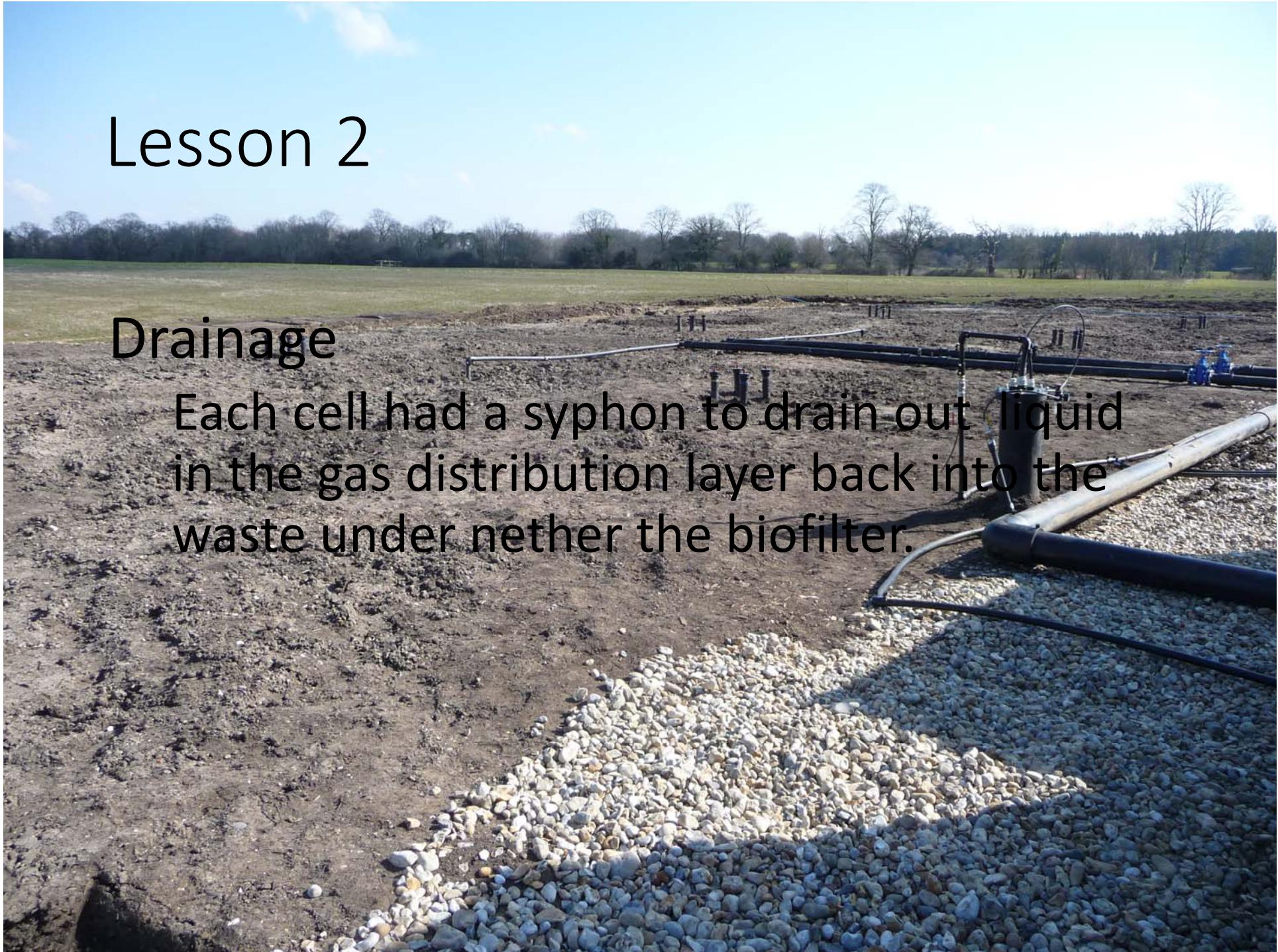
1. Starting Biofilters in the middle of winter is no fun!  
Frankham had 4 cells with different mixtures of the matrix  
Those with a higher compost content than the others starter faster
2. Drainage
3. Short circuiting
4. Sampling
5. Power



# Lesson 2

## Drainage

Each cell had a siphon to drain out liquid in the gas distribution layer back into the waste under nether the biofilter.



# Lesson 3

## Short Circuiting

The sides of each cell were constructed vertically.

As the media started to settle and decompose it pulled away from the sides resulting in a simple pathway for the gas to escape from the gas distribution layer directly to atmosphere.



## Lesson 4

### Research data(sampling)

Both of these projects were considered to be research projects and as such gas samples at different depths in each cell were taken by installing 1" sample pipes.

Over time these started to become filled with water and became a weak point.



# Lesson 5

## Power

You need enough power to drive the blower(s).



# Site W.

- Designing a new biofilter for;
  - Stopped taking waste 40 years ago.
  - Pumping trial done covering ~16% of the site only 1 well out of 6 showed methane up to ~ 25% other 5 almost nothing
  - Site is approximately 21 hectares which was recapped with a new membrane and 500 mm of virgin soil.



# Design criteria

Sufficient retention time in the media (based on pumping trial)

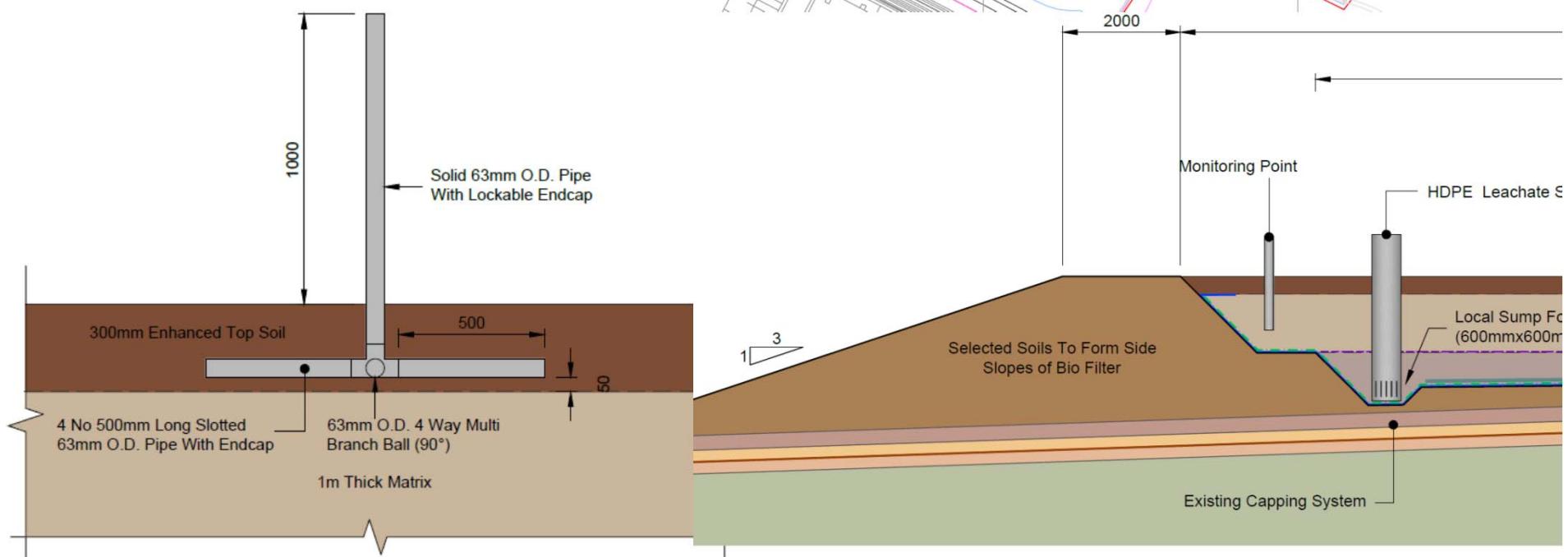
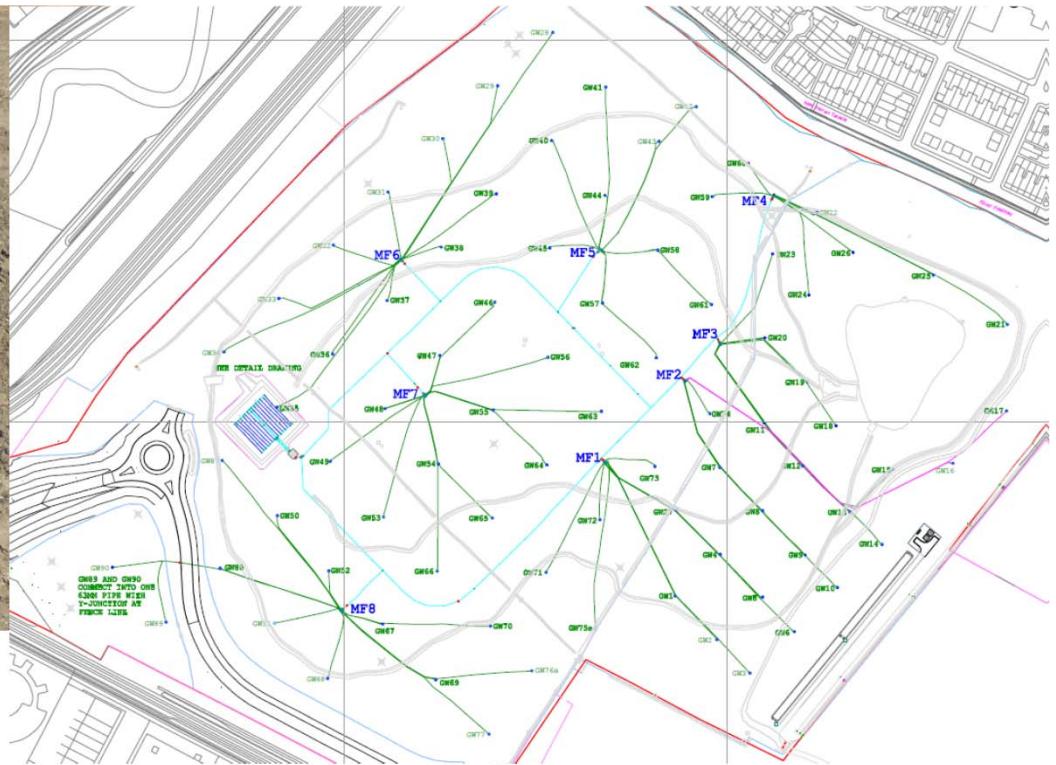
Even gas flow through the media

Avoid short circuiting at the edges

Avoid surface cracking

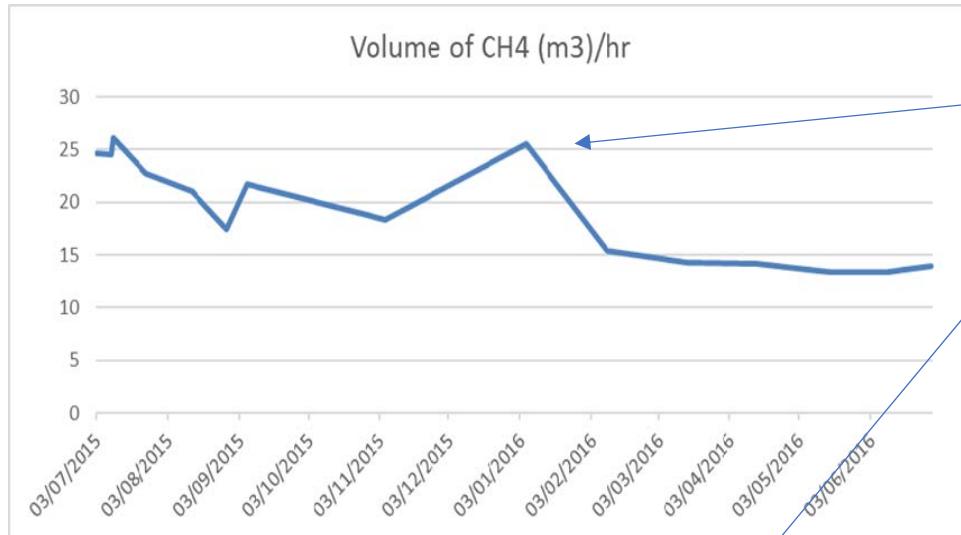
Controlled drainage

Limited monitoring points (as not needed)

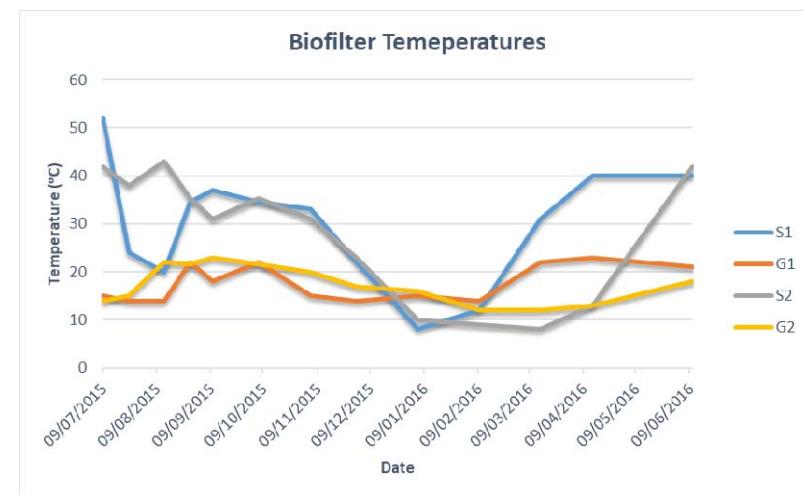
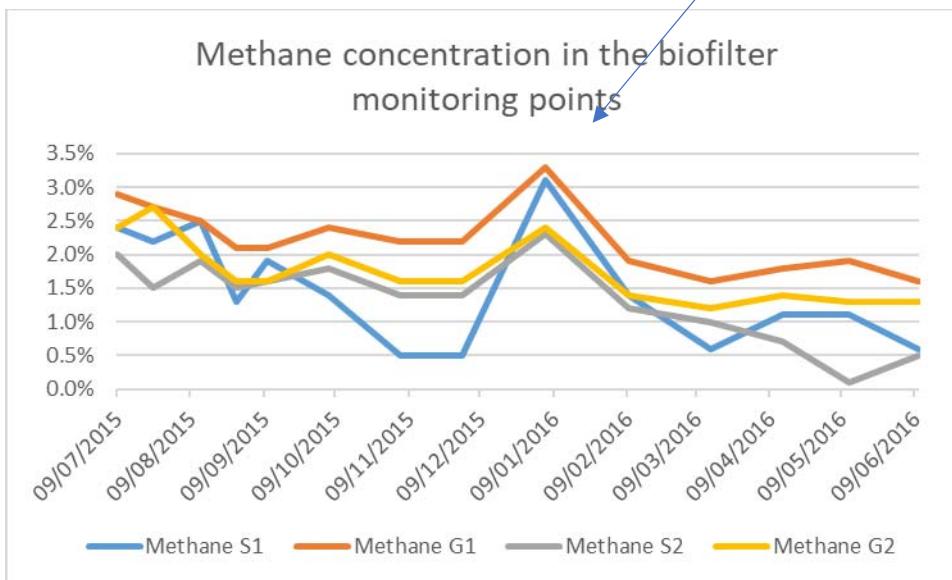




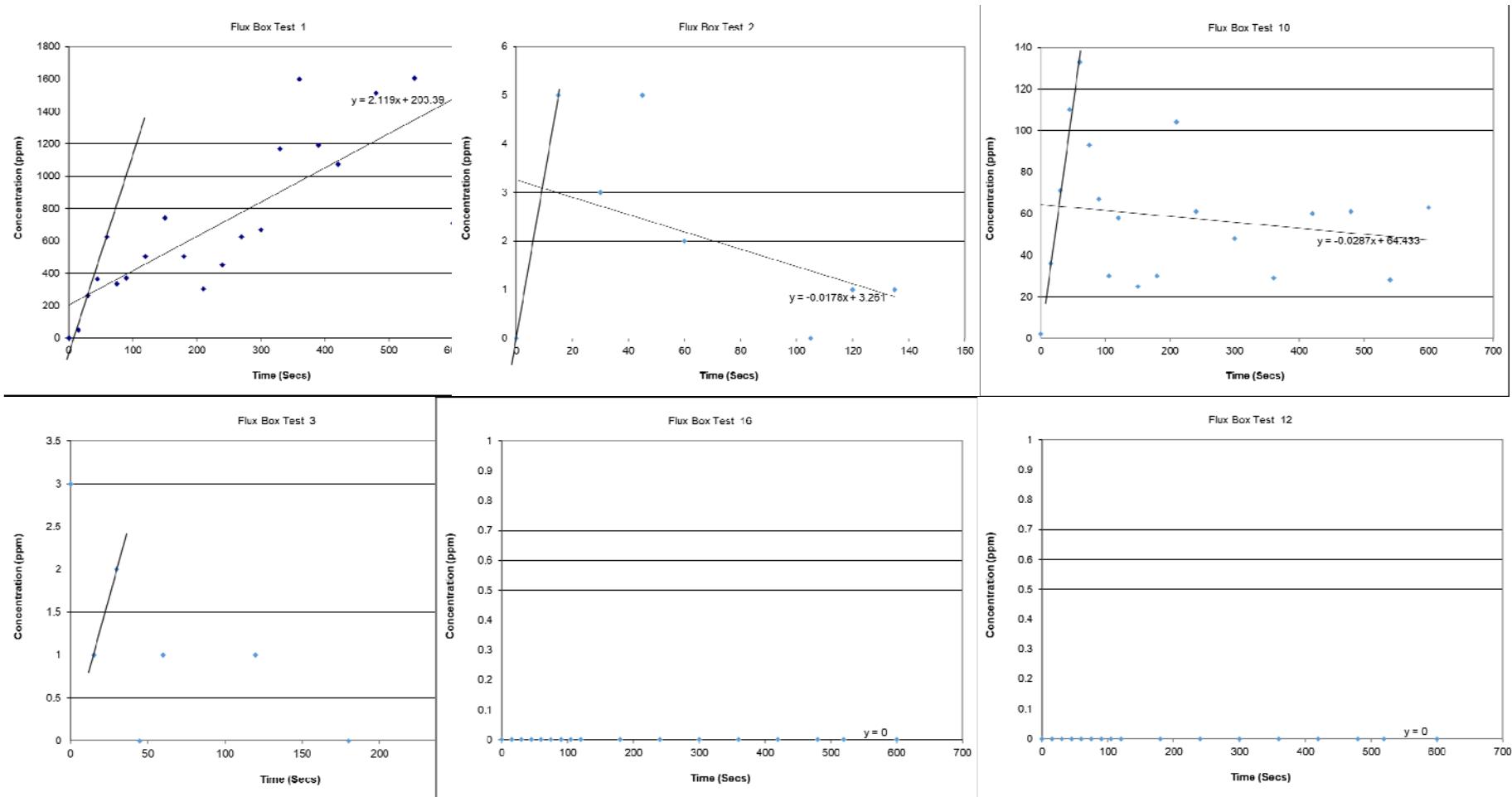




More wells opened



# 16 Flux box tests 2016



Over all flux calculated at =  $1.91 \text{ kg(CH}_4\text{). hr}^{-1}$  which is  $\sim 80\%$  methane removal efficiency

# Conclusions

- Biofilters are a excellent follow on technology after landfill gas can no longer be utilized or flared.
- Good design can prevent some of the early teething problems
- We see bi-oxidation occurring in the perimeter monitoring data at very many sites in natural insitu soils, so a significant reduction in costs may still be possible in the matrix material
- Don't do a pumping trial before you replace the cap!

Thank you