

## **Graphical Summary of Jerome Measurements For the First Quarter 2022.**

### **Introduction.**

This report provides a graphical summary of the findings of deployments of the Council's Jerome hydrogen sulphide monitoring instruments for the first quarter of 2022. Each graph shows concentration (ppb) plotted against time.

The Jeromes were deployed at selected properties, where they were left to continuously monitor ambient concentrations of hydrogen sulphide, taking a measurement every 10 minutes. The aim was to deploy the instruments at properties which would be downwind of Walleys Quarry, or at least in close proximity of the site, during the deployment period.

The findings of previous deployments are given within a previous report 'Graphical Summary of Jerome Measurements From August 2021 Onwards'.

The assessment criteria provided by the World Health Organisation, relating to annoyance and health impacts, and the relationship between hydrogen sulphide concentration and odour intensity are described below.

### **Assessment Criteria**

With regards to health impacts, there is no statutory limit which relates to environmental exposure to hydrogen sulphide. However, the World Health Organisation has produced an air quality guideline for the avoidance of annoyance at  $7 \mu\text{g}/\text{m}^3$  averaged over 30mins, which approximates to 5 parts per billion (ppb) averaged over 30 minutes. This equates to a distinct odour (perceived intensity score of 3) and is the threshold of recognition of hydrogen sulphide (i.e. the concentration at which 50% of the population would recognise the odour as H<sub>2</sub>S).

The World Health Organisation has also produced an air quality guideline for the protection of health -  $150 \mu\text{g}/\text{m}^3$  averaged over 24 hours, which equates to 100ppb averaged over 24 hours. This is 100<sup>th</sup> of the concentration identified as resulting in the onset of health impacts, namely eye irritation, which begin to occur at 10 parts per million (i.e. 10 000 ppb).

As described within the DEFRA publication 'Odour Guidance for Local Authorities March 2010', the characteristics of an odour affects the impact. Fairly regular exposure to some strong odours, even for short periods, can be both objectionable and offensive, such as in the case of hydrogen sulphide. Also, the concentration at which these odours become a statutory nuisance could be relatively low if they are persistent and frequent.

With regards to odour, by applying the Weber-Fechner Law, the perceived odour intensity (scored from 0 to 6) for hydrogen sulphide can be estimated from the measured concentration as described within the table below:

Odour Strength	Perceived Intensity	Approximate Concentration ( $\mu\text{g}/\text{m}^3$ )	Approximate Concentration (ppb)
Extremely strong	6	148	99
Very strong	5	57	38
Strong	4	22	14

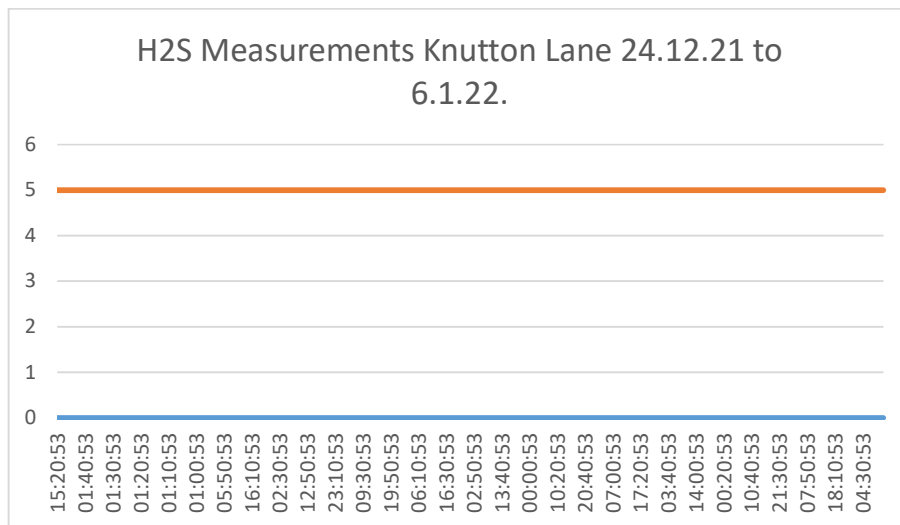
Distinct	3	7	5
Weak/faint	2	3	2
Very weak/very faint	1	0.7	0.5
Not perceptible/no odour	0	0	0

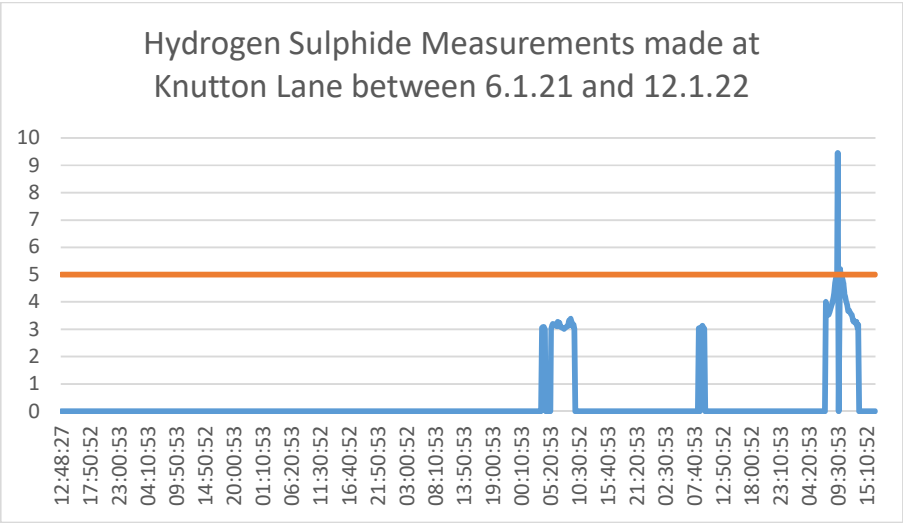
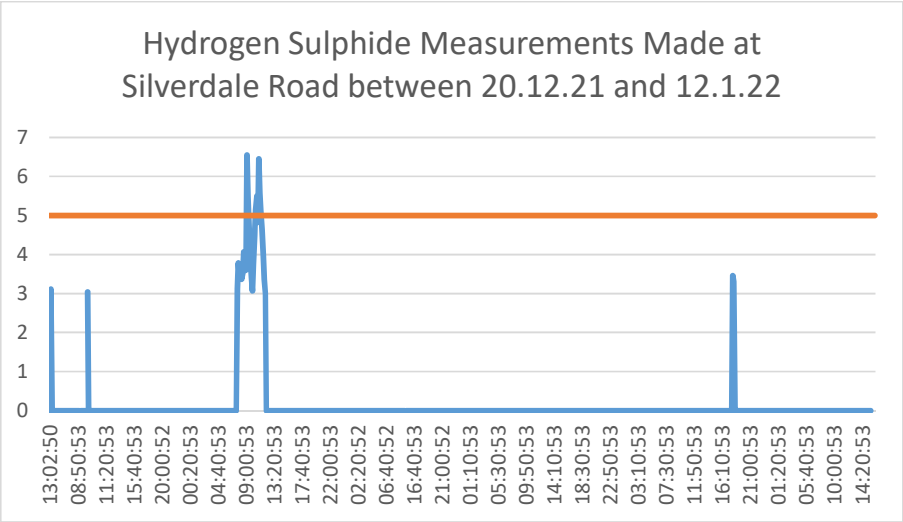
**Note:** The exact conversion between ppm and  $\mu\text{g}/\text{m}^3$  is proportional to temperature and atmospheric pressure.

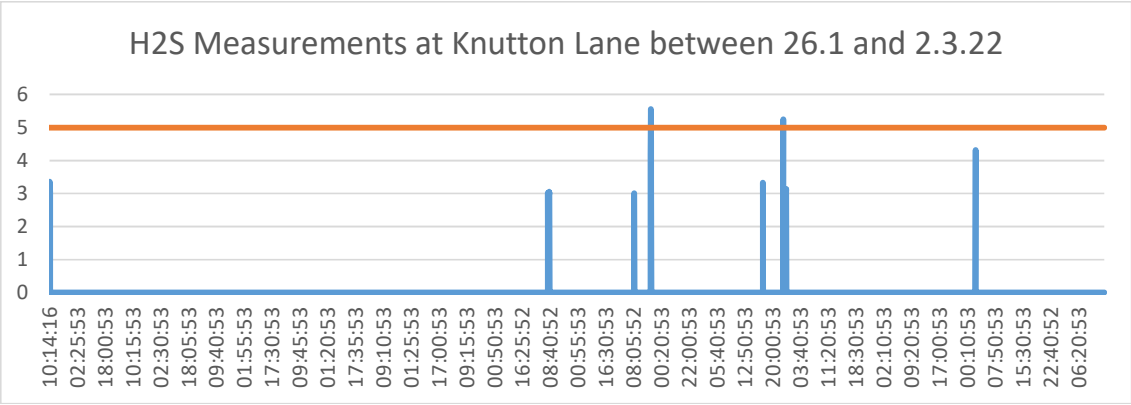
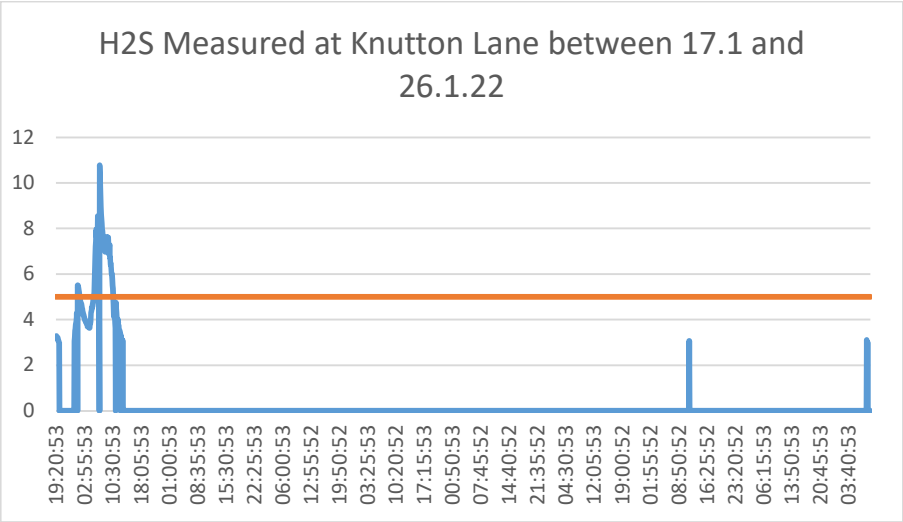
The limit of detection of the Jerome J605 is 3ppb. Any measurement below this value would be reported as 0. This does not necessarily mean that odour or gases associated with the landfill were absent, it can only be said that hydrogen sulphide concentration was below 3ppb at the time of measurement.

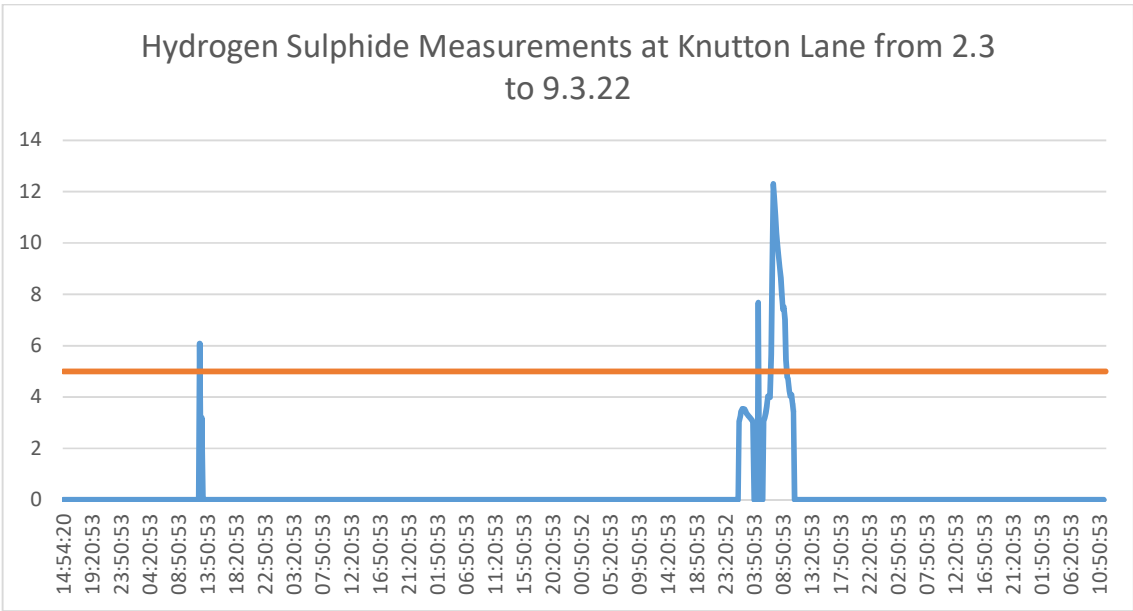
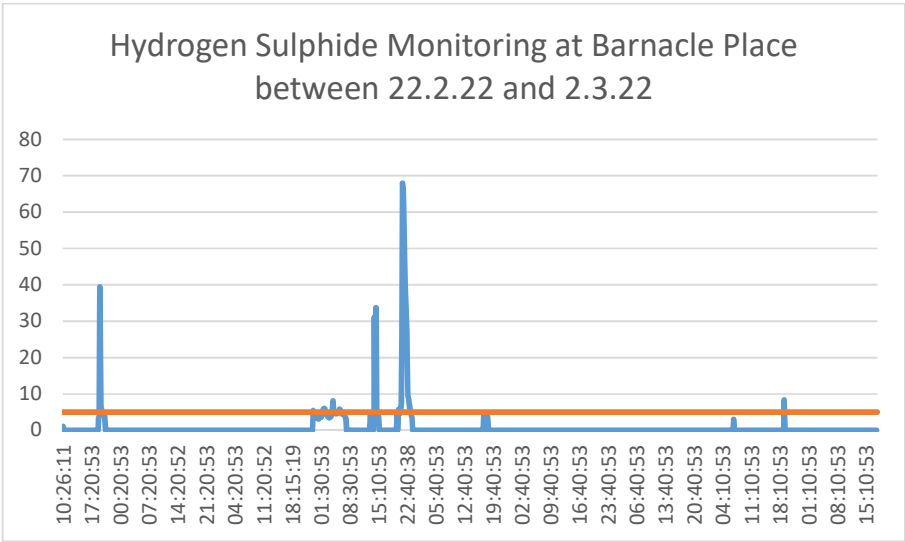
### Deployments to Properties.

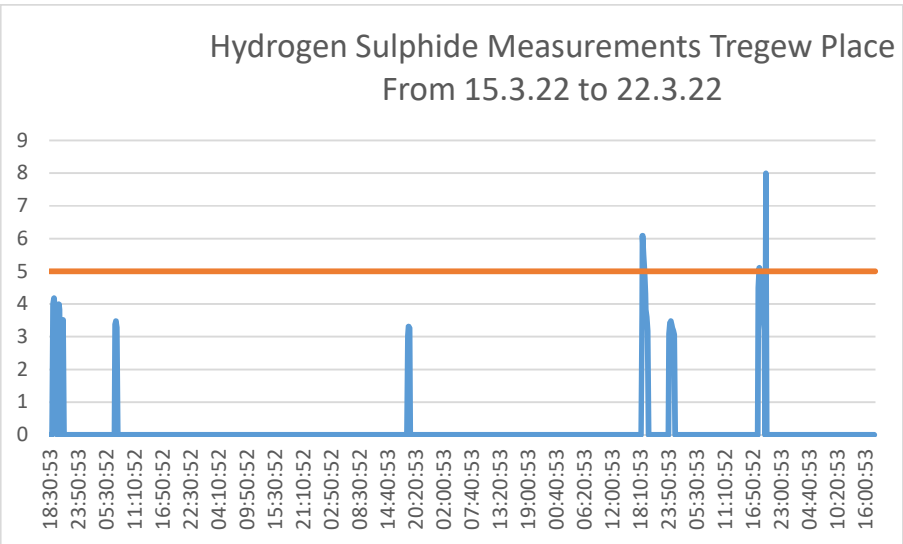
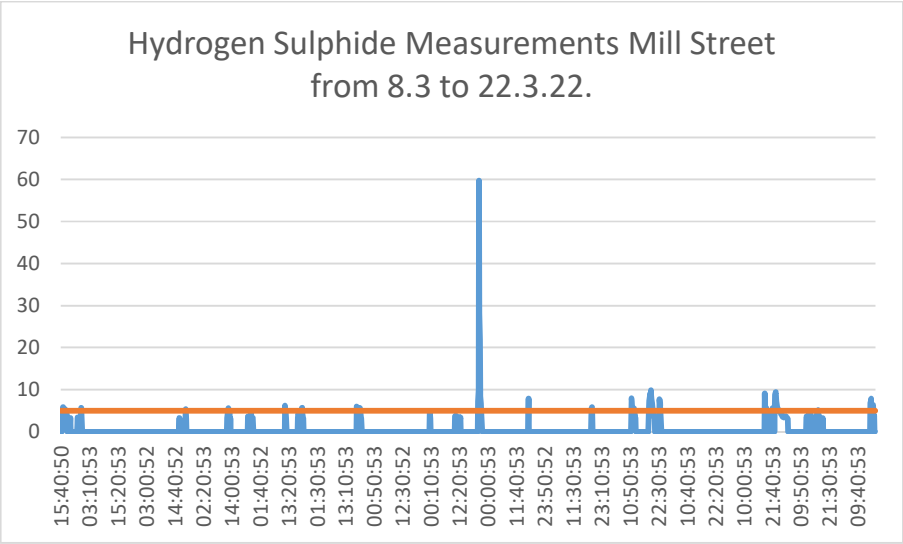
A graphical representation of each deployment of the instruments is given below.

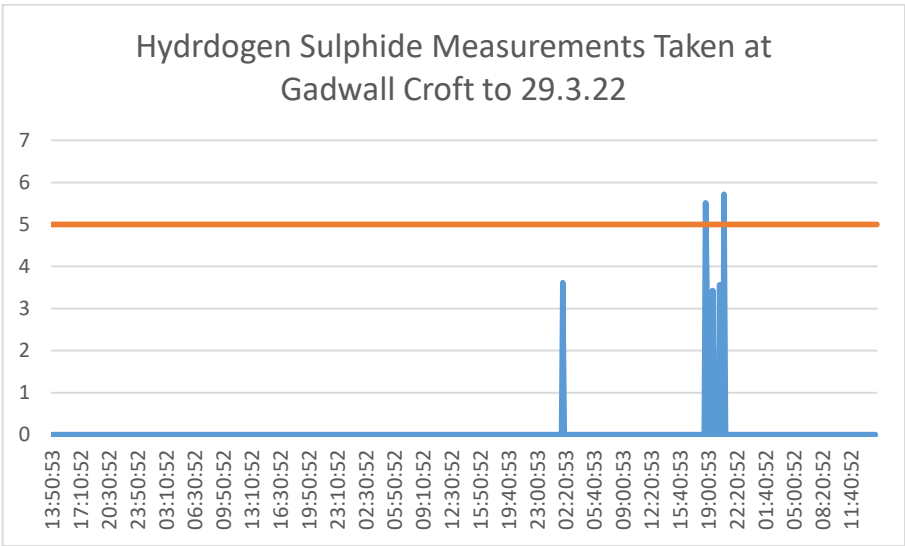
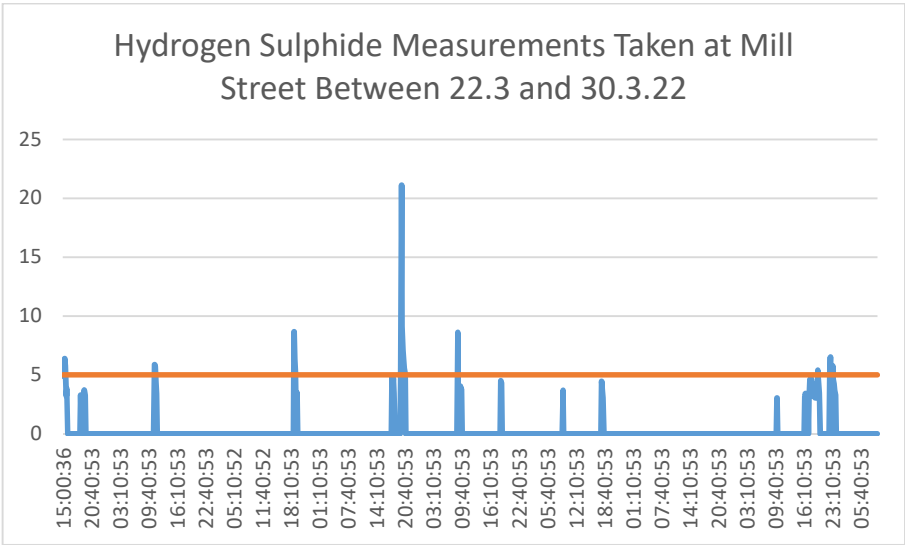












**Summary of Deployments.**

No measurements exceeded the World Health Organisation air quality guideline for the protection of health -  $150 \mu\text{g}/\text{m}^3$  (100ppb) averaged over 24 hours.

Ten of the measurement series reported concentrations above 0ppb and exceedances of the World Health Organisation air quality guideline for the avoidance of annoyance at  $7 \mu\text{g}/\text{m}^3$  (5ppb) averaged over 30mins were indicated within 9 of these. One, of the eleven sets of measurements, reported no measurements above 0ppb (although it should be noted that any measurement below 3ppb would be reported as 0).

**Summary of Indoor and Outdoor Monitoring at Wain Avenue.**

An exercise to compare internal and external measurements was carried out at a property upon Wain Avenue on the 17<sup>th</sup> January, 2022. Instruments were deployed to the living room and just outside the front façade at a time when previous monitoring at the site had indicated that high concentrations would be found internally and measurements were taken upon both instruments for a period of 30 minutes, as summarised below. No conclusions were drawn from the exercise as the high concentrations reported previously were not observed.

