



A5 Western Transport Corridor (A5 WTC)

Appendix TNI - Theme Report: Air Quality

21 July 2016

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Air Quality

1. The Environmental Statement (2016) for the proposed A5 Western Transport Corridor (A5WTC) scheme was published in February 2016, which included an 'Air Quality' chapter (Chapter 8) that reported the findings of the respective air quality impact assessment. The air quality assessment considered the potential impacts of both the construction and operation phases of the Proposed Scheme on local and regional air quality. The assessment was completed in accordance with the guidance provided in the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, part 1 (HA207/07).
2. This statement provides further information on the key themes highlighted within the objections received in relation to air quality and the Proposed Scheme.

Local Air Quality

3. The assessment of local air quality investigated changes in concentrations of traffic-related air pollutants nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀). These are two of the principal pollutants associated with vehicular emissions and two which are of main concern in relation to human health.
4. Accordingly, EU legislation established limit values for these pollutants that are not to be exceeded, relative to the protection of human health. These limit values have been translated to UK law through the air quality standards regulations.
5. The air quality assessment involved the calculation of concentrations of the two pollutants at sensitive receptors. Sensitive receptors comprised:
 - people living within 200 m of the relevant sections of the existing road network and the Proposed Scheme, identified in accordance with parameters detailed in the DMRB; and
 - locations where significant numbers of the public and more vulnerable members of the public regularly congregate, such as hospitals, schools and care homes.
6. The predicted change in pollutant concentrations relative to sensitive receptors was established using a dedicated computer programme to model and calculate concentrations in the projected opening year for each phase of the Proposed Scheme:
 - Phase 1 opening year (2019)
 - Phase 2 opening year (2023)
 - Phase 3 (completed Scheme) opening year (2028)

7. Vehicle emission rates for each pollutant in these future years were derived using a tailored programme known as the Emissions Factors Toolkit (EFT) released by the Department for Environment Food and Rural Affairs (Defra). The EFT provides emission rates for 2008 to 2030 and accounts for a range of information taken from the National Atmospheric Emissions Inventory, including vehicle fleet composition (e.g. petrol and diesel vehicles) based on European emission standards. The emission rates were used within the computer programme to calculate concentrations.
8. Calculations were completed assuming the existing network would, in one instance, remain without the Proposed Scheme in place (Do-Minimum Scenario), and in the second instance would include the Proposed Scheme (Do-Something Scenario). The results provided the required indication of increase or reduction in concentrations and hence potential detrimental or beneficial local air quality impact as a consequence of the Proposed Scheme being implemented.
9. The air quality assessment demonstrated that many more sensitive receptors in the vicinity of the existing A5, the wider road network and the Proposed Scheme are predicted to experience a slight improvement in concentrations of NO₂ and PM₁₀ than would be subject to a slight worsening, should the Proposed Scheme be implemented.
10. The results predicted that the implementation of the Proposed Scheme would not result in new exceedances of the NO₂ limit values at any sensitive receptor. The assessment predicted there would be no exceedances of the PM₁₀ limit values in both the Do-Something and Do-Minimum scenarios.
11. Exceedances of the NO₂ limit value that would occur without the Proposed Scheme in place are predicted to be removed or reduced in magnitude with the Scheme in operation. However, the vast majority of sensitive receptors are predicted to remain substantially below the NO₂ and PM₁₀ limit values with the Proposed Scheme in operation.
12. Given the higher numbers of receptors predicted to experience a slight improvement in concentrations of these pollutants, it is concluded that local air quality impacts would be generally beneficial. This would not constitute a significant environmental effect.
13. It should be noted that, in December 2015, the UK government committed to ensuring that almost every car and van is a zero emission vehicle by 2050, as part of the Zero Emission Vehicle Alliance with twelve other international members. Therefore, roadside concentrations of NO₂ and PM₁₀ in future years would be expected to fall due to the increased uptake of ultra-low

emission vehicles (ULEVs), combined with a gradual reduction in the proportion of diesel and petrol vehicles within the national fleet.

Regional Air Quality

14. The assessment of impacts related to regional air quality involved a comparison of annual emissions of specified exhaust gases emitted by traffic associated with the existing and Proposed Scheme road network. In accordance with the DMRB specific criteria, parts of the road network that were considered in this assessment were identified based on defined changes in volumes of traffic. The exhaust species included in the assessment comprise carbon dioxide (CO₂) hydrocarbons (HC) particulate matter (PM₁₀) and oxides of nitrogen (NO_x).
15. The predicted changes in emissions involved the use of Defra's Emission Factor Toolkit for vehicle emissions. In common with local air quality, calculations were completed for the Do-Minimum Scenario and Do Something scenario in the opening year of the completed scheme (2028). Calculations were also undertaken and comparative figures derived for both scenarios in a future design year (2041).
16. The results, based on the information provided in the ES, have demonstrated that there would be an increase in total emissions of the assessed species with the Proposed Scheme in place under both scenarios.
17. Table 1 (2028 opening year) and Table 2 (2041 design year) below present the changes in annual emissions of these species, as reported in the ES, within the context of 2013 emissions reported by the National Atmospheric Emissions Inventory (NAEI) for the Northern Ireland road transport sector.

Table 1 Proposed Scheme (2028) predicted annual emissions totals versus Northern Ireland road transport sector (2013) annual emissions totals

Exhaust species	Annual emissions total (tonnes per year)				Change as % of NI Roads Total
	Do-Minimum	Do-Something	Change	NI Road Transport	
HC	15	17	+2	800	0.3%
NO _x	144	181	+37	10,800	0.3%
PM ₁₀	28	32	+4	800	0.5%
CO ₂	146,006	174,269	+28,263	3,951,200	0.7%

Table 2 Proposed Scheme (2041) predicted annual emissions totals versus Northern Ireland road transport sector (2013) annual emissions totals

Exhaust species	Annual emissions total (tonnes per year)				Change as % of NI Roads Total
	Do-Minimum	Do-Something	Change	NI Road Transport Total*	
HC	17	20	+3	800	0.4%
NO _x	159	203	+44	10,800	0.4%
PM ₁₀	32	37	+5	800	0.6%
CO ₂	162,313	198,838	+36,525	3,951,200	0.9%

* 2013 is the most recent inventory year reported by NAEI

18. Although increases in each vehicle exhaust species are predicted with the Proposed Scheme in place, the above tables demonstrate that these increases are very slight when compared to total regional emissions in Northern Ireland from the road transport sector.
19. The increases associated with the Proposed Scheme equate to less than 1% of the respective road sector totals in both years of assessment.
20. There has been a number of concerns raised with respect to the impact of the Proposed Scheme on climate change in terms of greenhouse gas emissions. The major greenhouse gas associated with vehicle emission is CO₂. As evidenced above, the additional emissions of CO₂ associated with the Proposed Scheme are predicted to equate to less than 1% of national road transport sector emissions. When compared to national A-road emissions only, the contribution of the Proposed Scheme equates to 1.5%.
21. Furthermore, it may be reasonable to expect that other roads within the region would experience a reduction in vehicle volumes as vehicle journeys transfer to the Proposed Scheme as a more efficient route. This potential reduction in vehicles on other roads could effectively contribute to offsetting the increase in vehicle emissions associated with the Proposed Scheme.
22. The Emissions Factors Toolkit used in the assessment calculated CO₂ emissions based on petrol and diesel vehicles. However, alternative ULEVs, such as hybrid and electric vehicles are now part of the national fleet. The predicted road-CO₂ emissions totals for all scenarios are considered conservative, given that the proportion of ULEVs is expected to continue to increase within the national fleet in future years. This is in line with UK government's commitment to ensure almost every car and van is a zero emission vehicle by 2050. This will inevitably lead to a lowering of regional vehicle emissions from the road transport sector.

Construction Phase Impacts

23. In relation to construction-related traffic emissions, the assessment concluded that in light of the relatively low number of additional vehicles using potential routes on existing roads, and existing low concentrations of the two key traffic-related pollutants (NO₂ and PM₁₀), there would be no significant impact associated with such emissions during construction. Further, emissions associated with construction traffic would be temporary.
24. In relation to dust, the assessment recognised that, in common with large construction projects of the type proposed, a number of activities would generate and potentially disperse dust. Also in common with projects of the type proposed, proven measures focused on controlling and suppressing the generation of dust have been included in the environmental commitments detailed in the Environmental Statement. This would also include channels for registering concern should there be periods when dust is perceived as a nuisance by residents in the vicinity of the working area.
25. These measures would become a mandatory part of the construction contracts should the Proposed Scheme be approved and would be incorporated into the Construction Environment Management Plans (CEMPs) for the contracts.
26. The assessment has concluded that, with the adoption of appropriate mitigation measures, dust nuisance during construction would be kept to a minimum.