

For accuracy, the changes arising from the proposed Development were calculated using the exact output from the ADMS-Road model (i.e. numbers to at least 10 decimal places) rather than the rounded numbers.

NO₂

- 10.97 The results in Table 10.10 indicate that for 2011, annual mean NO₂ concentrations are predicted to exceed the objective at four receptor locations and are close to the objective at another six receptor locations. This is consistent with the RBC local air quality monitoring undertaken near the Site.
- 10.98 As discussed in Appendix 10.1, the hourly mean objective for NO₂ is unlikely to be exceeded at a roadside location where the annual-mean NO₂ concentration is less than 60µg/m³. As shown in Table 10.10, the predicted concentrations in 2011 are less than 60µg/m³ at all the existing locations and as such it is unlikely that the hourly objective would be exceeded.
- 10.99 In 2018 'without' and 'with' the proposed Development concentrations are predicted to meet the NO₂ annual mean objective value of 40µg/m³ at all of the receptor locations. Table 10.10 illustrates that 'without' and 'with' the proposed Development, the highest predicted annual mean NO₂ concentration (of 35.93µg/m³ at Receptor 34) is less than 60µg/m³ and as such the hourly objective is likely to be met in 2018 at all existing receptors.
- 10.100 Table 10.11 summarises the magnitude of change (as outlined in Table 10.5) and the significance of effects (as outlined in Table 10.6) for annual mean NO₂ concentrations as a result of the completed Development in 2018.

Table 10.11: Summary of Effect Significance

No.	Receptor Location	Magnitude of Change (see Table 10.5 of the Significance Criteria above)	Significance (dependent on magnitude of change and magnitude of concentration see Table 10.6 of the Significance Criteria above)
1	1 st Floor Flat, 125 Friar Street	Imperceptible	Negligible
2	54 Russell Street	Imperceptible	Negligible
3	107 Castle Hill	Imperceptible	Negligible
4	Alms House Castle Street	Imperceptible	Negligible
5	41 Bath Road	Imperceptible	Negligible
6	96 Berkeley Avenue	Imperceptible	Negligible
7	88 Queens Road	Imperceptible	Negligible
8	Grantley Heights	Imperceptible	Negligible
9	90 Kings Road	Imperceptible	Negligible
10	Forbury Hill School	Imperceptible	Negligible
11	119 Caversham Road	Imperceptible	Negligible
12	20-30 New Bright Street	Imperceptible	Negligible
13	10-20 Hieatt Close	Imperceptible	Negligible
14	44 Crown Street	Imperceptible	Negligible
15	6 Tilehurst Road	Imperceptible	Negligible
16	Blenheim Terrace, Castle Street	Imperceptible	Negligible
17	162 Castle Hill	Imperceptible	Negligible
18	31a Vastern Road	Imperceptible	Negligible
19	68 George Street	Imperceptible	Negligible
20	10 Trinity Place	Imperceptible	Negligible
21	33 Caversham Road	Imperceptible	Negligible
22	Merchants Place	Imperceptible	Negligible
23	Gateway, 31 Greyfriars Road	Imperceptible	Negligible
24	Malthouse Public House, 53 Greyfriars Road	Imperceptible	Negligible
25	Projection West	Imperceptible	Negligible
26	25a-25b Friar Street	Imperceptible	Negligible
27	32-34 Friar Street	Imperceptible	Negligible
28	36-137 Friar Street	Imperceptible	Negligible
29	144 Friar Street	Imperceptible	Negligible
30	Bridewell House/ Samuel House	Imperceptible	Negligible
31	Stanshawe Road	Imperceptible	Negligible
32	Terrace House, Vachel Road	Imperceptible	Negligible
33	Kennet House, 80-82 Kings Road	Imperceptible	Negligible

No.	Receptor Location	Magnitude of Change (see Table 10.5 of the Significance Criteria above)	Significance (dependent on magnitude of change and magnitude of concentration see Table 10.6 of the Significance Criteria above)
34	15-21 Tudor Road	Imperceptible	Negligible
35	Projection East	Imperceptible	Negligible

- 10.101 As presented in Table 10.11 in relation to annual mean NO₂, the proposed Development is predicted to result in a **negligible** effect at all receptors considered.
- 10.102 Given this, and that 'without' and 'with' the proposed Development the hourly-mean NO₂ objective is not likely to be exceeded, it is considered that the Development would have a **negligible** effect on hourly NO₂.

Fine Particulates

- 10.103 As shown in Table 10.10, the annual mean and daily concentrations of PM₁₀ are predicted to be well below the objective values in 2011 and in 2018 both 'with' and 'without' the Development at all the receptor locations. This is consistent with RBCs review and assessment work which concluded that no AQMA needed to be declared for PM₁₀.
- 10.104 Using the magnitude of change descriptors outlined in Table 10.5, the Development is predicted to result in an 'imperceptible' change (an increase / decrease <0.4µg/m³ annual mean PM₁₀ and <1 day increase / decrease in relation to daily mean PM₁₀) at all the receptor locations. On the basis of the significance of effect criteria outlined in Table 10.6 and Table 10.7, a **negligible** effect on annual and daily mean PM₁₀ is predicted as a result of the proposed Development.
- 10.105 The results in Table 10.10 indicate that the annual mean PM_{2.5} objective of 25µg/m³ is predicted to be met in all scenarios modelled, 2011 and 2018 both 'with' and 'without' the Development in place. There are no significance criteria in relation to annual mean PM_{2.5} concentrations (see Significance Criteria above). However, given that the predicted annual mean PM_{2.5} concentrations are well below the objective at all receptors with the Development in place, and the greatest increase in concentrations is <0.02µg/m³ as a result of the Development, it is considered that the proposed Development would result in **negligible** effects on annual mean PM_{2.5}.

Conditions within the Development

- 10.106 As shown in Table 10.10, predicted NO₂, PM₁₀ and PM_{2.5} concentrations for the worst case locations modelled within the proposed Development itself in 2018 are well below the respective objectives at all on-Site receptors.
- 10.107 The results presented in Table 10.10 are for the first floor levels of Block E and the first floor and fourteenth floor levels of Block F (i.e. the lowest level, in each building where residential use is located as well as the closest residential floor to the heating plant emissions). As shown by the results in Table A1.13 to Table A1.16 in Appendix 10.1 the predicted annual mean NO₂, PM₁₀ and PM_{2.5} concentrations for other floors (above the lowest level) at the receptors within the Development, are also well below all the objectives in 2018.
- 10.108 As shown in Table 10.10, the predicted concentrations in 2018 are less than 60µg/m³ at all the proposed on-site receptor locations and as such it is unlikely that the hourly objective would be exceeded.

- 10.109 Given the above it is considered that the effect of introducing residential uses to the Site is of **negligible** significance.

Sensitivity Analysis

- 10.110 As outlined above, recent DEFRA analyses of historical monitoring data have shown a trend that NO_x and NO₂ concentrations are not declining as expected.
- 10.111 The results of the sensitivity analysis (i.e. considering the potential effect of the Development against the current baseline, 2011, conditions) are presented in Appendix 10.1 (refer to Table A1.10). The overall predicted concentrations are higher than those presented above for 2018 owing to higher background concentrations and vehicle emissions rates in 2011 than 2018. The higher emissions rates also lead to higher changes in pollutants concentrations at some receptors.
- 10.112 Table A1.11 in Appendix 10.1 summarises the significance of the effects on NO₂ for the existing receptors in accordance with the magnitude of change (as outlined in Table 10.5) and the significance of effects (as outlined in Table 10.6) assuming no improvements to NO_x and NO₂. The Development is predicted to result in an 'imperceptible' change (an increase / decrease <0.4µg/m³ annual mean NO₂) at all receptor locations. On the basis of the significance of effect criteria outlined in Table 10.6, assuming no improvements in NO_x and NO₂, the proposed Development is predicted to result in the same effect as above; a **negligible** effect at all receptor locations.
- 10.113 As shown in Table A1.10 in Appendix 10.1, assuming that NO_x and NO₂ concentrations are not declining as expected, predicted annual mean concentrations, 'without' and 'with' the proposed Development are below 60µg/m³ at all receptors. It is therefore considered that when assuming no improvements in NO_x and NO₂, the Development would have a **negligible** effect on hourly NO₂.
- 10.114 Table A1.17 in Appendix 10.1 summarises the predicted annual mean NO₂ concentrations for the residential receptor locations within the proposed Development itself, assuming no improvements in NO_x and NO₂, and identifies that annual and hourly mean NO₂ concentrations are all below the objectives when assuming no improvements in NO_x and NO₂. The overall significance of introducing residential uses to the Site, assuming no improvements in NO_x and NO₂, is considered to be **negligible**.

Mitigation Measures

Demolition and Construction - Wider Development

Nuisance Dust

- 10.115 As part of the Construction Environmental Management Plan (CEMP) for the Site (refer to Chapter 6: Development Programme Demolition and Construction) which is required through Condition 35 on the SH3 Scheme Planning Consent as well as elements of Conditions 32 and 33, a range of environmental management controls would be developed with reference to the Building Research Establishment (BRE) guidance 'Controlling Particles, Vapour and Noise Pollution from Construction Sites - Set of Five Pollution Control Guides'³⁵. Such measures would follow best practice guidelines to prevent the release of potentially contaminated dust entering the atmosphere and/or being deposited on nearby receptors. Measures would include:

- Routine dust monitoring at sensitive residential locations, especially around the western, eastern and southern boundaries of the Site, with the results and effectiveness of controls reviewed at regular intervals;
- Damping down surfaces during dry weather;
- Erection of appropriate hoarding and/or fencing to reduce dust dispersion and restrict public access;
- Sheeting of buildings, chutes, skips and vehicles removing demolition wastes;
- Building elevations which front public boundaries or are immediately adjacent to adjoining properties would be fully scaffolded and completely enclosed by sheeting to provide a dust and safety shield during the demolition process;
- Appropriate handling and storage of materials, especially stockpiled materials;
- Restriction of drop heights onto lorries and other equipment;
- Use of 'deconstruction' demolition techniques, where appropriate;
- Use of a wheel wash, limiting of vehicle speeds to 5 mph, avoidance of unnecessary idling of engines and routing of Site traffic as far from residential and commercial properties as possible;
- Fitting all equipment (e.g. for cutting, grinding, crushing) with dust control measures such as water sprays wherever possible;
- Use of gas powered generators rather than diesel if possible (these are also quieter) and ensuring that all plant and vehicles are well maintained so that exhaust emissions do not breach statutory emission limits;
- Switching off of all plant when not in use;
- No fires would be allowed on the Site; and
- Ensuring that a road sweeper is available to clean mud and other debris from hardstanding roads and footpaths.

10.116 The CEMP would also include reporting and complaints management provisions (refer to Chapter 6: Development Programme Demolition and Construction, for further information).

10.117 Particular attention would be paid to operations which would inevitably have to take place close to the most sensitive surrounding properties (due to their proximity and orientation in relation to the Site) at the eastern and western boundary of the Site.

10.118 Measures to control dust are routinely and successfully applied to construction projects throughout the UK, and are proven to reduce significantly the potential for adverse nuisance dust effects associated with the various stages of construction work.

Vehicle Emissions

10.119 Measures to control construction traffic will be discussed and agreed with RBC to establish the most suitable access and haul routes for Site traffic. The most effective mitigation would be achieved by ensuring that construction traffic does not pass along sensitive roads (residential roads, congested roads, via unsuitable junctions, etc.) where possible. The timing of large-scale vehicle movements to avoid peak hours on the local road network will also be beneficial.

Interim Condition: Temporary Flexible Event Space

- 10.120 Given the potential effects are negligible, no mitigation is required for the operational temporary event space.

Completed Development

- 10.121 The overall effects of the completed Development on air quality are considered to be negligible and therefore no mitigation measures are required. However, a travel plan will be developed for the completed Development which will include measures to reduce vehicle trips associated with the Development which would benefit local air quality.

Residual Effects

Demolition and Construction - Wider Development

Nuisance Dust

- 10.122 Following the implementation of appropriate management controls as described above, it is envisaged that the demolition and construction effects would be significantly reduced. However, due to the proximity of the residential properties, there would remain the potential for a precautionary worst-case **temporary, local** and **adverse** residual effect of **minor** significance.

Vehicle Emissions

- 10.123 The effect of plant operating on the Site would be **negligible** in the context of local background concentrations or existing adjacent road traffic emissions.
- 10.124 The effects of construction vehicles entering and leaving the Site would be at worst **temporary, local** and **minor adverse** during the peak construction period and **negligible** for the remaining time, especially in the context of local background concentrations or existing adjacent road traffic emissions.

Interim Condition: Temporary Flexible Event Space

Completed Development

- 10.125 The residual effect from traffic emissions on air quality as a result of the temporary flexible event space is considered to be **negligible**.

Completed Development

- 10.126 In terms of annual mean NO₂, assuming no reduction in NO_x and NO₂ concentrations, the proposed Development is predicted to have a **negligible** effect on local air quality at all receptor locations.
- 10.127 In relation to annual mean and daily mean PM₁₀ concentrations, the operation of the proposed Development is predicted to have **negligible** effects at all of the modelled receptors.
- 10.128 The effect of introducing residential uses onto the Site, as part of the proposed Development, assuming no reduction in NO_x and NO₂ concentrations, is considered to be **negligible**.

Summary and Conclusions

Comparison of Effects between this ES and the Consented SH3 Scheme ES

10.129 There are no changes to the summary of effects from those presented in the 2013 ES for the SH3 Scheme.

Summary of Potential Effects, Mitigation and Residual Effects

10.130 A summary of potential effects, mitigation measures and resulting residual effects in relation to local air quality are summarised below within Table 10.12.

Table 10.12: Summary of Potential and Residual Air Quality Effects

Issue	Potential Effect	Mitigation	Residual Effect
Demolition and Construction - Wider Development			
Dust emissions from construction activities.	Moderate adverse	Routine environmental management control measures to prevent and control dust.	Minor adverse
Emissions from on-site plant.	Negligible	None required.	Negligible
Emissions from construction vehicles.	Negligible to minor adverse	Routine environmental management control measures.	Negligible to minor adverse
Interim Condition: Completed Temporary Flexible Event Space			
Emissions from traffic associated with the Temporary Flexible Event Space	Negligible	None required.	Negligible
Completed Development			
Emissions from traffic and heating plant associated with the completed Development.	Negligible	None required.	Negligible
New sensitive receptors introduced to the Site.	Negligible	None required.	Negligible

References

- ¹ Council Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe.
- ² Defra, 2010, The Air Quality Standards (England) Regulations
- ³ Office of the Deputy Prime Minister (ODPM), 1995, 'The Environment Act' 1995.
- ⁴ HMSO, London. Department of the Environment (DoE), 1997, 'The UK National Air Quality Strategy'. HMSO.
- ⁵ Department of the Environment, Transport and the Regions, 2000, 'UK Air Quality Strategy for England, Scotland, Wales and Northern Ireland'. HMSO, London
- ⁶ Department of the Environment, Food and Rural Affairs (DEFRA), Scottish Executive, Welsh Assembly Government and the Department of the Environment in Northern Ireland, 2003, 'The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: (Addendum)'. DEFRA, London.
- ⁷ Department of the Environment, Food and Rural Affairs (DEFRA), 2007. 'The Air Quality Strategy for England, Scotland, Wales & Northern Ireland'
- ⁸ Bate, K.J. and Coppin, N.J. 1991, 'Dust impacts from mineral workings', Mine and Quarry, 20 (3), 1991, pp31 – 35.
- ⁹ Department for Communities and Local Government (2012) 'National Planning Policy Framework.'
- ¹⁰ DCLG (2014), 'Planning Practice Guidance: Air Quality (ID 32)' (06 March 2014).
- ¹¹ Defra (2009), 'Local Air Quality Management Policy guidance PG(09)', DEFRA, London.
- ¹² Institute of Air Quality Management, 2014, 'Guidance on the Assessment of dust from demolition and construction.
- ¹³ Reading Borough Council, 2008. Reading Borough Local Development Framework Core Strategy, Adopted January 2008
- ¹⁴ Reading Borough Council, 2012. Reading Borough Local Development Framework Site & Detailed Policies Document, Adopted October 2012
- ¹⁵ Reading Borough Council, 2009. Reading Borough Local Development Framework Reading Central Area Action Plan, Adopted January 2009
- ¹⁶ Reading Borough Council, 2007. Station Hill South Planning and Urban Design Brief, March 2007
- ¹⁷ Reading Borough Council, 2010. Reading Station Area Framework, Adopted December 2010
- ¹⁸ Reading Borough Council, 2009. Reading Borough Council Air Quality Action Plan, January 2009
- ¹⁹ Cambridge Environmental Research Consultants Ltd, ADMS-Roads (22 November 2012) Version 3.1.4.
- ²⁰ AEA, NO_x to NO₂ Calculator, <http://laqm1.defra.gov.uk/review/tools/monitoring/calculator.php> Version 3.2, 5th September 2012
- ²¹ Communities and Local Government, 2012, 'Technical Guidance to the National Planning Policy Framework March 2012.
- ²² <http://laqm.defra.gov.uk/faqs/faqs.html>
- ²³ EPUK and IAQM (2015): Land-Use Planning & Development Control: Planning for Air Quality: Guidance from Environmental Protection UK and the Institute of Air Quality Management for the consideration of air quality within the land-use planning and development control processes, IAQM, London
- ²⁴ Reading Borough Council, 2003 Updating and Screening Assessment
- ²⁵ Reading Borough Council, 2003 Updating and Screening Assessment Supplement
- ²⁶ Reading Borough Council, 2004 Progress Report
- ²⁷ Reading Borough Council, 2006 Detailed Assessment
- ²⁸ Reading Borough Council, 2008 Detailed Assessment
- ²⁹ Reading Borough Council, 2008 Further Assessment
- ³⁰ Reading Borough Council, 2009 Updating and Screening Assessment
- ³¹ Reading Borough Council, 2010 Progress Report
- ³² Reading Borough Council, 2011 Progress Report
- ³³ Reading Borough Council, 2012 Updating and Screening Assessment
- ³⁴ Arup Environmental/Ove Arup and Partners, The Environmental Effects of Dust from Surface Mineral Workings (HMSO, 1995)
- ³⁵ Building Research Establishment (BRE) 2003, Controlling particles, vapour and noise from pollution from construction sites

11. Noise and Vibration

Introduction

- 11.1 This Chapter, written by Waterman Infrastructure & Environment Ltd, assesses the effects of the proposed Development in terms of noise and vibration. In particular, it considers the potential effects of noise and vibration during the demolition and construction works, and on completion of the Development. The assessment also considers the suitability of the Site in relation to the proposed residential land uses.
- 11.2 Given outline planning permission has been granted for the SH3 Scheme and for an interim Temporary Flexible Event Space, an overview is also provided of how the effects of the SH3 Scheme as amended and extended by the Telecom House / Plot E Scheme, differ from those previously reported in the 2013 ES.
- 11.3 The Chapter describes the methods used to assess the baseline conditions currently existing at the Site and its surroundings. Potential direct and indirect effects of the Development arising from noise and vibration are identified, together with mitigation measures required to prevent, reduce or offset any significant effects. The resulting residual effects are also identified.
- 11.4 Additional supporting information relating to the noise and vibration assessment is contained within the following appendices:
- Appendix 11.1: Glossary of Acoustic Terminology;
 - Appendix 11.2: Baseline Noise Survey;
 - Appendix 11.3: Construction Noise Assessment;
 - Appendix 11.4: Suitability for Residential Amenity;
 - Appendix 11.5: Traffic Noise Assessment; and
 - Appendix 11.6: Noise Assessment for Temporary Flexible Event Space.

Legislation, Planning Policy Context and Guidance

- 11.5 Legislation, National and Local Planning Policy and Guidance documents have been consulted, key elements of which are discussed below.

Legislation

Control of Pollution Act, 1974

- 11.6 Part III of the Control of Pollution Act 1974 (CoPA)¹ is specifically concerned with the control of pollution. With regard to noise, the CoPA covers construction sites; noise in the street; noise abatement zones; codes of practice; and Best Practicable Means (BPM).

National Planning Policy

National Planning Policy Framework, 2012

- 11.7 The National Planning Policy Framework (NPPF)² sets out the Government's planning policies for England and how these are expected to be applied. The NPPF is a material consideration in planning decisions.
- 11.8 With regard to noise the NPPF states that: