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Environmental Statement – Volume 3 – Appendix 23.8 A2030 Eastern Road Traffic Sensitivity Testing - Air Quality

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Appendix 23.8 A2030 Eastern Road Traffic
Sensitivity Testing - Air Quality

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CONTENTS

APPENDIX 23.8 A2030 EASTERN ROAD TRAFFIC SENSITIVITY TESTING – AIR QUALITY 1

1.1.	BACKGROUND	1
1.2.	METHODOLOGY	2
1.3.	PREDICTED IMPACTS AND CUMULATIVE EFFECTS	7
1.4.	CONCLUSION	15

TABLES

Table 1 – Sensitivity Testing Model Performance	6
Table 2 - Impacted Receptors Inside AQMA	7
Table 3 - Particularly Sensitive Receptors Inside AQMA No.9	9
Table 4 – Non-construction Related Traffic Assessment Results for the Do-Something Scenario 1 (2026) Inside AQMA No.9	9
Table 5 – Sensitivity Testing Magnitude of Effect for the DS1 Scenario	10
Table 6 – Non-construction Related Traffic Assessment Results for the Do-Something Scenario 2 (2026) Inside AQMA No.9	11
Table 7 Sensitivity Testing Magnitude of Effect for the DS2 Scenario	12
Table 8 – Sensitivity Study Representative Receptor Selection	14

PLATES

Plate 1 - A2030 Eastern Road Traffic Sensitivity Testing Study Area	2
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APPENDIX 23.8 A2030 EASTERN ROAD TRAFFIC SENSITIVITY TESTING – AIR QUALITY

1.1. BACKGROUND

- 1.1.1.1. Diverted traffic impacts resulting from the Proposed Development were modelled using the Solent Sub-Regional Transport Model ('SRTM'), which is a multi-modal strategic transport model for Hampshire, the Isle of Wight and Portsmouth. Traffic data from the SRTM has been used to assess the impacts on local air quality in the study area which includes modelling scenarios representing road closures and diversions required along cabling routes.
- 1.1.1.2. Although the traffic management will temporarily impact local road traffic and modelling estimates are considered to be robust, Air Quality Management Area (AQMA) No.9 located on Eastern Road is a sensitive area for air quality. The impact of the redistribution of traffic resulting from the traffic management required for a possible cable route along the A2030 between Tangier Road and Eastern Avenue has not been assessed. As a result, the following written questions were received concerning the assumptions underpinning the traffic reassignment:
- **AQ1.2.7** - *“What assumptions have been made in the ES [APP-138] when re-assigning traffic during construction works in Air Quality Management Area 9 at Eastern Road? How were construction emissions factored into the NO₂ equation?”*
 - **AQ 1.2.8** - *“In relation to the assumptions made when re-assigning traffic during construction works in Air Quality Management Area 9 at Eastern Road [APP-138], is it likely that vehicles would not divert but would instead wait at the traffic lights operating for the single lane closures with engines idling, leading to a deterioration in air quality rather than improving it as suggested in the ES?”*
- 1.1.1.3. This Appendix therefore provides further detail as to the potential impact of traffic management required for a possible cable route along the A2030 between Tangier Road and Eastern Avenue on pollutant concentrations in AQMA No.9.

1.2. METHODOLOGY

1.2.1. STUDY AREA

1.2.1.1. Plate 1 shows the junctions of Tangier Road / A2030 Eastern Road and the Milton Road / Eastern Road junction. The Milton Road / Eastern Road junction lies inside AQMA No.9.

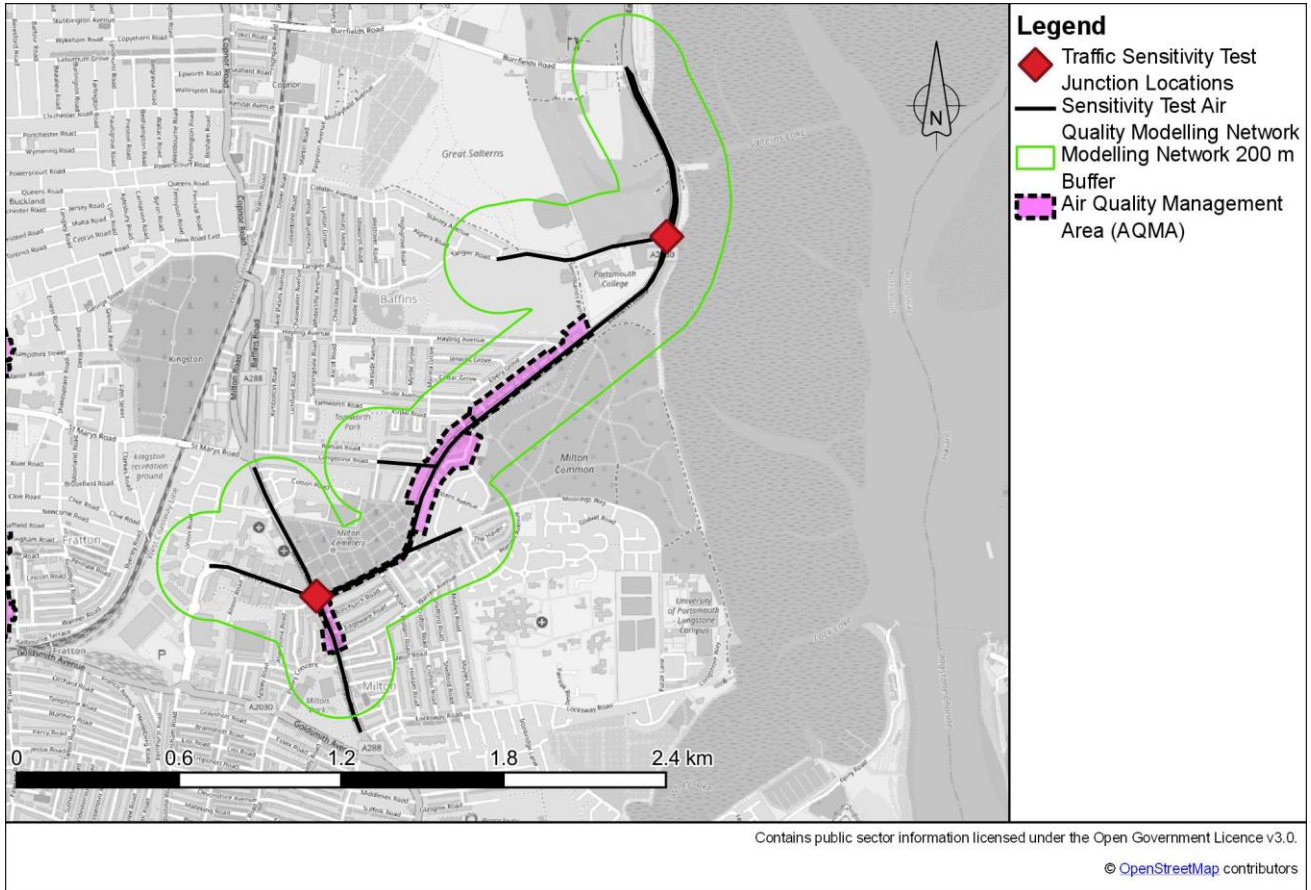


Plate 1 - A2030 Eastern Road Traffic Sensitivity Testing Study Area

1.2.1.2. For the purpose of the reporting of the sensitivity testing results, relevant human sensitive receptors in the study area which lie but outside AQMA No.9 are presented within the modelling results as the interactions of traffic at the junction of Tangier Road and Eastern Road are considered to have an impact on the AQMA.

1.2.2. TRAFFIC DATA

1.2.2.1. The Eastern Road Technical Note (Appendix E of the Supplementary Transport Assessment) (document reference 7.8.1.11) has been prepared in response to a Relevant Representation made by PCC (RR-185, received 19th February 2020) in response to the proposals stating that:

- **RR-185** - *“The traffic modelling has been carried out in line with the scoping note previously submitted to and agreed by the LHA. In line with this approach, the Applicant has attempted to replicate a "worst case" scenario. However, the modelling does not cover a possible cable route along the A2030 between Tangier Road and Eastern Avenue nor does it account for cumulative residual impacts of traffic merging to pass-by works or diverting away from works. It is noted that SRTM does make an assumption as to the redirection of traffic however it does not accurately predict vehicle movements at a microscopic level and as a consequence, the overall impacts of the works are likely to be greater/wider than anticipated.”*

1.2.2.2. The Eastern Road Technical Note reports on a traffic impacts scenario where construction works and associated traffic management are located on the A2030 Eastern Road between Tangier Road and Eastern Avenue. The note concludes:

- *Traffic delay and journey time changes will be similar to the traffic management scenario assessed within the SRTM between Airport Service Road and Burrfields Road. Given that there will only ever be a single instance of traffic management on the A2030 Eastern Road at any one time there will not be greater cumulative effects of more than one traffic management location. The further assessment in this TN [ERTN01] validates that the assessment of the A2030 Eastern Road completed in the TA and using the SRTM is robust and representative.*
- *The modelled traffic management temporarily impacts upon link speeds and journey times, decreases traffic flow and leads to a reassignment of traffic across the wider highway network.*

- *The Applicant also maintains the position that the local junction capacity and link based assessments undertaken in the transport assessment, using the SRTM traffic flows which account for the reassignment of traffic away from the works, robustly assess the temporary impacts on the wider highway network in the assessed scenarios.*
- *The highway implications of the Onshore Cable Route construction have been satisfactorily assessed and it is not necessary to undertake a microscopic assessment of the overall impacts of the works upon the Highway Network.*

1.2.2.3. The potential impact of traffic management required for a possible cable route along the A2030 between Tangier Road and Eastern Avenue has therefore been assessed using traffic data used to inform the impact scenario reported in Technical Note ERTN01.

1.2.3. ASSESSMENT YEAR

1.2.3.1. Consistent with Section 23.4 of Chapter 23, the traffic flow for a peak traffic year of 2026 have been used in the assessment with emissions factors from the EFTv9 and background pollutant concentrations for the year 2022 to ensure the potential emission are not under reported due to anticipated advancements in engine technology between 2022 and 2026. This is considered to represent a robust worst-case assessment for the assessment of impacts on Tangier Road, Eastern Road and AQMA No.9.

1.2.4. MODEL PERFORMANCE

1.2.4.1. Model verification has been completed following the swami methodology as described in **Section 1.2 of Appendix 23.3**. Verification is the process by which uncertainties are investigated and minimised.

1.2.4.2. **Table 1** shows the results of the model verification process as indicated by the Root Mean Square Error (RMSE) which is the average difference between monitored and modelled concentrations. The verification statistics for Verification Zone 2 are presented for comparison as AQMA No.9 is situated within this zone in the main air quality modelling exercise described in Chapter 23 (Air Quality) (APP-138 Rev002).

Table 1 – Sensitivity Testing Model Performance

Statistic	Verification Zone 2 after verification and adjustment (Appendix 23.3)	Sensitivity Study before verification and adjustment	Sensitivity Study after verification and adjustment	Comments
RMSE	5.02	8.24	6.08	Model marginally under-predicts after adjustment
Fractional Bias	0.15	0.64	0.02	
Correlation Coefficient	0.52	0.21	0.22	

1.2.4.4. Table 1 shows that the RMSE is reduced as a result of model verification and adjustment in the sensitivity model. The fractional bias and correlation are also both improved following model adjustment and they indicate that the model marginally under-predicts after adjustment.

1.3. PREDICTED IMPACTS AND CUMULATIVE EFFECTS

1.3.1. RECEPTORS

1.3.1.1. Within 200 m of the network used for sensitivity testing on AQMA No.9, the number of impacted receptors is shown in Table 2.

Table 2 - Impacted Receptors Inside AQMA

Type	Receptor Count
Residential	3,071
Commercial	164
Community	18
Military	0
Total Number of Receptors	3,253

1.3.1.2. Within the numbers of receptors shown in Table 2, there are receptors with particular sensitivity, as shown in

1.3.1.3. Table 3.

Table 3 - Particularly Sensitive Receptors Inside AQMA No.9

Sensitive Receptor	Receptor Count
Schools	4
Medical	7
Hospice	3
Sheltered Accommodation	1
Care Home	41

1.3.2. RESULTS

1.3.2.1. During the construction stage a summary of the results for road closure and diversion traffic for the DS1 scenario is shown in Table 4.

Table 4 – Non-construction Related Traffic Assessment Results for the Do-Something Scenario 1 (2026) Inside AQMA No.9

		Construction Scenario DS1 2026		
Pollutant		NO ₂	PM ₁₀	PM _{2.5}
Annual Mean Limit Value (µg/m ³)		40	40	25
Summary Results	DM (2026) Maximum Modelled Concentration	27.0	19.7	13.0
	DS1 (2026) Maximum Modelled Concentration	31.3	23.5	13.4
	Removed Exceedances	0	0	0
	New Exceedances	0	0	0
Total Number of Properties	Improvement in Concentration	0	0	0

		Construction Scenario DS1 2026		
Pollutant		NO ₂	PM ₁₀	PM _{2.5}
Annual Mean Limit Value (µg/m ³)		40	40	25
	No Change in Concentration	3,253	3,253	1,963
	Deterioration in Concentration	0	0	1,290
Do Something-Do Minimum Annual Mean Change (µg/m ³)	Maximum Improvement	0.0	0.0	0.0
	Maximum Deterioration	4.6	3.9	0.5

- 1.3.2.2. The summary results in Table 4 show that there is a deterioration of 4.3 µg/m³ in the maximum modelled concentration at receptors within AQMA No.9 for NO₂ in the DS1 scenario. The maximum DS1 concentration of 31.3 µg/m³ is significantly under the objective and is highly unlikely to exceed the objective value taking the RMSE into account. There is a deterioration of 3.8 µg/m³ in the maximum modelled concentration for PM₁₀ and a deterioration of 0.4 µg/m³ for PM_{2.5}.
- 1.3.2.3. There are no receptors predicted to experience an improvement in concentrations of NO₂ as a result of the sensitivity testing.
- 1.3.2.4. The magnitude of effect at all receptors is shown in Table 5.

Table 5 – Sensitivity Testing Magnitude of Effect for the DS1 Scenario

		NO ₂	PM ₁₀	PM _{2.5}
Negligible	Beneficial	0	0	0
	No change	0	0	1,290
	Adverse	2,929	2,844	1,963
Slight	Beneficial	0	0	0
	Adverse	313	409	0
Moderate	Beneficial	0	0	0

	Adverse	11	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

1.3.2.5. Table 5 shows that the majority of receptors are expected to experience negligible effects, however the highest predicted effect is adverse and moderate in magnitude.

1.3.2.6. A summary of the results for diversions and road closures for the DS2 scenario are shown in Table 6.

Table 6 – Non-construction Related Traffic Assessment Results for the Do-Something Scenario 2 (2026) Inside AQMA No.9

		Construction Scenario DS2 2026		
Pollutant		NO₂	PM₁₀	PM_{2.5}
Annual Mean Limit Value (µg/m³)		40	40	25
Summary Results	DM (2026) Maximum Modelled Concentration	27.0	19.7	13.0
	DS2 (2026) Maximum Modelled Concentration	31.3	23.5	13.4
	Removed Exceedances	0.0	0.0	0.0
	New Exceedances	0.0	0.0	0.0
Total Number of Properties	Improvement in Concentration	0.0	0.0	0.0
	No Change in Concentration	3,253	3,244	1,963
	Deterioration in Concentration	0.0	9	1,290

		Construction Scenario DS2 2026		
Pollutant		NO ₂	PM ₁₀	PM _{2.5}
Annual Mean Limit Value (µg/m ³)		40	40	25
Do Something- Do Minimum Annual Mean Change (µg/m ³)	Maximum Improvement	0.0	0.0	0.0
	Maximum Deterioration	4.6	3.9	0.5

- 1.3.2.7. The summary results in Table 6 show that there is predicted to be a deterioration of 4.3 µg/m³ in the highest predicted concentration within the study area for NO₂ in the DS2 scenario. There is a deterioration of 3.8 µg/m³ in the highest predicted concentration of PM₁₀, and a deterioration of 0.4 µg/m³ in the highest predicted concentration of PM_{2.5}.
- 1.3.2.8. No receptors are predicted to experience an improvement in concentrations in the DS2 scenario.
- 1.3.2.9. The magnitude of effect at all receptors for the DS2 scenario is shown in Table 7.

Table 7 Sensitivity Testing Magnitude of Effect for the DS2 Scenario

		NO ₂	PM ₁₀	PM _{2.5}
Negligible	Beneficial	0	0	0
	No change	0	9	1,424
	Adverse	2,948	2,903	1,829
Slight	Beneficial	0	0	0
	Adverse	295	341	0
Moderate	Beneficial	0	0	0
	Adverse	10	0	0
Substantial	Beneficial	0	0	0
	Adverse	0	0	0

- 1.3.2.10. The results in Table 7 show that the majority of receptors are expected to experience negligible adverse impacts, however there are a small number of moderate adverse impacts for NO₂.
- 1.3.2.11. NO₂ concentrations at a selection of representative receptors from Verification Zone 2 and Verification Zone 3 are shown in Table 8 consisting of high sensitivity receptors highlighted in Chapter 23 (Air Quality) (APP-138 Rev002).

Table 8 – Sensitivity Study Representative Receptor Selection

Receptor	NO ₂ Concentration (µg/m ³)						
	DM	DS1	DS1 Change	IAQM	DS2	DS2 Change	IAQM
Shearwater, 18 Moorings Way	20.1	22.3	2.2	Slight	22.2	2.1	Slight
Portsmouth College, Tangier Road	14.1	14.6	0.5	Negligible	14.9	0.8	Negligible
Tangier Road Childrens Home, 265-267 Tangier Road	14.7	15.4	0.7	Negligible	15.9	1.2	Negligible
94 Eastern Road	21.5	23.5	2.0	Negligible	23.4	1.9	Negligible
3 Plover Reach	15.7	16.2	0.5	Negligible	16.1	0.4	Negligible
18 The Haven	15.4	15.7	0.3	Negligible	15.7	0.3	Negligible
Miltoncross Academy, Milton Road	16.2	16.7	0.5	Negligible	16.7	0.5	Negligible
383 Eastern Road	16.4	17.5	1.1	Negligible	17.5	1.1	Negligible
229 Hayling Avenue	14.0	14.4	0.4	Negligible	14.4	0.4	Negligible
Eastern Road Car Sales	17.7	19.5	1.8	Negligible	19.3	1.6	Negligible
Texaco Ltd, Eastern Road Service Station, Eastern Road	18.7	20.9	2.2	Slight	20.5	1.8	Negligible

1.4. CONCLUSION

- 1.4.1.1. Results presented in Appendix 23.3 (APP-456), show that no exceedances of the annual mean NO₂ objective are predicted inside AQMA No.9 in the baseline scenario or at any PCC monitoring locations in 2018.
- 1.4.1.2. However, the sensitivity testing results assessing cabling activity on Tangier Road / Eastern Road show that the majority of modelled receptors will experience negligible adverse impacts in 2022. A small number of slight and moderate adverse impacts are predicted at sensitive receptors. It should be noted that no exceedances are predicted inside AQMA No.9 with or without cabling on Tangier Road / Eastern Road in 2026.
- 1.4.1.3. Overall, the results of the sensitivity testing are worse than the results presented in Appendix 23.3 Table 51 to Table 56 without cabling on Tangier Road / Eastern Road. The results are worse because of the reduction in redistribution in traffic across the wider network and increases queuing associated with the road closure on Tangier Road / Eastern Road. This serves to concentrate slow moving traffic at the junction locations which has an adverse effect on air quality in the AQMA.
- 1.4.1.4. The works are planned to be undertaken in 70-100 m sections along the cable route with a duration of approximately 1-2 weeks at each location, and therefore will be highly transient in nature.
- 1.4.1.5. Results reported in Chapter 23 (APP-138 Rev002) paragraphs 23.6.2.267 to 23.6.2.281 without cabling on Tangier Road / Eastern Road, show the impact to be **slight beneficial** and the effect **significant**. For the reasons described above, the impact of the sensitivity test results representing road closures and diversions to facilitate cabling on Tangier Road / Eastern Road is considered to be **slight adverse** and the effect **significant**. Although the results are predicted to be worse in the sensitivity scenario, it should be noted that the maximum prediction in AQMA No.9 is over 8 µg/m³ under the objective and exceedances of the health-based objective are unlikely.

