Mill Road Sensor Trial – Early findings

OCTOBER 2019

Introduction:
The Mill Road Bridge was closed to vehicles for 8 weeks from 1st July 2019 for crucial works carried out by Govia Thameslink to improve rail services. Smart Cambridge, in collaboration with partners at the City Council, took this opportunity to install 15 traffic count sensors and 7 air quality sensors to monitor road usage before, during and after the closure and air quality during and after the closure to understand how it impacted both traffic volumes and air quality on Mill Road itself and in other surrounding roads.

Project Aims:
- Trial new technology and the processes for its installation
- Make city data available to the public via Cambridgeshire Insight and iCP
- Understand whether closures affect behaviour and whether this is sustained
- Gain a better understanding of the analysis that can be carried out on sensor data and what insights can be gathered from the use of multiple data sets

Experience gained so far in relation to technology, process, analysis and sensor placement:
As stated above, one of the key purposes for doing this work was to gain understanding of the strengths and limitations of the technology as well as reviewing the process for installation of the sensors and analysis of the collected data. We have collated knowledge in the following areas to date:

- **Sensor Placement** – where best to locate sensors to collect the most accurate data for the specific scenario defined
- **Technical faults** – one failure of the SIMs in the sensors was experienced and resolved
- **Installation process** – what specific and generic information is required and what can be prepared in advance of a submission
- **Accuracy of sensors** – accuracy is within acceptable levels and can be verified with manual counts if required
- **Data collection** – definition of the information you need is essential before the sensors are installed to ensure you collect the data you need to answer your queries
- **Data integration** – APIs and/or access to the sensor portal are required to extract and manipulate the data. Permissions are required to access these either from the portal itself or via Cambridgeshire Insight and the Smart Cambridge intelligent city platform (iCP)
- **External events** – external or unexpected events also have an impact on the data collected and should be recorded for use when analysing the data

Data Analysis:
There are many ways in which the data collected can be analysed and reviewed. The most appropriate method for analysis and visualisation will be dictated by the questions to be answered and the audience it will be delivered to. Below you will see two different examples of the type of information that can be extracted.

The first shows the average number of pedestrians per day captured on the western end of Mill Road, travelling towards the city only. The data covers 3rd June to 22nd September. We have displayed this alongside milestones at which various external events occurred which may have had an impact on pedestrian numbers on the route.

The second example uses data from the same sensor (western end of Mill Road) but taking into account flows into and away from the city to show the average number of cyclists, pedestrians, cars and goods vehicles per day, Monday to Friday in 4 distinct periods. The four weeks pre-closure, the first four weeks of the closure, the second four weeks of the closure and the four weeks after the re-opening. For this second example, we have included some high level summary information on the changes in the traffic flow.

Analysis of the data that we have collected and continue to collect will be carried out periodically over the next 12 months. The raw data is also available for interested parties to download at Cambridgeshire Insight
https://cambridgeshireinsight.org.uk/

Example One – Number of pedestrians over full monitoring period

Mill Road Western End (towards city only)
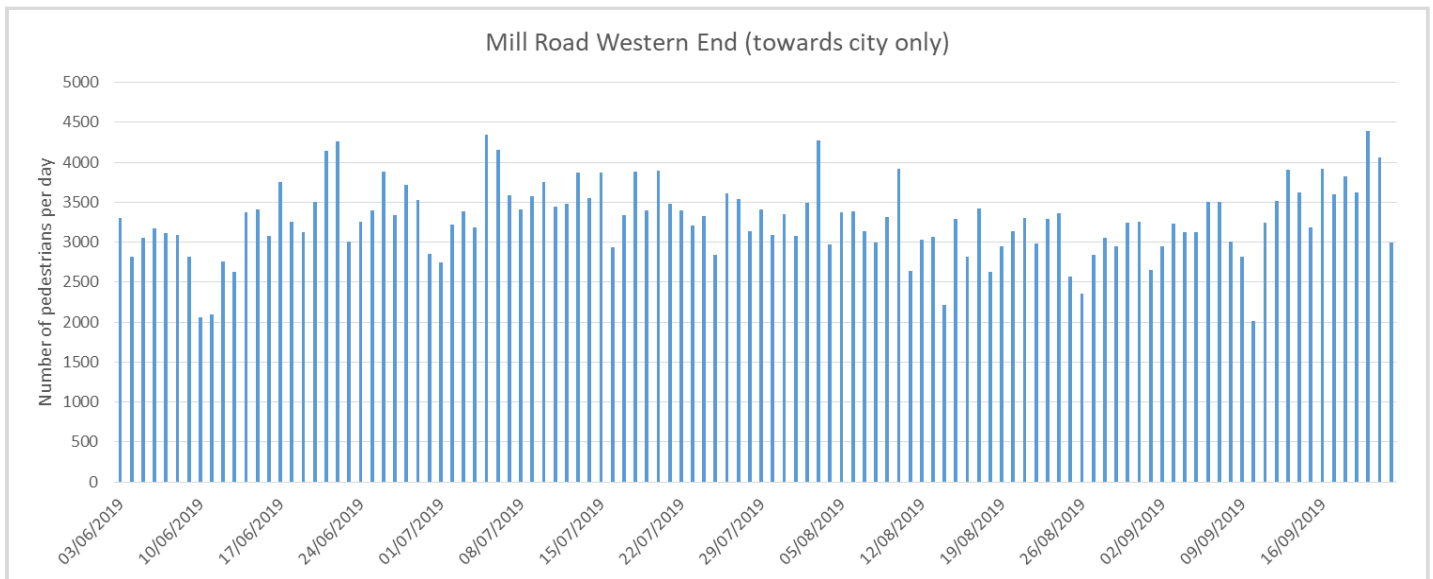
Milestone	Description	Dates
1	Bridge closed to cycles/pedestrians (advised)	5 – 8th, 11 – 13th , 28 – 31st July and 3 – 5th August
2	Bridge closed to cycles/pedestrians (actual)	11 – 12th July, 1st – 2nd August
3	Fire on Mill Road	15th July (night)
4	Additional road closures as a result of fire	16 – 17th July
5	Extinction Rebellion Activity	6th July and 23rd August

Example Two – "How did the average number of cars, goods vehicles, pedestrians and cyclists at the western end of Mill Road change during and after the Mill Road Bridge closure compared to the month before the closure?"

In the 4 weeks prior to the closure approximately **10,386 cars per day*** were recorded on the western end of Mill Road. By the second month of the closure, this had **dropped by over 55%** to 4591. The number of goods vehicles also dropped from 1688 to 916 over the same period, a **drop of 45%**. As expected, in the 4 weeks after the re-opening of the bridge, the number of cars and goods vehicles has risen back towards pre-closure levels.

As expected given that there were only a very small number of days that pedestrian and cycle access was completely prohibited, the variation in the number of pedestrians and cyclists along the route have been less dramatic. The data below shows that there has been a small increase in the volume of pedestrians and cyclists counted since the re-opening. When the next four week period of data is available, we will be able to identify whether this is a sustained change in volumes.
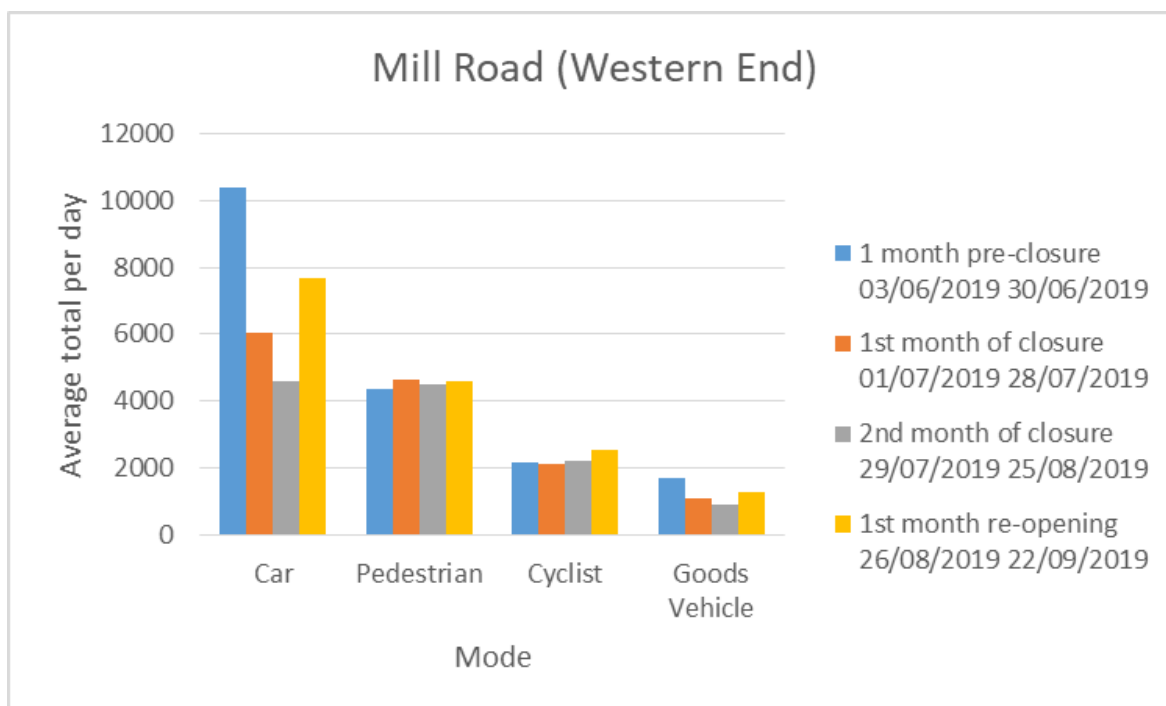
* Based on Monday to Friday only