

Project:	Southwater – Phase 5	SMA Ref: 6186
Subject:	Response to EHO Comments (App Ref: DC/19/2464)	
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Stuart Michael Associates received comments from Horsham District Council (HDC) regarding an Air Quality Assessment for Phase 5 of the Southwater Development (App. Ref.: DC/19/2464). We have reviewed the submitted AQ assessment report (SMA June 2024 AQ report – Issue 4) and the HDC comments regarding ‘more information’ and ‘modification’, and our response is detailed below. Copies of HDC comments are included for ease of reference.

Fine Particulate Matter

2. PM_{2.5} has a significant impact on human health and as stated in the IAQM Air Quality Guidance, the air quality assessment should include *Impacts on existing receptors during operation (usually on concentrations of nitrogen dioxide, PM₁₀ and PM_{2.5})*. The AQA report outline does not include PM_{2.5}.

I acknowledge that PM_{2.5} is not written in paragraph 1.13, Report Outline, however it is assessed and covered in the June 2024 report.

Air Quality Modelling

3. It is not clear which roads links were modelled. A map clearly showing the road links is required.

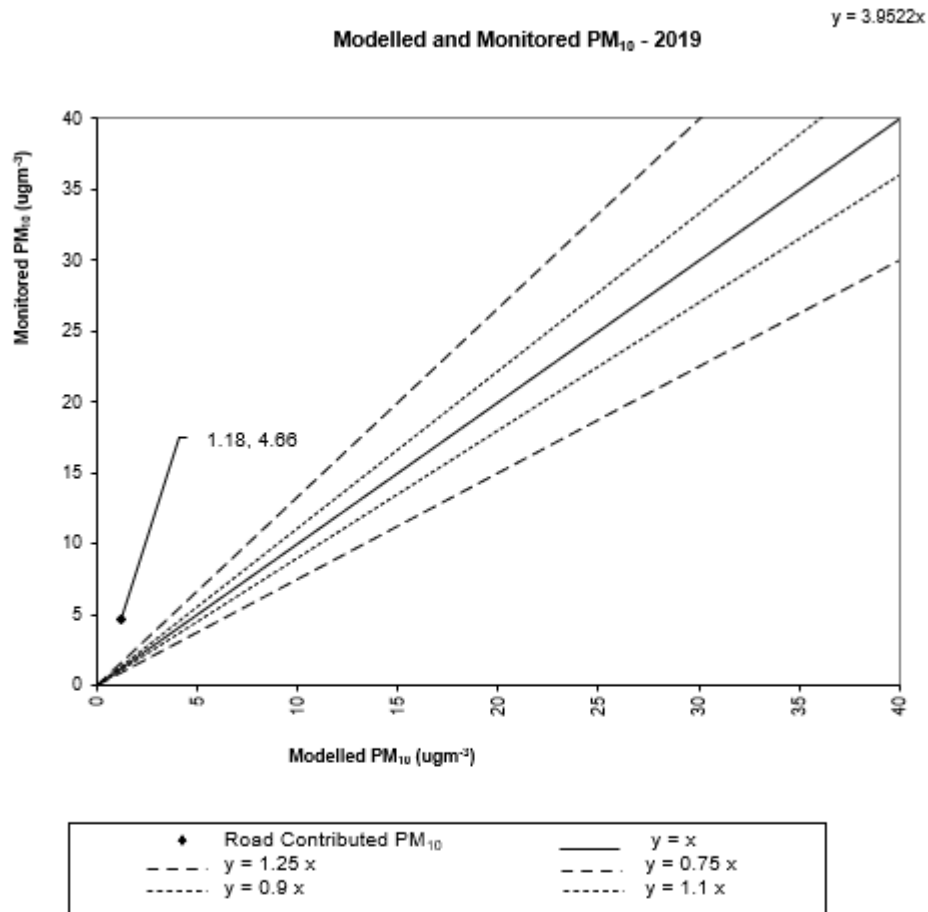
The roads included in the air quality modelling are presented in Table 3.9 of the SMA June 2025 report and the Worthing Road and Church Lane are illustrated on Figure 4.5. An overall link diagram is presented below to clarify the entire modelled road network;



4. What was the model verification for particulate matter (PM₁₀ and PM_{2.5})? Please provide full statistical analyses to give full picture of the model performance.
- a. It is expected that the predicted particulate matter concentrations for 2024 at receptor HO2 are being underpredicted, considering the concentration trend from the most up to date ASR.

In addition to the verification of NO₂ in the SMA June 2024 AQ report, the following is the verification of the modelled PM₁₀ for 2019.

Following the guidance in TG(22), the background concentrations of PM₁₀ in the kilometre square containing HO2 (minus the road traffic sources: PM₁₀ = 0.06 µg m⁻³ and PM_{2.5} = 0.06 µg m⁻³) have been subtracted from the monitored and modelled PM₁₀ concentrations and the results have been compared to see the difference. Presented in the following graph is the comparison of the modelled and monitored road traffic contribution of PM₁₀.



The ADMS model is under predicting the road traffic contributions of PM₁₀ by a factor of 3.9522 when the slope of best fit between the 'measured' and 'monitored' PM₁₀ concentrations when forced through zero. Therefore, the predicted future concentrations of road traffic contributions of PM₁₀ have been adjusted by a factor of 3.9522. The adjustment factor has also been applied to the road traffic contributions of PM_{2.5}.

The updated results from the ADMS modelling of PM₁₀ and PM_{2.5} are presented in the following Tables (Table references correspond to the SMA June 2024 AQ report except the last table).

Table 4.4: Predicted air quality concentrations at sensitive receptors 2024

Receptor Number and Name		NO _x	NO ₂	PM ₁₀		PM _{2.5}
		Annual mean µgm ⁻³	Annual mean µgm ⁻³	Annual mean µgm ⁻³	Days >50 µgm ⁻³	Annual mean µgm ⁻³
HO2	HO2	32.4	20.7	19.1	2.4	12.8
R1	House of the corner of Church Lane and Worthing Road	22.7	15.6	16.6	0.5	11.4
R2	Flats above Co-op	26.3	17.5	17.3	0.9	11.8
R3	Property on the corner of Station Road and Worthing Road	23.5	16.0	16.6	0.5	11.4
R4	Corner of Woodfield and Church Lane	19.4	13.9	15.8	0.3	10.9
R5	Southwater Junior Academy	20.4	14.4	15.9	0.3	11.0
R6	Residential Property on Worthing Road, opposite Southwater Junior Academy	25.7	17.2	17.2	0.8	11.7
R7	Residential Property opposite Bakers Close	24.0	16.3	16.9	0.7	11.5
DT49	Southwater 1	28.0	18.5	17.7	1.2	12.0
NAQO	-	-	40	40	35	25

Table 5.4: Predicted air quality concentrations at sensitive receptors in 2028 “do nothing”

Receptor Number and Name		NO _x	NO ₂	PM ₁₀		PM _{2.5}
		Annual mean µgm ⁻³	Annual mean µgm ⁻³	Annual mean µgm ⁻³	Days >50 µgm ⁻³	Annual mean µgm ⁻³
HO2	HO2	26.9	17.8	19.1	2.4	12.8
R1	House of the co Church Lane and Worthing Road	20.9	14.7	16.7	0.6	11.4
R2	Flats above Co-op	23.4	15.9	17.5	1.0	11.9
R3	Property on the corner of Station Road and Worthing Road	21.4	14.9	16.7	0.6	11.4
R4	Corner of Woodfield and Church Lane	18.7	13.5	15.9	0.3	11.0
R5	Southwater Junior Academy	19.3	13.8	15.9	0.3	11.0
R6	Residential Property on Worthing Road, opposite Southwater Junior Academy	23.0	15.7	17.3	0.9	11.8
R7	Residential Property opposite Bakers Close	21.6	15.0	16.9	0.7	11.6
DT49	Southwater 1	24.6	16.6	17.9	1.3	12.1
NAQO	-	-	40	40	35	25

Table 5.5: Predicted air quality concentrations at sensitive receptors in 2028 “do something”

Receptor Number and Name		NO _x	NO ₂	PM ₁₀		PM _{2.5}
		Annual mean µgm ⁻³	Annual mean µgm ⁻³	Annual mean µgm ⁻³	Days >50 µgm ⁻³	Annual mean µgm ⁻³
HO2	HO2	26.9	17.8	19.1	2.4	12.8
R1	House of the corner of Church Lane and Worthing Road	21.1	14.8	16.8	0.6	11.5
R2	Flats above Co-op	23.6	16.1	17.6	1.1	11.9
R3	Property on the corner of Station Road and Worthing Road	21.6	15.0	16.8	0.6	11.5
R4	Corner of Woodfield and Church Lane	18.8	13.5	16.0	0.3	11.0
R5	Southwater Junior Academy	19.4	13.8	16.0	0.3	11.0
R6	Residential Property on Worthing Road, opposite Southwater Junior Academy	23.2	15.8	17.4	1.0	11.8
R7	Residential Property opposite Bakers Close	21.7	15.1	17.0	0.7	11.6
DT49	Southwater 1	24.9	16.7	18.0	1.4	12.2
NAQO	-	-	40	40	35	25

Table 5.6: Predicted change in air quality concentrations at sensitive receptors in 2028 “do something”

Receptor Number and Name		NO ₂		PM ₁₀				PM _{2.5}	
		Change in annual mean μgm^{-3} (%)		Change in annual mean μgm^{-3} (%)		Change in days >50 μgm^{-3} (%)		Change in annual mean μgm^{-3} (%)	
HO2	HO2	0.02	(0.07)	0.01	(0.05)	0.01	(0.42)	0.01	(0.08)
R1	House of the corner of Church Lane and Worthing Road	0.18	(0.86)	0.08	(0.48)	0.04	(6.66)	0.05	(0.44)
R2	Flats above Co-op	0.23	(0.98)	0.09	(0.52)	0.06	(5.90)	0.05	(0.42)
R3	Property on the corner of Station Road and Worthing Road	0.16	(0.75)	0.06	(0.36)	0.03	(5.05)	0.04	(0.35)
R4	Corner of Woodfield and Church Lane	0.13	(0.70)	0.07	(0.44)	0.02	(6.74)	0.04	(0.36)
R5	Southwater Junior Academy	0.09	(0.47)	0.03	(0.19)	0.01	(3.42)	0.02	(0.18)
R6	Residential Property on Worthing Road, opposite Southwater Junior Academy	0.22	(0.96)	0.08	(0.46)	0.05	(5.49)	0.05	(0.43)
R7	Residential Property opposite Bakers Close	0.12	(0.55)	0.05	(0.30)	0.03	(4.23)	0.03	(0.26)
DT49	Southwater 1	0.28	(1.14)	0.15	(0.90)	0.03	(0.19)	0.02	(0.19)

Table 5.8: PM₁₀ – Significance of change in annual mean concentrations following the completion of the proposed development in 2028

Receptor Number and Name		PM ₁₀		
		Change in annual mean (µgm ⁻³)	Magnitude of Change	“Significance” of change
HO2	HO2	0.01	Imperceptible	Negligible
R1	House of the corner of Church Lane and Worthing Road	0.08	Imperceptible	Negligible
R2	Flats above Co-op	0.09	Imperceptible	Negligible
R3	Property on the corner of Station Road and Worthing Road	0.06	Imperceptible	Negligible
R4	Corner of Woodfield and Church Lane	0.07	Imperceptible	Negligible
R5	Southwater Junior Academy	0.03	Imperceptible	Negligible
R6	Residential Property on Worthing Road, opposite Southwater Junior Academy	0.08	Imperceptible	Negligible
R7	Residential Property opposite Bakers Close	0.05	Imperceptible	Negligible
DT49	Southwater 1	0.15	Imperceptible	Negligible

Table (not in SMA report): $PM_{2.5}$ – Significance of change in annual mean concentrations following the completion of the proposed development in 2028

Receptor Number and Name		$PM_{2.5}$		
		Change in annual mean ($\mu g m^{-3}$)	Magnitude of Change	“Significance” of change
HO2	HO2	0.01	Imperceptible	Negligible
R1	House of the corner of Church Lane and Worthing Road	0.05	Imperceptible	Negligible
R2	Flats above Co-op	0.05	Imperceptible	Negligible
R3	Property on the corner of Station Road and Worthing Road	0.04	Imperceptible	Negligible
R4	Corner of Woodfield and Church Lane	0.04	Imperceptible	Negligible
R5	Southwater Junior Academy	0.02	Imperceptible	Negligible
R6	Residential Property on Worthing Road, opposite Southwater Junior Academy	0.05	Imperceptible	Negligible
R7	Residential Property opposite Bakers Close	0.03	Imperceptible	Negligible
DT49	Southwater 1	0.02	Imperceptible	Negligible

With reference to the above Tables, the predicted impacts from development generated traffic in the SMA June 2024 AQ report do not change (except at R5 where the initial assessment resulted in No Change which is now 0.02 change in annual mean concentrations which is an Imperceptible change in concentrations which is considered Negligible).

Therefore, the Conclusions of the SMA June 2024 AQ report do not change with the predicted impacts on concentrations of PM_{10} and $PM_{2.5}$ are considered Negligible significance.

5. The Proposed Development is to be built in a number of phases and will introduce new receptors, these new receptors were not identified in the modelling.

The introduced receptors were not included in the modelling due to background levels within the development site being well below the NAQO levels (NO_2 : 2024 = $7.5 \mu\text{g m}^{-3}$ and 2028 = $6.9 \mu\text{g m}^{-3}$; PM_{10} : 2024 = $13.3 \mu\text{g m}^{-3}$ and 2028 = $12.6 \mu\text{g m}^{-3}$ and $\text{PM}_{2.5}$: 2024 = $8.6 \mu\text{g m}^{-3}$ and 2028 = $8.5 \mu\text{g m}^{-3}$) and the predicted impacts due to development generated traffic being Imperceptible (NO_2 = $0.28 \mu\text{g m}^{-3}$ or less, PM_{10} = $0.15 \mu\text{g m}^{-3}$ or less and $\text{PM}_{2.5}$ = $0.05 \mu\text{g m}^{-3}$ or less) and of Negligible significance.

Emissions Mitigation

6. When completing the damage-cost calculation, the damage costs toolkit should be used. The price base year should be the year of appraisal (2024), and the start year, the predicted opening year (2028). Please could the applicant review their calculation of emissions and air quality appraisal.

Paragraphs 5.26 to 5.29 covers the DEFRA Emissions Factor Toolkit calculations with a base year of 2024 and future year of 2028. The outputs from the calculations are presented below:

5.28 The first step is to quantify the change in emissions for NO_x and $\text{PM}_{2.5}$ for 5 years of scheme operation.

Table 5.9: EFT Output (tonne/annum)

	2024	2025	2026	2027	2028
NO_x	0.4725	0.4226	0.375	0.3294	0.2867
$\text{PM}_{2.5}$	0.044	0.0433	0.0429	0.0422	0.0419

5.29 The second step is to calculate damage costs for NO_x and $\text{PM}_{2.5}$ for 5 years of scheme operation. The costs per tonne are as follows: £8,148* tonne (NO_x) + £74,769* tonne ($\text{PM}_{2.5}$).

Table 5.10: Output from Damage Cost Appraisal Toolkit** (£)

	2024	2025	2026	2027	2028	Total
NO_x	3849.93	3443.34	3055.50	2683.95	2336.03	15368.76
$\text{PM}_{2.5}$	3289.84	3237.50	3207.59	3155.25	3132.82	16023.00
Totals	7139.77	6680.84	6263.09	5839.20	5468.85	31391.75

7. The Mitigation measures for the proposed development should be in line with the *Sussex Air (2021) Air Quality and Emissions Mitigation Guidance* for Sussex. The emission mitigation statement should contain itemised costing for each proposed mitigation option and total value of all proposed emissions' mitigation. This should be equal to the value from Emissions calculation and total calculated value of emissions' health damage cost. *Sussex Air quality guidance* aims to avoid the duplication of measures that would normally be required through other regimes.

Proposed mitigation measures are presented in paragraphs 6.20 to 6.26 of the SMA June 2024 AQ report and can be presented in more detail within an emissions mitigation statement if required as part of a planning condition.

In summary, the modelled road network is presented in a figure above, modelled PM₁₀ concentrations have been verified against monitored concentrations at HO2 and were under predicting as suggested. The road traffic contribution of PM₁₀ has been adjusted and the results are presented in the Tables above. With reference to the above Tables, the predicted impacts from development generated traffic do not change (except at R5 where 'No Change' changes to 'Imperceptible'). Therefore, the Conclusions of the SMA June 2024 AQ report do not change with the predicted impacts on concentrations of PM₁₀ and PM_{2.5} are considered Negligible significance. Concentrations of NO₂, PM₁₀ and PM_{2.5} within Phase 5 are well below the NAQO levels and impacts are predicted to be Imperceptible at all receptors, therefore no introduced receptors have been included in the AQ assessment. The damage-cost calculation was undertaken in accordance with the Horsham District Council Air Quality Action Plan – Planning Advice Document: Air Quality & Emissions Mitigation Guidance for Sussex (2021) with a 2024 base year and five years to 2028. Proposed mitigation measures presented in SMA June 2024 AQ report, and can be presented in more detail within an emissions mitigation statement if required as part of a planning condition.