



## **Soil Sampling Plan**

**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 EfW CHP 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 starting on Tuesday 1 September 2020.

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.

The first sampling will be carried out prior to commissioning of the CHP EfW, and subsequently 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)

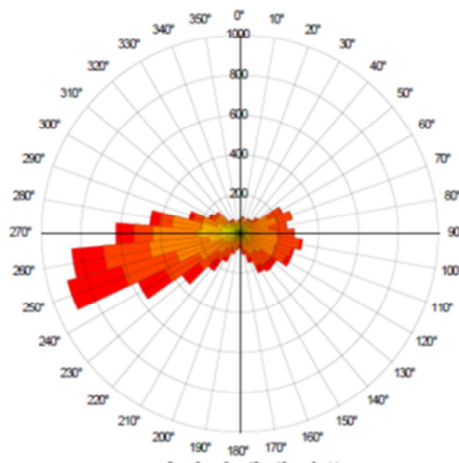
The results of these tests will be assessed to provide benchmark levels of soil concentrations against which to assess any impact of the parallel operation of both plants.

### **Sampling Location Criteria**

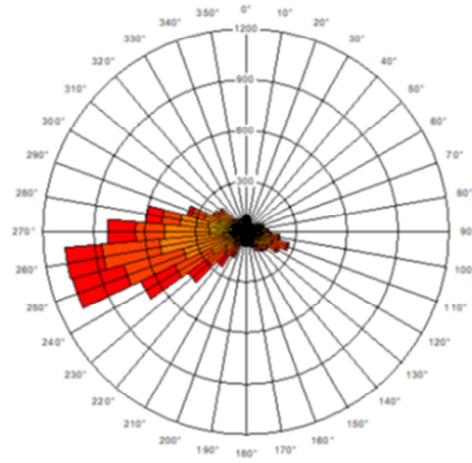
Four sampling locations have been chosen downwind of the prevailing wind, and two sites chosen upwind to act as controls. The downwind locations were selected in the area of predicted maximum ground level concentration from the atmospheric plume dispersion model. These locations have been selected following confirmation that they correspond with the prevailing wind direction as indicated in the following Wind Roses obtained from RAF Leuchars for 2014-2018.



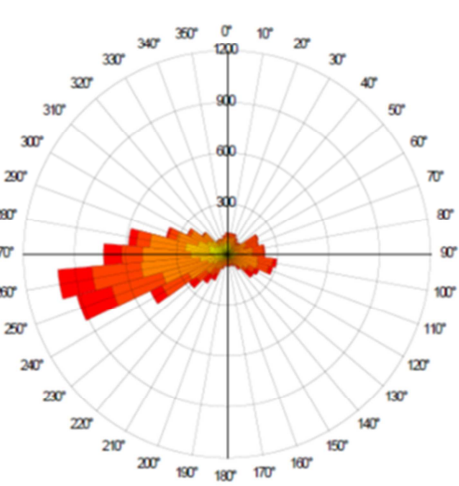
## Wind Roses from RAF Leuchars 2014-2018



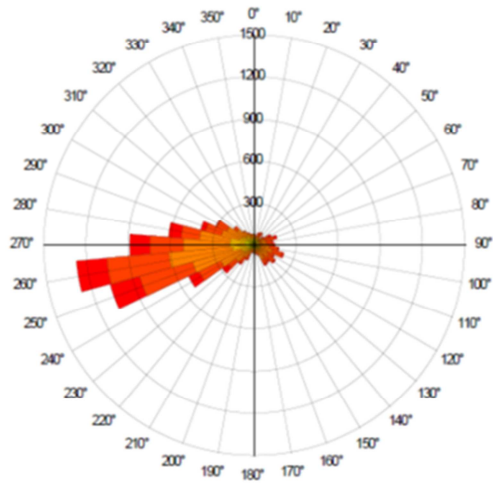
2014



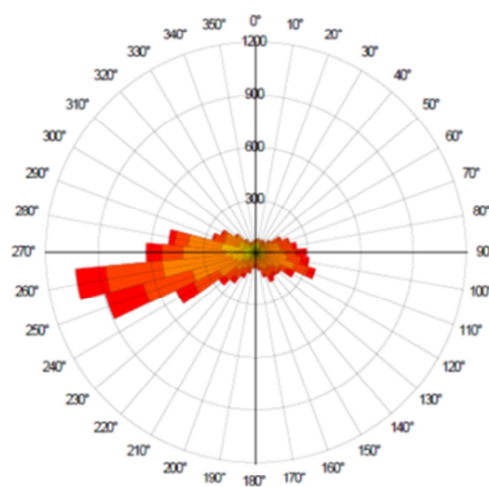
2015



2016



2017



2018



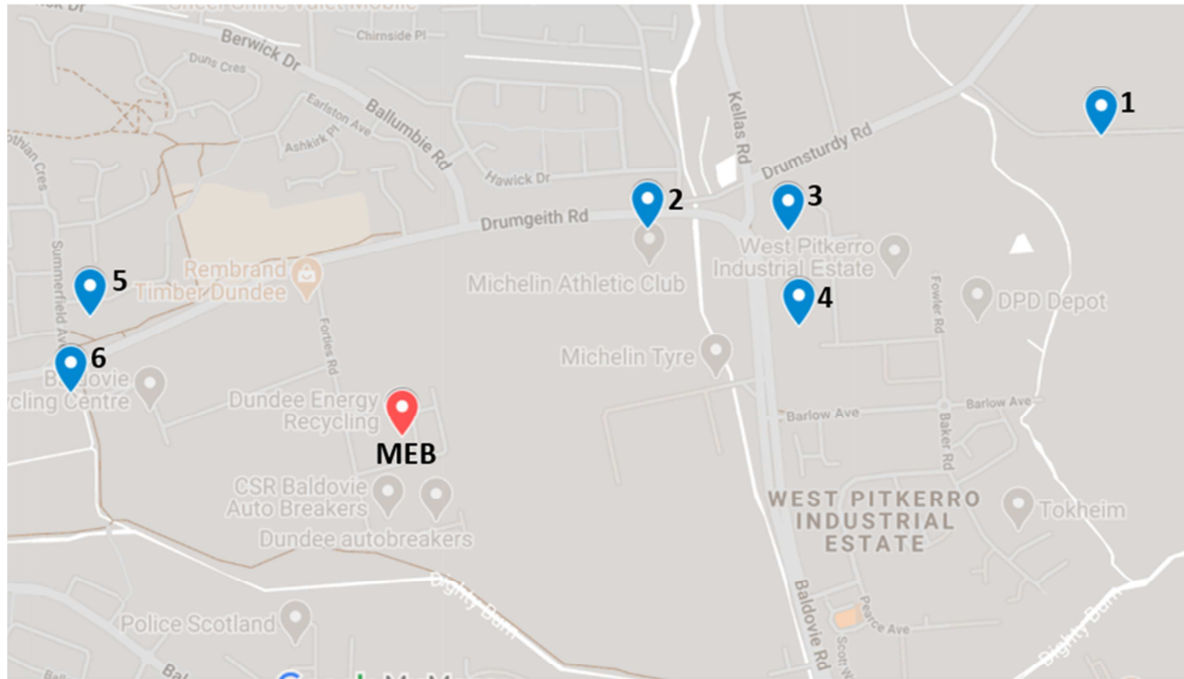


Figure 1: Site locations



Figure 2: Site locations on the contour plot of maximum deposition



## Downwind Sites

1. Off Drumsturdy Road, shown in Figures 3 and 4. This is a quiet farm road with a direct line of sight towards the stack and is within the maximum deposition zone as detailed in the contour plots. This site has a tree and wall which can be used for future identification.

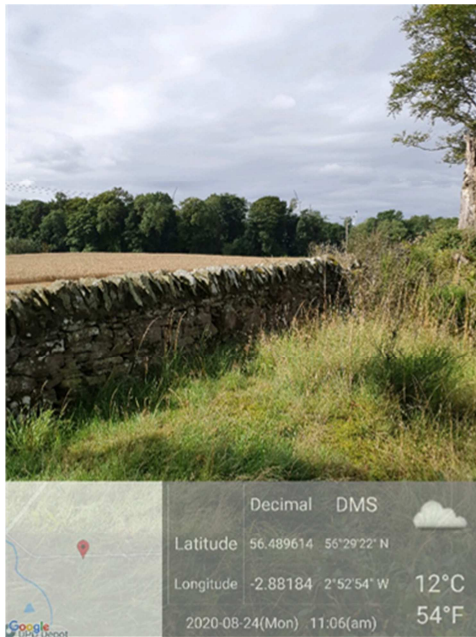


Figure 3: Sampling site 1 off Drumsturdy Road



Figure 4: Road sign upon entrance to the farm road and side view from the road of the proposed site



2. Michelin Club Grass, shown in Figure 5. This site is within the maximum deposition zone, far from the road and has easily identifiable markers in fencing and trees.

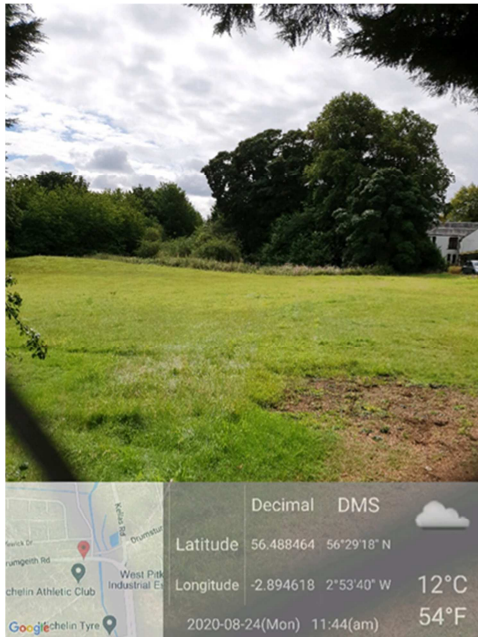


Figure 5: Michelin Club Grass

3. Baldovie Road Northern site, shown in Figure 6. This site is within the maximum deposition zone, has a direct line of sight towards the stack and has a fence line which can be used to identify in the future.

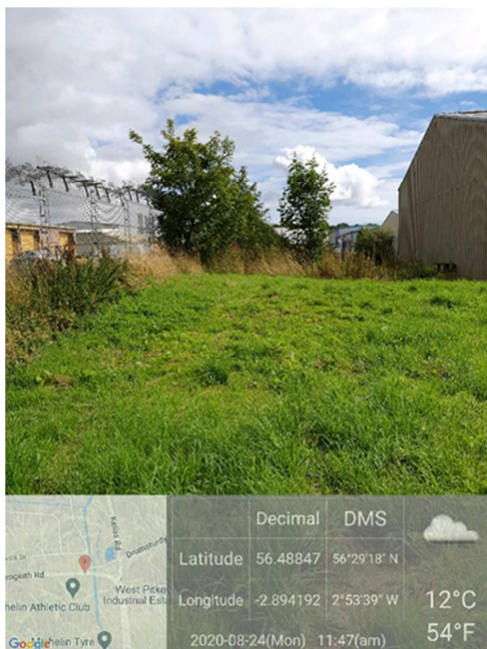


Figure 6: Baldovie Road Northern site



4. Baldovie Road Southern site, shown in Figure 7. This site is within the maximum deposition zone, has a direct line of sight towards the stack and has a fence line which can be used to identify in the future.



Figure 7: Baldovie Road Southern Site



## Upwind Sites

5. Summerfield Avenue site, shown in Figure 8. This is within the maximum deposition zone upwind of the stack, is far enough away from the road and has noticeable trees to identify the location in the future.

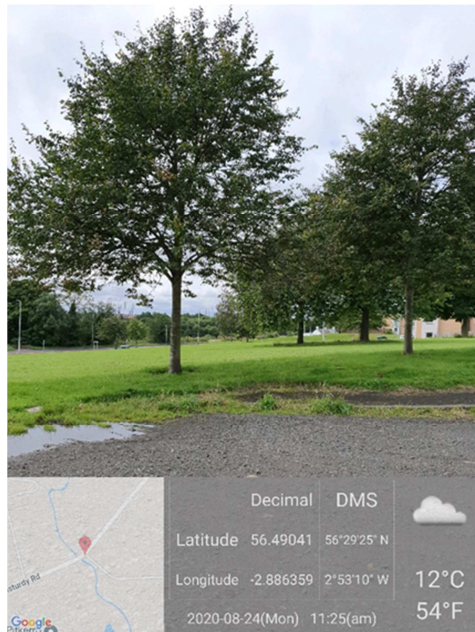


Figure 8 Summerfield Avenue site

6. Drumgeith Road site, shown in Figures 9 and 10. This is within the maximum deposition zone upwind of the stack, is far enough away from the road shown in figure 8, and has noticeable trees to identify the location in the future.



Figure 9: Drumgeith Road Site



Figure 10: Road from upwind site 2





## Sampling Procedure

MEB (either directly or through their appointed contractor –Socotec) will collect six baseline samples starting on Tuesday 1 September 2020 before the new EfW CHP plant (Line 3) begins operation to establish a baseline position and then six samples per month will be collected from the same locations once the plant is in operation. Consequently, there will be seven rounds of sampling in total.

Socotec will carry out the baseline sampling and show a representative of MEB how to carry out the subsequent sampling.

Socotec will then provide the correct sampling containers and ensure that the scheduling and chain of custody paperwork is completed correctly.

MEB has requested that Socotec provide a factual report of the baseline sampling and update this report with the details and laboratory results of the subsequent rounds of sampling.

Once the six-monthly sampling rounds are complete Socotec will carry out an assessment of the results of all of the sampling. MEB has requested that this assessment includes a human health risk assessment.

## 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 3, will also record time, date and temperature of the sampling at each site.

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.

## 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 100 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 100 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.

Therefore the top 100 mm will be separated away first, and stored and transported and analysed separately. Written confirmation provided that this will be the case. Any deviation to this will be checked with SEPA first and fully justified.





### **Sample handling and storage**

Each sample is to be sealed in a pre-labelled non-chlorinated plastic tub with details of time/date/location (GPS) and unique identifier.

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

### **Sampling and Analysis**

Socotec will attend site for one day to collect six surface samples from locations to be selected by MEB. The locations and elevations of the samples will be recorded using GPS enabled smartphones

The Socotec Environmental Scientist will be accompanied by a representative of MEB who will be shown how to collect the samples and complete the appropriate paperwork. The samples will be taken in accordance with BS 10175 - guidance on soil sampling.

The samples will be analysed at Socotec's UKAS and MCerts accredited laboratory in Burton on Trent for the suite specified by SEPA.

This suite includes:

- Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/F)
- Dioxin like PCB
- Antimony
- Arsenic
- Cadmium
- Chromium (trivalent and hexavalent)
- Mercury
- Lead
- Nickel
- Soil organic matter (SOM)



## **Reporting**

Socotec will prepare a factual report that will include the details of the fieldwork carried out and the results of the laboratory analysis of the baseline samples. This report will be updated monthly after each sampling round.

MEB will forward the reports from Socotec to SEPA each month.

Once the six-monthly sampling rounds are complete Socotec will prepare a report that will include an assessment of all the results including a human health risk assessment.

The human health risk assessment will be carried out by comparing the laboratory results with the relevant end-use generic assessment criteria (GAC) derived using the CLEA methodology in line with published SEPA guidance.