The air quality impact of temporary traffic restrictions and road closures

May 2021

Introduction

This briefing is for information about the air quality impact of temporary traffic restrictions. Air quality has been monitored at temporary traffic restrictions at Tower Bridge Camberwell Rail Bridge, and Rye Lane.

Background

A road closure was in place at Tower Bridge from September to December 2016, for 12 weeks, for bridge maintenance works and carriageway resurfacing. During the closure road traffic was diverted to both London Bridge and the Rotherhithe Tunnel. Pedestrian access was retained and cyclists were required to dismount to use the crossing. Tower Bridge is a heavily trafficked strategic river crossing that forms part of the Inner London Ring Road. When open, Tower Bridge carries approx. 40,000 vehicles per day.

A road closure took place at Camberwell Rail Bridge, on Camberwell Grove, from 5th October 2016 to 5th November 2019, for 3 years and 1 month, to enable bridge strengthening and the construction of a dedicated cycle lane over the bridge. Traffic over the bridge is a single restricted width carriageway and flows one way at a time whilst controlled by traffic lights at the junction of Camberwell Grove and McNeil Road. There was no cycle lane over the bridge prior to the works. During the restrictions the bridge was closed to road vehicles with diversions via Chadwick Road, Lyndhurst Way and McNeil Road. Pedestrian access was retained and cyclists were required to dismount to cross.

On Rye Lane road closures, to enable gas main replacement work were implemented from 7th January 2019 until 15th June 2019. The phased works 1 to 6 are shown in Figure 1, with the bus diversion routes shown in burnt orange. There is a banned right turn for traffic (except buses) at the junction of Hanover Park and Rye Lane. This permits traffic to access the supermarket car park on Hanover Road. Non-bus traffic uses the northern section of the A2215 (Clayton Road) to join Peckham High Street or to turn south on Consort Road. Rye Lane has also been closed to traffic during the COVID-19 pandemic to create greater circulation space for pedestrians and to make space for effective social distancing and external queues for shops.

Road traffic is a significant source of local atmospheric pollution including Nitrogen Dioxide (NO_2) and particulate emissions. Additional air quality monitoring for NO_2 was implemented around all 3 of these roadworks, to monitor whether the temporary highway closures resulted in measurable changes in local air quality.

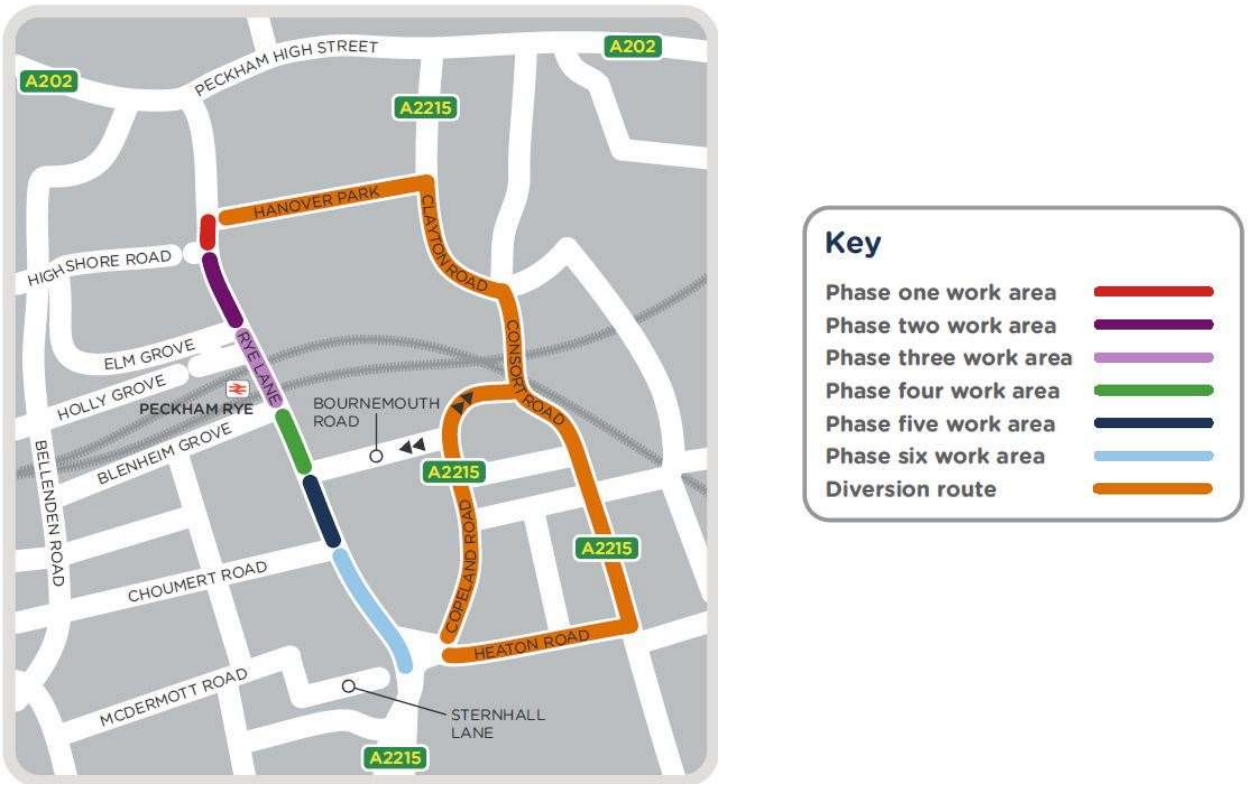

Figure 1: Rye Lane diversions

Air quality monitoring locations

Concerns were raised by residents that air pollution in the Camberwell Grove area might increase on the re-opening the bridge to vehicular traffic when the plans for the re-opening of Camberwell Grove Bridge were announced.

Monitoring commenced 7th August 2018. A NO_2 diffusion tube was deployed south of the bridge (site SDT 119) to monitor any change in air quality following re-introduction of traffic. A further diffusion tube was deployed at Bellenden Road/Lyndhurst Way (SDT 118) to monitor change in air quality due to removing any diverted traffic. Monitoring continued until November 2019.

The Rye Lane road closures provided an opportunity to monitor the effect of Highways change on air quality. In particular, it was considered that air quality monitoring could potentially illustrate an improvement in air quality on Rye Lane, and a commensurate deterioration in air quality on the diversion route. Monitoring the effect of a full year closure would have removed some of the uncertainty in air quality measurements that is caused by seasonal variation. The work was, unexpectedly, completed well ahead of schedule, and the road closure was lifted after 26 weeks.

Additional Nitrogen Dioxide diffusion tubes were deployed in the Rye Lane area in November 2018 at the locations marked as yellow dots on Figure 2 below. The new monitoring locations supplemented existing monitoring locations marked as blue or red dots also on Figure 2. There is no significance in the difference between blue and red locations for the purpose of this report.

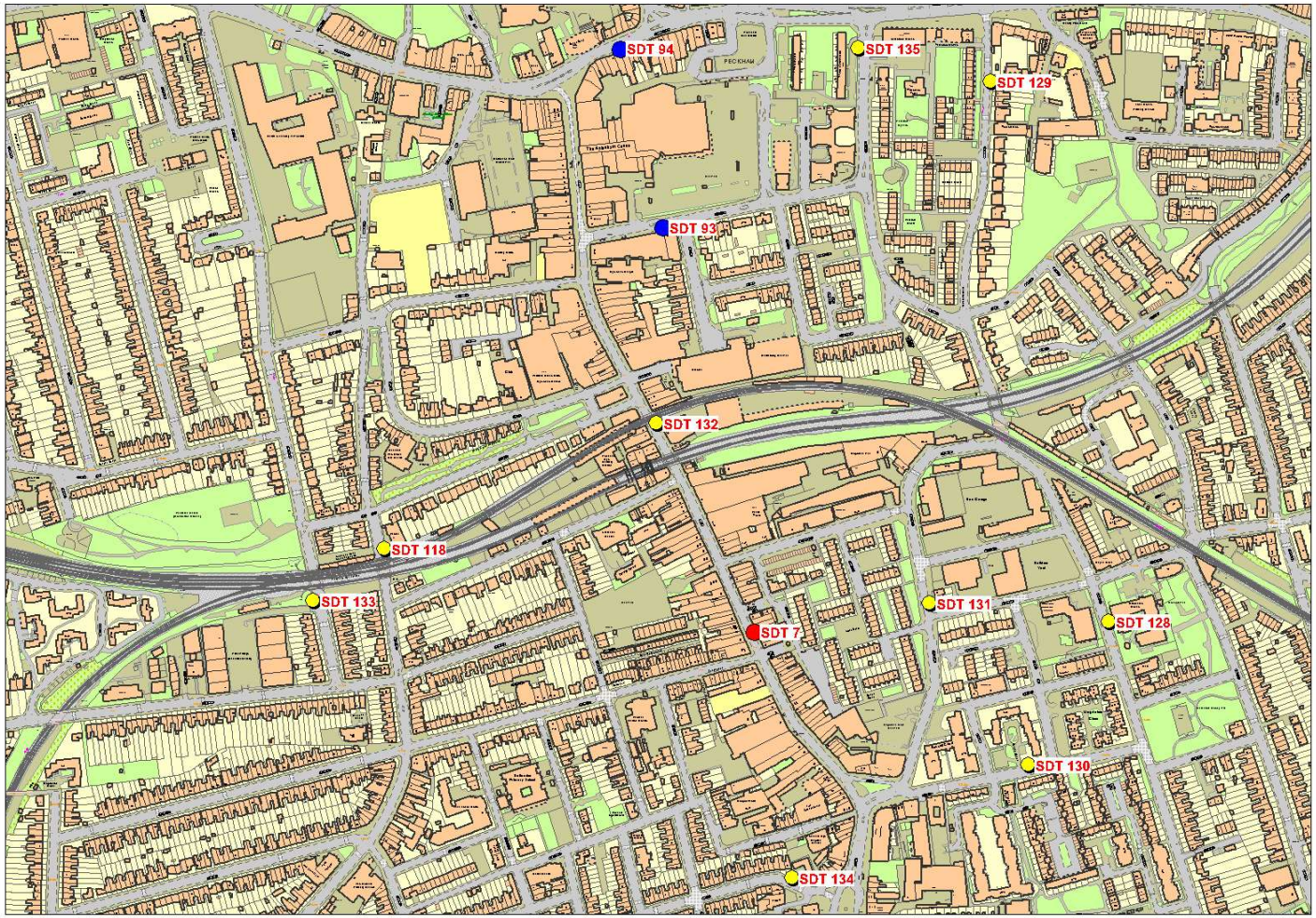

Figure 2: Location of Nitrogen Dioxide diffusion tubes in the Rye Lane area

Air quality monitoring data

The results of monitoring at Bellenden Road (SDT 118) and Camberwell Bridge (SDT 119) are shown in Figure 3.

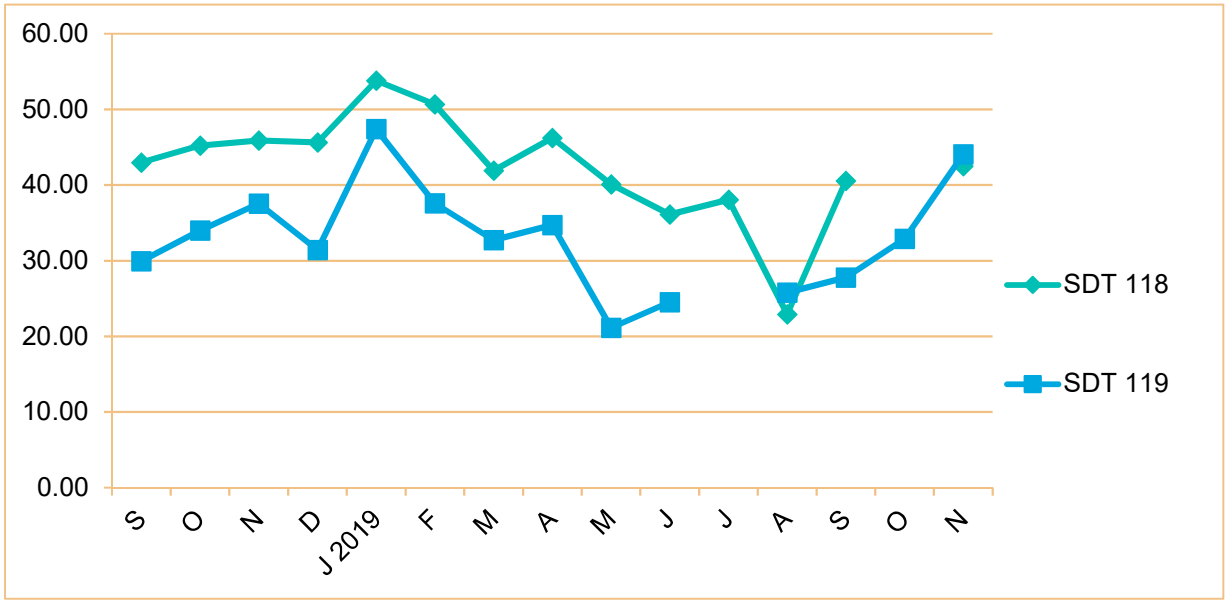

Figure 3: Nitrogen Dioxide Diffusion Tubes results at Camberwell Grove Bridge

Monitoring data for the Rye Lane Gas Network replacement work is presented in Table 1. Blank cells indicate that no data was available for that month due to on-site loss of the diffusion tube/s.

The results of the monitoring of the Rye Lane area sites are presented in Figure 4.

Period	Month	SDT 6	SDT 7	SDT 54	SDT 93	SDT 94	SDT 105	SDT 118	SDT 119	SDT128	SDT129	SDT130	SDT131	SDT 132	SDT 133	SDT 134	SDT135
9	S 2018	57.10	38.44	28.68	81.93	69.88	50.79	42.98	29.95								
10	O	60.11	46.49	36.62	74.10	67.38	49.63	45.22	33.99								
11	N	54.53	41.42	38.10	74.34	88.22	47.47	45.89	37.56	47.90	45.79	41.19	47.00	55.40	61.29	45.19	66.01
12	D	58.08	36.24	37.01	55.93	65.77	40.37	45.63	31.43	38.84	39.82	35.19	37.83	49.25	36.21	36.56	55.53
1	J 2019	74.39	41.37	42.33	84.44	139.04	51.32	53.82	47.41	53.11	54.08	54.26	52.32	39.79	45.15	50.96	77.32
2	F	58.51	34.84	45.48	45.78	93.94	53.54	50.70	37.61	46.50	46.34	45.53	46.53	34.18	38.26	45.78	68.88
3	M	64.66	30.87	32.94	34.16	70.38	38.81	41.91	32.73	41.13	36.72	39.04	42.87	27.83	31.01	34.40	58.58
4	A	60.99	31.60	33.60	43.78	84.52	40.32	46.23	34.74	45.07	45.01	40.83	49.53	31.26	34.93	36.71	46.36
5	M	48.93	23.97	24.50	36.81	70.67	36.78	40.11	21.13	35.00	34.89	31.36	36.26	23.25	25.36	27.17	47.79
6	J	55.06	37.71	24.60	52.07	68.90	35.30	36.12	24.50	33.81	30.52		33.60		27.02	27.00	57.86
7	J	53.30	34.84	21.93	58.00	74.57	33.20	38.05		33.12	27.51	24.48	29.66	40.43	33.28	27.49	58.83
8	A	50.90	36.61	24.99		75.86	36.50	22.92	25.79	37.7		24.99	31.79	39.25	36.67	28.79	
9	S	53.75	37.95	25.85	57.18	66.79	37.00	40.58	27.76		32.64	30.11	33.78	39.63	26.37	29.52	35.11
10	O	51.55	24.67	27.78	47.71	57.92	40.61		32.92	33.78	34.98	25.46	38.59	35.74	35.76	30.56	47.67
11	N	69.20	47.84	34.58		3.78	44.08	42.50	44.08					51.14			

Table 1: Air quality monitoring data for the period around the Rye Lane area closure

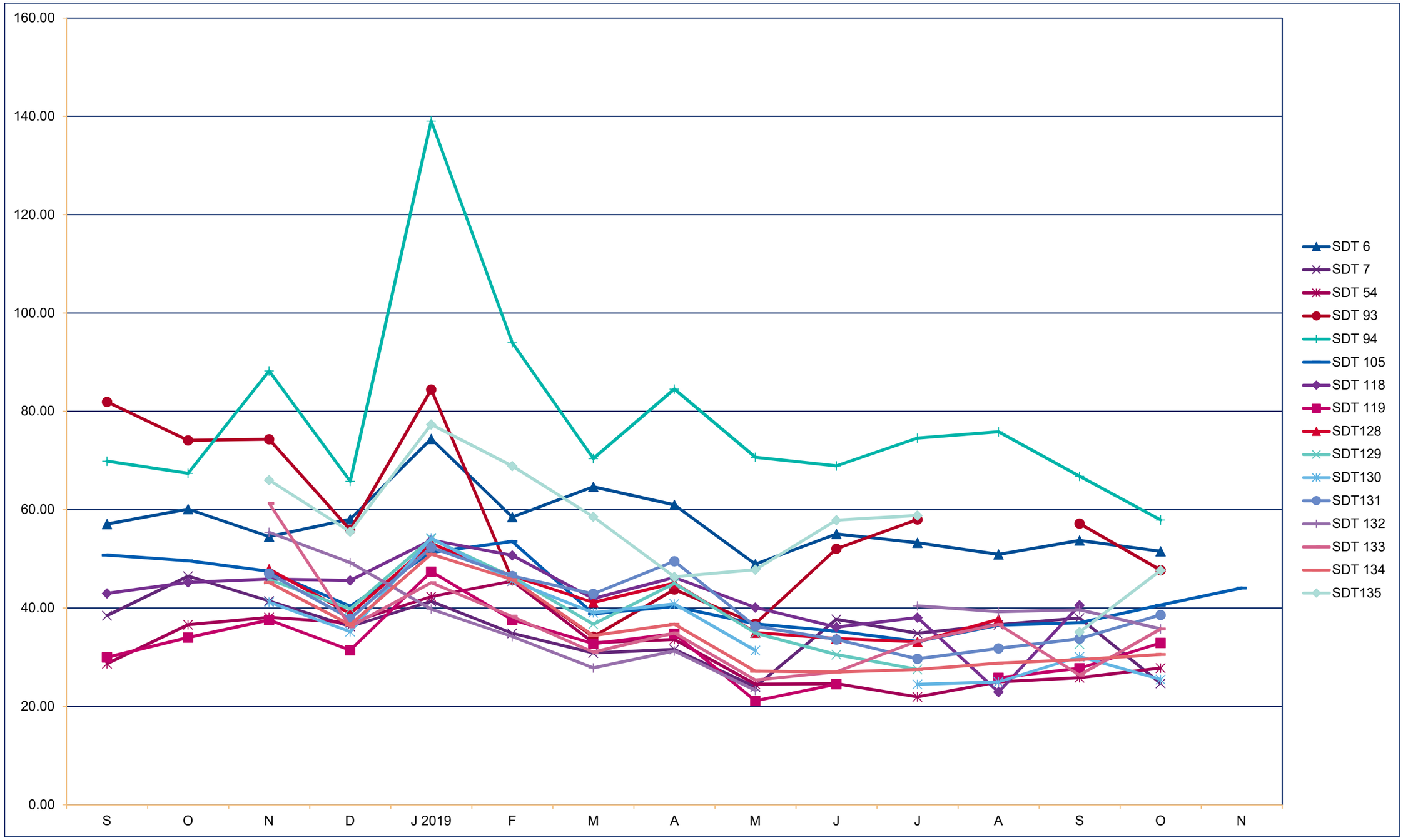

Figure 4: **Air quality monitoring results for the Rye Lane area**

Discussion of results

Tower Bridge

A report by air quality consultants AECOM identified no conclusive evidence that the closure of Tower Bridge for a period of approximately 12 weeks from October 2016 to December 2016 impacted annual mean NO_2 concentrations at any of the diffusion tube monitoring locations.

Due to the long-term nature of air quality monitoring to identify trends, and the measurements being taken over such a short period of time, it was not possible to distinguish any clear impacts on NO_2 concentrations in the area. AECOM concluded that it would appear that the year-to-year variations observed in the diffusion tube monitoring results were primarily influenced by variations in meteorological conditions, the relatively high background levels of pollution in an area that is on the edge of inner London, and expected variations in the factors affecting the annual bias adjustment.

Camberwell Grove

The results show a fairly consistent difference in concentrations between Camberwell Grove and Bellenden Road/Lyndhurst Way. The Bellenden Road route has higher concentrations due to the higher number of vehicles using the route.

The results show an increase in the pollution levels on both roads from September 2019 to January 2019. This pattern is also repeated in the Rye Lane closure measurements. This increase is more likely due to increased use of domestic heating systems in the autumn and winter. The results show a decrease in air pollution levels on both roads in August. This fall is likely due to a decrease in traffic and the use of domestic heating during the summer holiday period.

Due to the late timing of the late request, no air quality monitoring was carried out before the road closure, thus monitoring was only in place for a short period before the re-opening of the bridge. Any difference in pollution levels caused by change in traffic flows cannot be observed above the natural variations of air quality over this short period. There is considerable seasonal variation in air pollution levels; these obscured any change that may have existed. It has therefore not been possible to draw any conclusions regarding the impact of the traffic flow changes on local air quality from this location.

Rye Lane

The results show one data outlier as a high peak in the results for SDT 94 in January 2019. This monitoring location is near a defined loading bay on Peckham High Street, and could be due to a hyper-local factor such as idling delivery vehicles using the bay.

There was an increase in NO_2 concentrations in the first month of the closure. This is consistent with an increase elsewhere in the Borough, including results at Camberwell Grove Bridge (Figure 2). There is however no seasonal reduction in the concentrations over the summer holidays that would be expected from other roads in the Borough, this may indicate the area is constantly busy, and therefore less sensitive to changes due to an absence of school run traffic. When traffic fully returned to Rye Lane the monitoring sites saw an increase in concentration of $15\mu g.m^{-3}$, which was also seen in other monitoring sites across the Borough.

It cannot be demonstrated that the closure of Rye Lane caused a measureable air quality impact on the surrounding roads.

Conclusion

Diffusion tubes, which capture monthly average exposure to NO_2, are particularly good at identifying long term trends in air quality data. They do not provide sufficient resolution or granularity of data that would make them an effective method to draw conclusions from short term changes in traffic flow and their impact on local pollutants. These changes are effectively masked by background pollutant levels in inner London, variations in meteorological conditions, by other seasonal sources of local air pollution and, by variations in the annual bias adjustment factors.

Effective monitoring of the subtle changes in air quality caused by temporary or short term road traffic changes would require much more sensitive, and thus much more expensive, air quality monitoring equipment, deployed a year in advance of any highway changes, and then left in place for at least a year after the highway reverted to being open. Any road closure that is likely to be in place for over a year could then be assessed, however, very short term road closures or highway changes, such as the above examples, simply do not give time for sufficient air quality data collection to enable any changes in air quality to be effectively and accurately assessed.

What is true is that the public perception is that quieter, low-traffic roads have cleaner air, however, in inner-city locations this may not be true.