Attachment 8

SUMMARY OF VILLAGE ROAD AIR QUALITY MEASUREMENTS

Background

Sixteen(16) periods of 1 hour duration between 8.00 am and 4.30pm within the interval Aug.1st to Nov.24th were selected to enable a wide range of hourly traffic flows from 50 - 600 vehicles to be studied.
The concentrations of major pollutants such as nitrogen dioxide(NO2), micro-particulates of >= 10 microns(PM10) and <= 2.5 microns(PM2.5) were measured by the portable Plume Lab Flow device. The accuracy of this miniature device was checked for NO2,PM10 & PM2.5 concentrations against the Boughton Continuous NO2 Monitor and the Wrexham AURN Monitor, which reports Hourly Averages of all three pollutants, on several occasions.

Results

Plots were prepared of the concentrations of NO2,PM10 & PM2.5 versus the total hourly traffic flow through the centre of the village (ie., North+South) and compared with World Health(WHO) and EU(UK) allowable exposure limits (see Attachments 1-3 for a comparison of the variation of standards between the WHO, EU and EPA (USA).
All three pollutant concentrations increased significantly with traffic flow, despite the expected scatter, with NO2 and PM10 showing the largest increases.
The best straight line fit of concentrations for traffic volumes from 0 to 600v/hr are plotted on the graphs below and are compared with the full range of values(attachment 5) in the following table

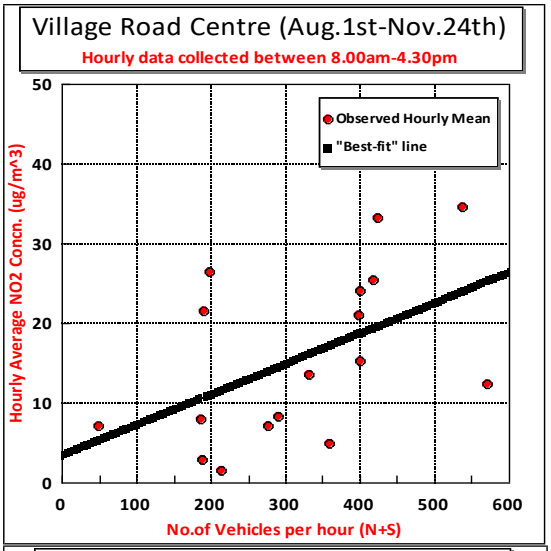
ug/m3	**Full range**	**Straight line fit values**
NO2	0 – 74	5 – 25
PM10	8 - 85	9 - 32
PM2.5	2 - 64	8.5 -11.5

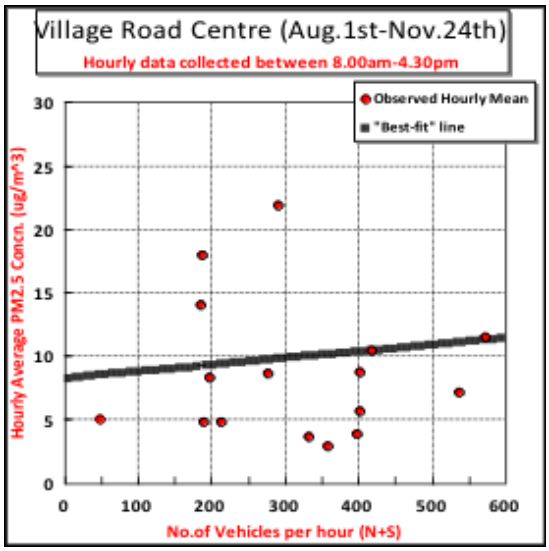
Conclusions

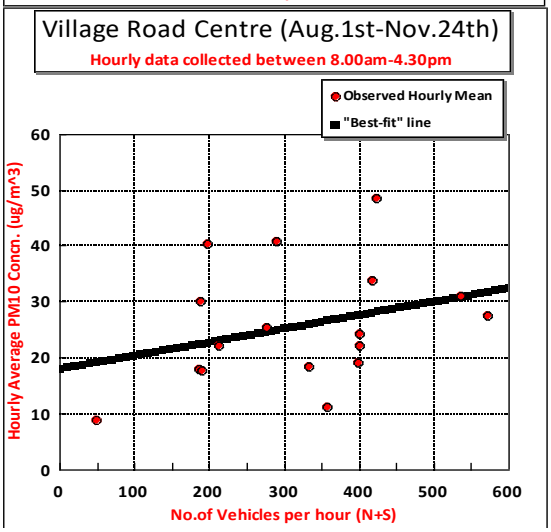
NO2: the concentrations lie well below the recommended annual mean exposures of 40ug/m^3{EU(UK) & WHO} to 100ug/m^3(USA).
NO2 does not appear to be a significant concern

PM10: the concentrations of PM10 tend to lie below the WHO & EU(UK)24 hour mean exposure limit of 50 ug/m^3. This limit, though is being approached transiently at peak traffic flows during school term.
Particular attention should be paid to PM10 concentrations during peak traffic flow over the Winter Period, when domestic production of PM10's is expected to increase

PM2.5: the concentrations of PM2.5 on average are already close to the WHO and EPA (USA) annual mean exposure limits of 10 ug/m^3 and 12 ug/m^3,respectively.
On several occasions they have exceeded these limits by a factor 1.5-2! However, they still lie well below the EU(UK) annual mean standard of 25ug/m^3.
As with PM10 they are expected to increase over the Winter period.
PM2.5 concentrations are a cause for concern!


Village Road Centre (Aug.1st-Nov.24th)
Hourly data collected between 8.00am-4.30pm
Observed Hourly Mean
"Best-fit" line
Hourly Average NO2 Concn. (ug/m^3)
No.of Vehicles per hour (N+S)
0
10
20
30
40
50
0
100
200
300
400
500
600


Village Road Centre (Aug.1st-Nov.24th)
Hourly data collected between 8.00am-4.30pm
Observed Hourly Mean
"Best-fit" line
Hourly Average PM2.5 Concn. (ug/m^3)
No.of Vehicles per hour (N+S)
0
5
10
15
20
25
30
0
100
200
300
400
500
600


Village Road Centre (Aug.1st-Nov.24th)
Hourly data collected between 8.00am-4.30pm
Observed Hourly Mean
"Best-fit" line
Hourly Average PM10 Concn. (ug/m^3)
No.of Vehicles per hour (N+S)
0
10
20
30
40
50
60
0
100
200
300
400
500
600