APPENDIX A:

Update on air quality monitoring network

1. Air quality is monitored using a number of methods in SCDC, including diffusion tubes, continuous monitors and 'Zephyr' sensors.

Diffusion tubes

2. Diffusion tubes are used to monitor for the pollutant nitrogen dioxide at approximately 36 locations throughout the district. These are mostly targeted at roadside locations (as nitrogen dioxide is strongly linked to pollution from vehicles, especially diesel vehicles) but also including background locations.
3. Diffusion tubes provide good annual mean pollution data and allow for a large coverage of locations given their low cost.
4. Details of all monitoring locations are included in the Annual Status Report (ASR) included as Appendix B to this committee report, however, since the publication of the ASR new locations have been introduced to monitor in some parishes where monitoring has not previously taken place, these include Gamlingay, Meldreth, Melbourn, Fulbourn, Fen Ditton and Great Shelford. Additional new tubes have been positioned in Linton to complement the existing diffusion tubes in the village.
5. Monitoring has continued at a number of existing sites, including areas of significant growth, such as Cambourne, Northstowe and Waterbeach, to ensure continuity and to allow for analysis of long-term trends.
6. As confirmed in the ASR, all monitoring locations are well below (i.e. compliant with) UK national objectives.

Continuous monitors

7. Continuous monitors are used to measure both nitrogen dioxide and particulate matter pollution. These monitors provide ratified and accurate results accepted by Defra although they are more costly to run and represent a single fixed location. SCDC currently operates three continuous monitors:
    a. Impington continuous monitor situated adjacent to the A14 in Impington parish.
    b. Harston continuous monitor situated in the centre of the village adjacent to the A10.
    c. Northstowe continuous monitor situated in the centre of the village to monitor the impacts of growth in this major growth area.
8. Harston and Northstowe are both newly operational this year (2023) and the live results from all monitors are available to the public via the Air Quality England website run by Ricardo (www.airqualityengland.co.uk/local-authority/?la_id=316). Although there have been some initial teething problems, these monitors are now performing well and providing data.
9. Northstowe monitor is due to be moved as we have received complaints about its visual impact in its current location. The new location is currently being decided but should still be close to the centre of Northstowe and adjacent to the B1050. We will consult with the town council as well as district and county councillors prior to any relocation.
10. Continuous monitors have been discontinued at two locations (Orchard Park school and Girton, adjacent to the A1307 Huntingdon Road). The monitors at both locations were reaching the end of the operational life. Data had been collected at these locations for over

five years and these areas are no longer likely to be significantly impacted by the regional growth. These units will be fully decommissioned and removed in the following year.

11. The Orchard Park monitor was original installed to assess the impacts of works to the A14 on the local air quality with a requirement that monitoring continued for three years following the completion of works. The monitor has been in place throughout the course of the works to the A14 and for three years following the completion of these works on the 5 May 2020. Levels of nitrogen dioxide and particulate matter have been consistently low throughout this period, well below the nationally set annual mean objective and consistently lower than the other two continuous monitors over the past five years.
12. Monitoring in Orchard Park will continue through the use of diffusion tubes in other parts of Orchard Park, which show similar levels of NO_2, and the Impington continuous monitor adjacent to the A14 less than 1km to the west. These monitoring points are easier to access than the continuous monitor which is located on school grounds and has complications around access for contractors during school times.
13. Although the concern around Orchard Park primary school being located close to the A14 is recognised, there is no evidence that the air pollution at the school has been adversely affected. Any significant changes to the air pollution associated with the A14 or the Orchard Park area will be identified through other monitoring methods.
14. We are therefore satisfied that the removal of the Orchard Park monitor is acceptable.

Zephyr sensors

15. Zephyr sensors are a lower cost monitoring option that can be used to measure nitrogen dioxide, $PM_{2.5}$ and PM_{10}. They can be relatively easily moved to new monitoring locations and they provide instant monitoring data via an online portal. However, they are not calibrated to the same standards as the continuous monitors and the results cannot be used for reporting to Defra.
16. Zephyr monitors have been used for studies outside schools in Harston, Cambourne, Northstowe, Swavesey, Histon and Milton, which are all available on the air quality pages of the SCDC website. They are currently operating in Waterbeach, Girton and Barton.
17. We will continue to use Zephyr monitors to monitor pollution in public locations such as schools, but also to target areas of significant solid fuel burning or other sources of particulate pollution.
18. Although the results are not ratified to a standard that can be used in reporting to Defra, we have been able to have good confidence in the results, especially for particulate matter pollution which can be compared to the continuous monitors.
19. Figure 1 compares the levels of $PM_{2.5}$ at the three continuous monitors operated by SCDC to the Zephyr currently operating in Girton. The closest Defra operated background continuous monitor, at Wicken Fen, has also been included as a control. The graph covers a typical four-day period.
20. All of the instruments follow approximately the same trend with corresponding high and low periods, including some periods of very close correlation.
21. There is little difference in $PM_{2.5}$ pollution levels between the roadside monitors (Harston adjacent to A10 and Impington adjacent to A14), and the Defra background monitor at Wicken Fen, which is stationed remote from any roads or buildings. This is because $PM_{2.5}$ pollution is dominated by regional factors rather than local factors.
22. Significant local events can be picked out by comparing all monitors. A potential local event can be observed at the Harston monitor during the beginning of the period shown on Figure 1.

23. The general conclusions from the Zephyr school studies are as follows:

    a. Nitrogen dioxide pollution levels are observed as being lower around schools during holiday periods when compared to term time indicating school traffic does impact pollution levels.

    b. $PM_{2.5}$ pollution levels are not necessarily lower during school holidays than term time as $PM_{2.5}$ can be largely influenced by regional events.

    c. Data varies from day-to-day and during the day dependant on weather conditions (wind, rain, sunshine and atmospheric pressure), traffic volumes, traffic make-up and regional pollution levels. It has not therefore been possible to identify clear and specific peaks around school drop off and pick up times.

24. Current and future planned monitoring projects with the Zephyr include:

    a. Monitoring in residential area of Girton to identify pollution from domestic burning.

    b. Monitoring at Barton CE Primary School.

    c. Monitoring close to the location of the proposed new Waterbeach school as part of the new Waterbeach major development.

Figure 5: Comparison of $PM_{2.5}$ monitoring from continuous monitors and Zephyr sensors over a four-day period