



MVV Environment – PPC permit PPC\A\1003157 Sampling Plan for Metals, Dioxins, Furans and Dioxin-like PCBs in Soils

Purpose

This proposal forms part of supporting documentation to the application for Variation of the existing permit PPC\A\1003157 to allow for concurrent operation of the existing fluidised bed EfW Plant together with the new moving grate CHP EfW plant for a period of up to 10 years.

Further to the Human Health Risk Assessment study, this sampling plan has been requested in order to demonstrate that there are no significant impacts from metals, dioxins and furans at nearby sensitive receptor locations. The preference is for monitoring to begin before the new facility comes online to provide background data without the potential effect of the new facility emissions.

Methodology

MVV propose to carry out a campaign of soil sampling from sites in the vicinity of the two waste incineration plants at Baldovie Industrial Estate, Dundee, Scotland.

Composite samples of soil will be taken along the axis of the prevailing wind, in areas of predicted maximum deposition to ground as detailed in the Air Quality Assessment (AQA) and the atmospheric plume dispersion modelling.

Sampling will be carried out prior to commissioning of the CHP EfW, monthly for the first six months of parallel operation, and a test repeated after 5 years of parallel operation.

The soil samples will be analysed to identify content of heavy metals, dioxins and furans, dioxin-like PCBs and soil organic matter (SOM)

The results of these tests will be assessed to provide benchmark levels of soil concentrations against which to assess any impact of the parallel operation of both plants.

Sampling Location Criteria

Four sampling locations were chosen downwind of the prevailing wind, and two sites were chosen upwind to act as controls. The downwind locations were selected in the area of predicted maximum ground level concentration from the atmospheric plume dispersion model.

The sampling locations were chosen taking into account the following criteria, so far as could be determined:

- Samples were to be collected from undisturbed sites: sites to which soil may have been imported were avoided.
- Samples were to be collected at least 5 m distant from any road
- Sampling to take place away from any buildings, fences, poles or any man-made structures.
- Samples were not to be collected from currently or previously cultivated land or land which had been sprayed with herbicide or fertilisers.



Soil Sampling Plan

- Areas subject to regular flooding and/or unusual erosion problems were to be avoided including banks of burns.
- Areas to be avoided include possible or likely historical sites for incineration of farm waste or bonfires

The precise position of the sampling points will depend on agreement with land owners, but so far as is possible, one of the points will be in, or as close as we can arrange with landowners to, a field between Hillock and Kincordie, off the B961, where the 1994 soil sampling point for dioxins and furan where a soil sample was taken from.

Location Identifiers

Each sample location will be marked on a map, such as that below, and the accompanying legend will comprise the unique identifier and the GPS co-ordinates in decimal format.

A summary table will be provided to describe the location, description, time and date of sampling, and a geotagged image of the actual location(s) as below

In so far as is possible, the exact location of sampling will be used on every occasion.

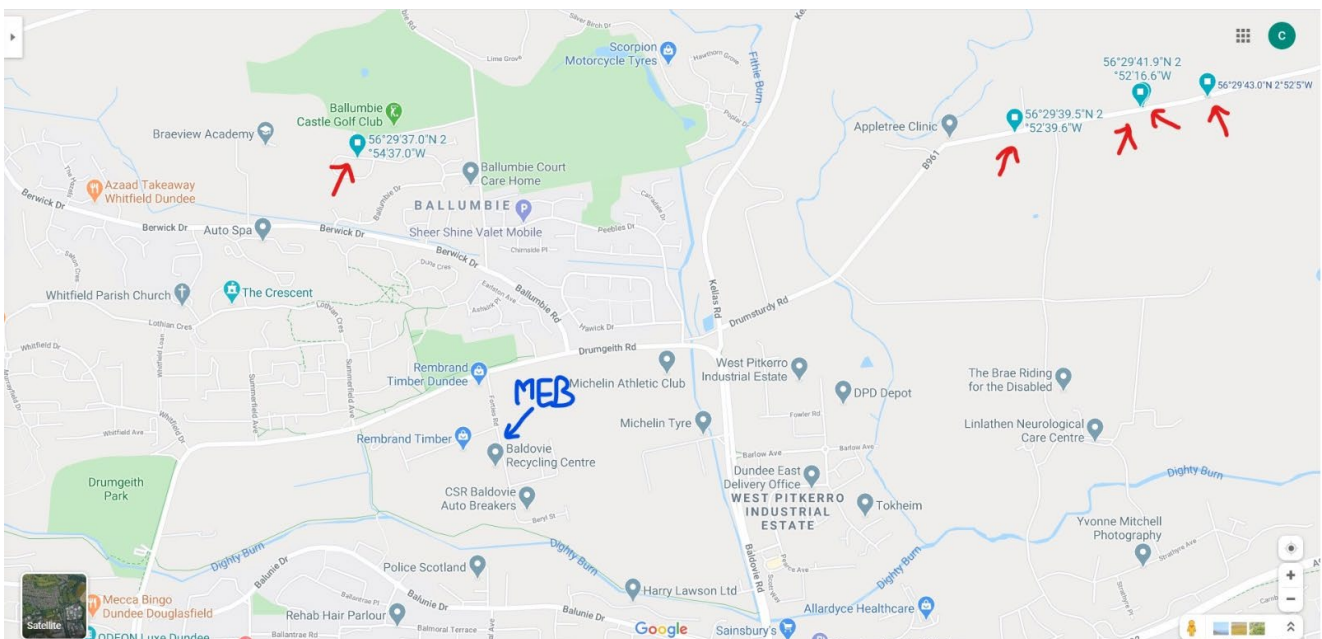


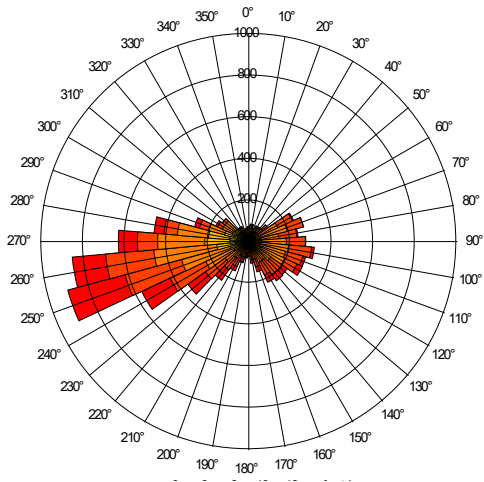
Figure 1 Sampling Locations

These locations have been selected following confirmation that they correspond with the prevailing wind direction as indicated in the following Wind Roses obtained from RAF Leuchars for 2014-2018.

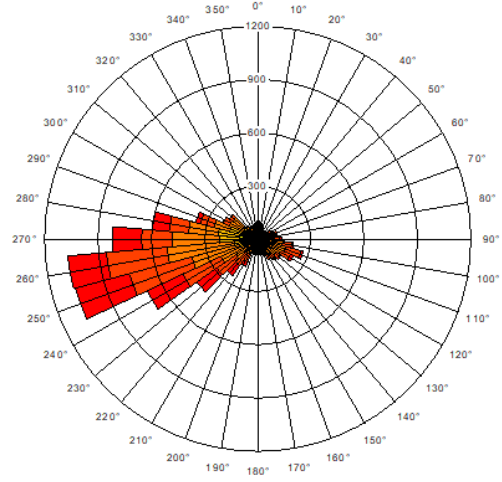


Soil Sampling Plan

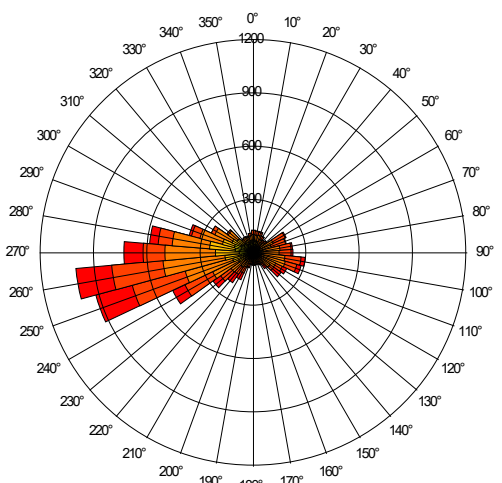
Wind Roses from RAF Leuchars 2014-2018



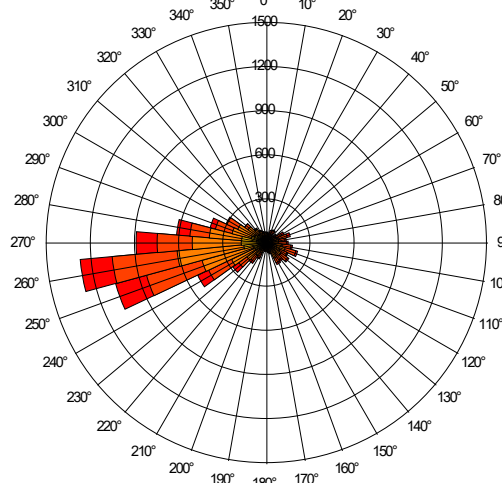
2014



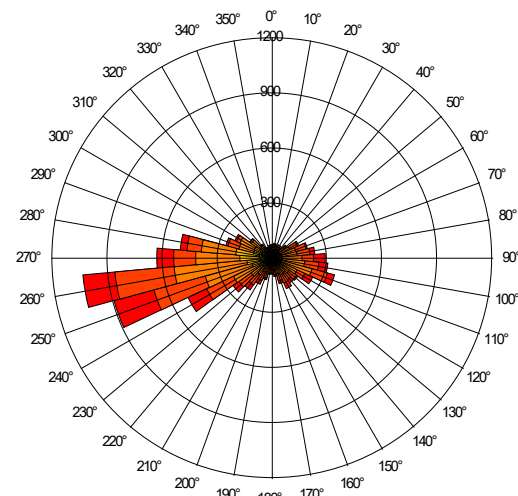
2015



2016



2017



2018





Soil Sampling Plan



Figure 2 Geotagging of Images

Field Sampling

A record will be kept of exact GPS coordinates and description of each site.

For each sampling visit, a geotagged image, such as Figure 2 above, will also record time, date and temperature of the sampling at each site.

Sample preparation

The soil samples will be obtained using a standard agricultural soil coring tool such as that illustrated. This will produce a removable 'core' of soil approximately 20 mm dia. X 50 mm long

Each sample will be taken after the removal of any vegetation such as grass, to expose the top surface of the soil.

Soil samples will be taken to a standard 50 mm depth.

The highest loading of PCDD/Fs will be in the upper layers of the soil since they are highly lipophilic hence they are not generally leached by rain.

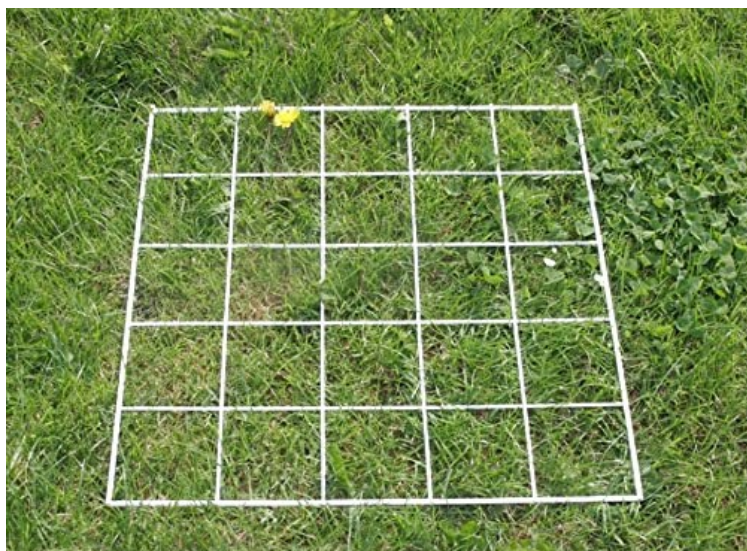


Figure 3 soil coring tool



Soil Sampling Plan

In order to obtain reasonably representative sample from each location, a composite sampling technique is to be used, where multiple 'cores' are extracted from the four corners and centre of a 500 mm x 500 mm quadrat grid.



Cores will be inspected and all extraneous organic growth/roots etc. will be picked off and insects, earthworms etc. removed.

The five cores are to be combined and mixed in a ziplock polythene bag to form a single composite sample for each location

The coring tool will be wiped down and rinsed with acetone and dried after each sampling site is visited.

Figure 4 quadrat grid for multiple sampling

Sample handling and storage

Each bagged sample is to be further sealed in a pre-labelled bag with details of time/date/location (GPS) and unique identifier.

The bagged samples are to be stored in a 'coolbag' at no higher than 4 deg C until despatched by commercial carrier to the laboratory for analysis.

Laboratory Analysis

The samples will be analysed for
PCDDs, PCDFs and dioxin-like PCBs
Soil Organic Matter (SOM)
Heavy metals

Reporting

A comprehensive report of each sampling campaign date point will be compiled and submitted to SEPA within 8 weeks of the samples being collected.