Proposed Residential Development: Midland Road, Royston, Barnsley

Air Quality Assessment

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Produced for:
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Summary

Mouchel was commissioned by Kier Living to undertake an air quality assessment in support of a full planning application for a residential development, located on land off Midland Road in Royston, Barnsley (the 'proposed development'). The proposed development site occupies approximately 6.3 acres of land and will comprise 80no. residential dwellings.

This report provides a review of existing air quality at and in proximity to the proposed development site and considers the impacts associated with the construction and operation phases of development in relation to local air quality.

A review of existing air quality conditions local to the proposed development site demonstrated that the site is not located within an air quality management area (AQMA) and none of the relevant air quality objectives – set for the protection of human health – are being or are predicted to be exceeded at the development site.

A construction phase assessment was undertaken in accordance with guidance provided by the Institute of Air Quality Management (IAQM). Effective implementation of appropriate mitigation measures for dust management and control is predicted to result, at worst, temporary and intermittent *slight adverse* local air quality impacts during the construction phase of the proposed development. Appropriate control and management of plant, equipment and vehicles within the site would ensure that emissions from non-road mobile machinery used during construction are not significant.

Potential air quality impacts during the operation phase of the proposed development may occur due to exhaust emissions associated with vehicles travelling to and from the site on the local road network. Operation of the proposed development is expected to generate a relatively minor number of vehicle trips to the local road network within the context of existing flows. Furthermore, the proposed development would generate a significantly lower number of vehicle movements compared to a previous planning application at the site, which was granted in 2012.

As such, vehicle emissions generated by the proposed development are predicted to have a *negligible* local air quality, with mitigation measures specific to air quality not considered necessary for the operation phase. However, the developer of the site (Kier Living) will consider and – where feasible and commensurate to the scale of development – incorporate best practice measures at the detailed design stage to contribute to Barnsley Council's local air quality management within Royston.

An assessment of suitability for residential land use was completed for the development site, based on a screening assessment of air quality using existing and future baseline vehicle flows on the local road network. The results of the assessment predicted that concentrations of traffic-related pollutants at the site would continue to remain well below the respective air quality objectives.

As such, the proposed development site is considered *suitable for residential land use*.

1. Introduction

Mouchel was commissioned by Kier Living to undertake an air quality assessment in support of a full planning application for a proposed residential development, located on land off Midland Road in Royston, Barnsley (the 'proposed development').

This report provides a review of existing air quality conditions at and in proximity to the proposed development site. The potential impacts of the proposed development on local air quality were assessed with respect to emissions associated with the construction and operation phases. The assessment was undertaken in accordance with current technical guidance published by the Department of Environment Food and Rural Affairs (Defra) and other relevant guidance published by the Institute of Air Quality Management (IAQM).

Air pollution in the UK, particularly within urban areas, is dominated by emissions from road vehicles. The main pollutants of health concern from road traffic exhaust releases are nitrogen dioxide (NO_2) and fine particulates assessed as the fraction of airborne particles of mean aerodynamic diameter less than 10 micrometres (PM_{10}) and 2.5 micrometres ($PM_{2.5}$), respectively. These pollutants are most likely to approach their respective air quality objectives in proximity to major roads and in congested urbanised areas. As such, emissions of NO_2 and particulate matter associated with the proposed development form the focus of this assessment.

1.1 Site Location, Surrounding Area & Planning History

The proposed development site, encompassing an area of approximately 6.3 acres, is the former Royston High School site, Midland Road, Royston S71 4EQ.

An ASDA supermarket complex is positioned adjacent to the east of the site boundary. Royston Library, Leisure Centre and Civic Hall are situated to the west of the site. Royston Parkside and St. John Baptist CE VA Primary Schools are located approximately 100 m and 250 m respectively to the south of the development.

Residential areas surround the development site, with properties located at the 'Scholars Gate' development off Ruston Drive to the north, The Lane and Galway Close to the east, B6428 Midland Road to the south and Queensway and Well Hill Grove to the west.

A previous planning application for the site (Application Reference 2012/1337) was approved in December 2012 and related to the erection of 143 dwellings, supermarket (Class A1), petrol filling station, additional parking for a community campus, car parking and an outline application for health centre (Class D1)

1.2 Proposed Development Plans

The proposed development plans are for 80no. residential dwellings with associated landscaping and car parking. The site location is presented in Figure 1 and the proposed development layout is presented in Figure 2.

2. Legislative Context and Planning Policy

2.1 European and National Legislation

European CAFE Directive (2008/50/EC)

Air pollution can have adverse effects on both human health and the quality of ecosystems. European Union (EU) legislation provides the foundation for UK air quality policy. The EU Air Quality Framework Directive 96/62/EC on Ambient Air Quality Assessment and Management (Ref 1) was established in September 1996. This became a structure for tackling air quality through provision of European-wide air quality limit values in a series of daughter directives, prescribing how air quality should be assessed and managed by each Member State. Directive 96/62/EC and the first three daughter objectives were pooled to form the new EU Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe (CAFE) (Ref 2), which launched in June 2008.

Air Quality Strategy and Air Quality Standards Regulations (2010)

The 1995 Environment Act necessitated the requirement for a national Air Quality Strategy (AQS), which fixed standards for specified air pollutants across the United Kingdom. The Act defined the relevant methods to be undertaken by local authorities with regard to meeting these objectives, through the Local Air Quality Management (LAQM) system.

The UK AQS was initially adopted in 1997 and has been reviewed and updated, when subject to evolving EU Legislation, technical and policy developments and the latest information on health effects of air pollution. The UK Government and the Devolved Administrations published the most recent AQS for England, Scotland, Wales and Northern Ireland in July 2007 (Ref 3).

The standards and objectives relevant to the LAQM system, as contained within the AQS, are prescribed through the Air Quality (England) Regulations 2000 (Ref 4), the Air Quality (England) (Amendment) Regulations 2002 (Ref 5) and the Air Quality Standards Regulations 2010 (Ref 6). These regulations outline the limit values and objectives for the protection of human health and are presented in Table 1, specific to the air pollutants considered within this assessment.

Table 1 AQS Objectives (England) for the purpose of LAQM

Air Pollutant	AQS Objective (England)		To be achieved
	Concentration	Averaging period	
Nitrogen dioxide (NO_2)	200 µg.m^{-3}	1-hour mean not to be exceeded more than 18 times per year	31/12/2005
	40 µg.m^{-3}	Annual mean	31/12/2005
Particles (PM_{10})	50 µg.m^{-3}	24-hour mean not to be exceeded more than 35 times per year	31/12/2004
	40 µg.m^{-3}	Annual mean	31/12/2004
Particles ($PM_{2.5}$)	25 µg.m^{-3}	Annual mean	2020

2.2 National Policy Guidance

The National Planning Policy Framework

The National Planning Policy Framework (NPPF) (Ref 7) was adopted in March 2012 and supersedes existing national planning policy in place since 2004.

Paragraph 109 of the NPPF states that "…*The planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution*."

Annex 2 of the NPPF defines 'Pollution' as "…*Anything that affects the quality of land, air, water or soils, which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions, including smoke, fumes, gases, dust, steam, odour, noise and light*."

The environmental impact of the proposed development will be a material consideration during the planning process. Paragraph 124 of the NPPF requires that planning policies should sustain compliance with, and contribute towards, EU Limit values or national objectives for pollutants, taking account of the presence of Air Quality Management Areas (AQMAs) and the cumulative impacts on air quality for individual sites in local areas. Planning decisions should ensure new development in (or which may affect) an AQMA is consistent with the local Air Quality Action Plan.

2.3 Local Planning Policy

Barnsley Core Strategy

The Barnsley Local Development Framework (LDF) provides a spatial policy for Barnsley Metropolitan Borough Council (BMBC) to support up to 2026, and brings together all those planning policies and the spatial planning strategy into this overarching document.

Contained within the LDF is the Core Strategy (Ref 8), which contains policies that inform the development process in the borough. The Core Strategy was adopted in September 2011. Three Core Strategy Policies directly relate to air quality:

- Policy CSP28 – Reducing the Impact of Road Travel
- "We will reduce the impact of road travel by…Developing and implementing robust, evidence based air quality action plans to improve air quality…"
- Policy CSP40 – Pollution Control and Protection
- "Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air pollution which would unacceptably affect or cause a nuisance to the natural and built environment or to people.
- We will not allow development of new housing or other environmentally sensitive development where existing pollution levels are unacceptable and there is no reasonable prospect of that these can be mitigated against."
- Policy AQ1 – Development in AQMAs

- "Development which impacts on areas sensitive to air pollution[1] in AQMAs will be expected to demonstrate that it will not have a harmful effect on the health or living conditions of any future users of the development in terms of air quality…
- We will only allow residential development which impacts on areas sensitive to air pollution, where the developer provides an assessment that shows living conditions will be acceptable for future residents, subject to any required mitigation…
- development which impacts on areas sensitive to air pollution due to traffic emissions will be expected to demonstrate suitable and proportionate mitigation relative to the increased traffic emissions generated by the development[2]."

Barnsley MBC Air Quality and Emissions Good Practice Planning Guidance (2014)

The BMBC Air Quality and Emissions Good Practice technical guidance (Ref 10) deals primarily with those pollutants regulated under the LAQM regime and the impact of traffic emissions, It provides a template for integrating air quality considerations into land-use planning and development management policies that can influence the reduction of road transport emissions.

The guidance sets out a three stage process for undertaking air quality assessment for new development:

- Stage 1 – Determining the classification of the development proposal
- Stage 2 – Assessing and quantifying the impact on local air quality
- Stage 3 – Determining the level of mitigation required by the proposal to meet Local Development Plan requirements.

Barnsley MBC Air Quality Action Plan

In accordance with LAQM guidance (Ref 11), BMBC has prepared an Air Quality Action Plan (AQAP) (Ref 12) following the declaration of AQMAs.

The AQAP includes 22 measures to improve air quality. These include:

- A low emission strategy package
- Ensuring that air quality is considered with regards to new development. The council will look for evidence that developers have taken appropriate steps to mitigate pollution impacts. Where appropriate, the council will seek to gain air quality improvements using Section 106 agreements.
- Ensure that all major traffic schemes are assessed for air quality impacts against the national AQS objectives

[1] Areas sensitive to air pollution include (but are not limited to) the Borough's AQMAs; "exceedance" areas within the Borough derived from the national assessment of air pollution by Defra and reported to the European Union; and housing within 20 metres of roads > 10k AADT (as defined within the Barnsley MBC Air Quality and Emissions Technical Planning Guidance document)

[2] Such areas sensitive to traffic emissions are defined within the Barnsley MBC Air Quality and Emissions Technical Planning Guidance, Section 5, Air Quality and Emissions Mitigation Assessment (https://www.barnsley.gov.uk/services/environment-and-planning/pollution/air-quality)

- Working with developers and employers to improve sustainable transport links to new economic and residential developments
- Encouraging uptake of lower emission vehicles and alternative fuels by participating in the Local Transport Plan funded South Yorkshire '*Low carbon re-fuelling infrastructure*' project.

3. Methodology

This section describes the assessment methodology, including data collation, local authority consultation and assessment criteria applicable to the air quality assessment.

3.1 Key Information Sources

The air quality assessment was completed with reference to key guidance, data, and other information obtained from relevant sources, as defined in Table 2.

Table 2 Air Quality Assessment Sources

Source	Reference	Purpose / Content
Department for the Environment Food and Rural Affairs (Defra)	Defra (2016) *Local Air Quality Management Technical Guidance LAQM.TG (16)* (Ref 11)	Technical guidance for undertaking air quality assessment
Defra LAQM Support Tools	Local Air Quality Management 1 km x 1 km grid background pollutant maps (**Error! Reference source not found.**)	Details of background concentrations throughout the UK
	Interactive Monitoring Networks Map found at uk-air.defra.gov.uk/interactive-map (Ref 14)	Information on AQMAs and monitoring network in vicinity of the proposed development
	MAGIC Interactive Ecological Map found at magic.defra.gov.uk (Ref 15)	Web-based interactive map containing information on local designated sites
Base Mapping	Ordnance Survey Street View® raster map tiles *SE30ne, SE30nw, SE30se, SE30sw, SE31ne, SE31nw, SE31se, SE31sw,*	Base mapping for use in air quality assessment
Barnsley Metropolitan Borough Council	Barnsley Metropolitan Borough Council (2016) *2016 Air Quality Annual Status Report* (Ref 16)	Local authority air quality monitoring and assessment submissions as part of the LAQM process
	Barnsley Metropolitan Borough Council (2014) *Barnsley MBC Air Quality and Emissions Good Practice Planning Guidance* (Ref 10)	Local authority air quality specific planning guidance for use
Institute of Air Quality Management (IAQM)	IAQM (2014) *Guidance on the assessment of dust from demolition and construction* (Ref 17)	Guidance for use assessing the local air quality impacts associated with the construction and operation phases of the proposed development
	IAQM (2015) *Land-use planning and development control: Planning for air quality* (Ref 18)	

3.2 Local Authority Consultation

The outcomes of a pre-application meeting with BMBC for the proposed development identified the potential for a ‘creeping baseline’, in terms of air quality, as a key issue within Royston due to future development. This report considers both the suitability of the site for residential use and the potential for it to impact local air quality due to the generation of emissions from additional vehicle movements on the local road network.

Mouchel consulted with the BMBC Regulatory Services Office[3] to agree an appropriate methodology for the assessment of potential local air quality impacts relating to the proposed development. The assessment detailed within this report was completed in accordance with the agreed methodology.

The proposed development is classified as a 'medium' development in accordance with the BMBC technical air quality guidance document (Ref 10).

3.3 Baseline Air Quality

BMBC has published a series of Review and Assessment documents in accordance with the LAQM process. The 2016 Air Quality Annual Status Report (Ref 16) was obtained from BMBC and reviewed to inform the existing conditions at and in proximity to the site.

Background pollutant concentrations conforming to the 1 km x 1 km grid squares covering the proposed development were obtained from the LAQM support tools (Ref 13) for use in this air quality assessment. Background concentrations for years 2015, 2016, 2017 and 2021 (indicative Opening Year for proposed development) were obtained to represent current and future baseline air quality conditions.

3.4 Construction Phase

Construction phase activities associated with the proposed development may result in the generation of fugitive dust emissions. If transported beyond the site boundary, dust can have an adverse impact on local air quality and/or cause annoyance through soiling.

The IAQM published a guidance document (Ref 17) for the assessment of demolition and construction phase impacts. The guidance considers the potential for dust nuisance and impact to human health and ecosystems to occur due to activities carried out during the following stages of construction:

- Demolition
- Earthworks
- Construction
- Trackout

Assessment of air quality impacts due to the release of fugitive dust and fine particulates during the construction phase was undertaken in accordance with the methodology detailed in the IAQM guidance. Full details of the construction phase assessment methodology are provided in Appendix A.

[3] Email correspondence between Damian Pawson (Mouchel) and Chris Shields (BMBC) dated 14th and 20th July 2016

3.5 Operation Phase

The focus of the operation phase air quality assessment was emissions of oxides of nitrogen (NO_x, which includes NO_2), PM_{10}, and $PM_{2.5}$ from vehicles generated by the proposed development on the local road network.

Indicative criteria are provided by IAQM guidance (Ref 18) to evaluate the requirement for a quantitative operation phase impact assessment, which are focussed on:

- Location of development (e.g. within an AQMA)
- Changes to traffic volumes and composition resulting from the proposed development
- Introduction of new roads / junctions or realignment
- Inclusion of substantial combustion plant within the development.

The proposed development is not located within an AQMA, will not require the introduction or realignment of a junction or road, and does not propose the inclusion of substantial combustion plant. As such, the following criteria, based on changes in traffic, were used to determine the need for quantitative assessment relating to operation phase traffic emissions:

- A change of light duty vehicle (LDV) flows of more than 500 24-hour AADT
- A change of heavy duty vehicle (HDV) flows of more than 100 AADT.

As part of the Transport Assessment submitted for the development, the survey data acquired for the development was collected during the AM and PM network peak hours and was factored to provide AADT and percentage of HDVs for the following scenarios:

- Base Year of 2016
- Indicative Base Year of 2017
- Proposed Opening Year of 2021 '*Without* Development'
- Proposed Opening Year of 2021 '*With* Development'.

The traffic data produced as part of the assessment and the respective percentage changes are provided in Appendix B.

The data provided indicate that the proposed development will generate 467 vehicle movements per day, which is below the criterion of a 500 AADT increase in LDV flows. The proportion of HDVs associated with the proposed development would be expected to be negligible, given the nature of the proposed land use. Further to this, the generated vehicle flows represent an increase of less than 5% on all local roads included in the Transport Assessment, with the exception of the site access road (The Lane), which has a baseline AADT flow of under 5,000 AADT (12.5% increase).

The development site previously gained planning consent in December 2012 (Application No. 2012/1337) for the provision of 143 dwellings, a supermarket, petrol filling station, additional parking for a community campus, public open space, landscaping access, parking and outline application for a health centre. The number of trips generated by the proposed development are predicted to be significantly less than the existing planning consent.

Based on the traffic data provided and consideration of the IAQM criteria, a quantitative air quality impact assessment was not considered necessary for the operation phase of the proposed development.

3.6 Suitability for Residential Land Use

Given that the proposed development includes the erection of 80no. dwellings, sensitive receptors will be introduced to the site. As such, the Design Manual for Roads and Bridges (DMRB) local air quality screening methodology was employed to assess the suitability of the site for residential use. Annual average daily traffic (AADT) data for base years 2016, 2017, and 2021 '*without*' the proposed development were provided by the project transport consultants, Pell Frischmann, and used within the screening assessment. These data are presented in Appendix B for the assessed roads, including Midland Road.

The baseline traffic survey was completed in June 2016, therefore it captured vehicle movements associated with the recently occupied properties as part of the Persimmon Homes development ('Scholars Gate') off Ruston Drive.

A number of proposed dwellings as part of the proposed development were included in the screening, at which annual mean NO_2 and PM_{10} concentrations were predicted to allow an assessment of suitability for residential use at the subject site. The receptors considered are provided in Table 3 and depicted in Figure 5; they were selected based on proximity to the local road network.

The results of the screening assessment were analysed within the context of the respective air quality objectives for these pollutants.

Table 3 Proposed receptor locations included in suitability for residential use assessment

Receptor		Grid Reference		Height (m)
		X	Y	
PR1	Proposed Residential 1	436276	411573	1.5
PR2	Proposed Residential 2	436372	411732	1.5
PR3	Proposed Residential 3	436205	411700	1.5
PR4	Proposed Residential 4	436234	411622	1.5
PR5	Proposed Residential 5	436387	411643	1.5
PR6	Proposed Residential 6	436362	411688	1.5

3.7 Significance Criteria

Construction Phase

The significance of any dust emissions from the construction of the proposed development was assessed in accordance with guidance provided by the IAQM (Ref 17).

Step four of the IAQM guidance states that *"…for almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation."*

The assessment is used to define appropriate mitigation measures to ensure that there will be no significant effects from the construction phase of the development and as such does not identify specific assessment significance criteria.

Operation Phase

A review of traffic data for the proposed development was undertaken within the context of IAQM guidance criteria (Ref 18) demonstrated that an assessment of the local air quality impact associated with the proposed development was not required. As such, significance criteria for operation phase air quality impacts were not required.

The suitability of the site for residential development was assessed semi-quantitatively based on baseline and future baseline air quality concentration predictions within the context of national air quality objectives for NO_2 and PM_{10}.

4. Baseline

4.1 Local Air Quality Management

The proposed development is not located within an AQMA. The nearest AQMA is situated approximately 5.4 km to the west of the proposed development:

- *Barnsley AQMA No. 1 (M1 Jct 35a – Jct 38)* – An area along the M1 between Junction 35a and Junction 38, including Haigh, Darton, Cawthorne Dike, Higham, Dodworth, Gilroyd, Rockley, Birdwell, and Tankersley. The area extends 100 m either side of the central reservation.

The AQMA was designated primarily due to vehicle emissions generated by traffic on the M1 motorway. The AQMA will not be impacted by the proposed development, given the distance and relatively insignificant contribution of traffic associated with the proposed development compared to existing volumes of traffic on the local road network.

4.2 Air Quality Monitoring

Nitrogen Dioxide (NO_2)

BMBC undertake ambient monitoring of NO_2 through the operation of a network of three continuous analysers and a series of passive NO_2 diffusion tubes, including an urban background monitoring site managed by Defra under the Automatic Urban and Rural Monitoring Network (AURN).

A review of the most recent LAQM report (Ref 16) indicated that the nearest NO_2 continuous monitor to the proposed development is at Wilthorpe Lane, Gawber. The monitoring station is approximately 5.5 km southwest of the proposed development boundary and is representative of an urban background location. The results from the Gawber continuous monitor are presented in Table 4.

The closest diffusion tube monitoring locations to the proposed development site are situated along A61 Wakefield Road, a main arterial road into Barnsley town centre. Tube sites DT24 and DT25 are located approximately 2.9 km and 3.2 km to the southwest of the site. The results from these locations are presented in Table 4.

Table 4 NO_2 continuous and passive monitoring data within proximity to the proposed development (2011 – 2015)

ID	OS Co-Ord (m)		Site Type	Location	NO_2 Monitored Concentrations Bias Adjusted (µg.m^{-3})				
	X	Y			2011	2012	2013	2014	2015
CM3	432525	407475	Urban background	Wilthorpe Lane, Gawber	20.0	21.0	22.0	19.0	19.0
DT24	434512	409256	Roadside	Wensley Road, off Wakefield Rd	24.9	25.7	27.3	27.6	25.5
DT25	434935	408647	Kerbside	Wakefield Road / Brunswick Close	30.5	30.5	28.3	29.0	29.7
Annual Mean Objective					**40 µg.m^{-3}**				

The monitoring data provided by BMBC indicate that the NO_2 annual mean objective was not exceeded at the aforementioned locations since 2011. The monitoring sites are not situated within an AQMA.

The diffusion tube monitoring locations presented in Table 4 are positioned on a main arterial route to Barnsley and would be exposed to more vehicular traffic than at the proposed development site. It would be anticipated that higher concentrations are observed along the A61 Wakefield Road than those at the development site.

Concentrations recorded at the continuous monitor in Gawber (CM3) are considered likely to be broadly representative of those at the development site, given the urban background setting of each location.

Particulate Matter (PM_{10} and $PM_{2.5}$)

The 2016 LAQM report confirmed that BMBC undertakes PM_{10} monitoring within the Borough through the implementation of two particulate beta attenuation monitors (BAM), one positioned at the A635 roadside site and one at an urban industrial location along Midland Road, Royston which is situated approximately 820 m to the east of the proposed development.

Monitoring results from the urban industrial monitor in Royston are presented in Table 5.

Table 5 PM_{10} Continuous monitoring data within proximity to the proposed development (2011 – 2015)

ID	OS Co-Ord (m)		Site Type	Location	PM_{10} Monitored Concentrations Bias Adjusted (µg.m^{-3})				
	X	Y			2011	2012	2013	2014	2015
CM4	437208	411675	Urban Industrial	Midland Road, Royston	22.0	21.0	27.0	27.0	21.0
Annual Mean Objective					**40 µg.m^{-3}**				

The monitoring data indicates that the PM_{10} annual mean objective was not exceeded at the Midland Road, Royston location.

BMBC carried out $PM_{2.5}$ monitoring as part of its LAQM commitments. In 2014, BMBC purchased two $PM_{2.5}$ E-samplers in order to ascertain background concentrations of $PM_{2.5}$ in the Borough and raise awareness of $PM_{2.5}$ air pollution within Barnsley.

A subsequent report was published by BMBC in December 2015 (Ref 20) in order to present representative monitored $PM_{2.5}$ concentrations in the BMBC area and provide evidence to confirm the previously estimated health burden for the Borough.

The equipment was installed at two sites in late August 2014, one in Athersley approximately 40 m from the A61 Wakefield Road and 3 km southwest of the proposed development site, and the second at the rear of Penistone Town Hall, west of the M1 motorway and approximately 14.2 km south west of the development. The annual $PM_{2.5}$ averages for Penistone and Athersley are detailed in Table 6.

Table 6 $PM_{2.5}$ continuous monitoring data within BMBC (2014 – 2015)

ID	OS Co-Ord (m)		Location	Data Capture (%)	Annual mean ($\mu g.m^{-3}$)
	X	Y			
PM1	434472	409265	Medical Centre, Athersley	99.0	10.3
PM2	424727	403260	Town Hall, Penistone	98.0	12.0
Annual Mean Objective				**25 $\mu g.m^{-3}$**	

The monitoring confirmed slightly more elevated concentrations recorded in the Barnsley urban area where the Athersley monitor is located, compared to the relative suburban setting at Penistone Town Hall. Both concentrations are below the annual mean objective.

4.3 Background Concentrations

Background annual mean concentrations of NO_x, NO_2, PM_{10}, and $PM_{2.5}$ obtained from the Defra air pollutant concentration maps are presented in Table 7.

Table 7 Background pollutant concentrations obtained for 1km² grids covering the proposed development and surrounding road network

1km² grid (OS ref)	Pollutant	Background pollutant concentration ($\mu g.m^{-3}$)			
		2015	2016	2017	2021
436500; 412500	**NO_x**	21.3	20.2	19.1	15.3
	NO_2	15.0	14.2	13.5	11.1
	PM_{10}	16.1	15.9	15.8	15.4
	$PM_{2.5}$	11.3	11.2	11.1	10.7
435500; 411500	**NO_x**	23.7	22.5	21.2	17.0
	NO_2	16.4	15.6	14.9	12.3
	PM_{10}	15.0	14.9	14.8	14.3
	$PM_{2.5}$	11.1	11.0	10.9	10.5
436500; 411500	**NO_x**	24.8	23.5	22.3	18.0
	NO_2	17.1	16.3	15.5	12.9
	PM_{10}	15.4	15.3	15.1	14.7
	$PM_{2.5}$	11.5	11.4	11.3	10.9

1km² grid (OS ref)	Pollutant	Background pollutant concentration (µg.m^{-3})			
		2015	2016	2017	2021
437500; 411500	NO_x	24.2	23.0	21.8	17.8
	NO_2	16.7	15.9	15.2	12.8
	PM_{10}	15.0	14.9	14.7	14.3
	$PM_{2.5}$	11.0	10.9	10.8	10.5

The background concentrations contained within Table 7 are based on a reference year of 2013. The gridded NO_2, PM_{10}, and $PM_{2.5}$ background concentrations for 2015, 2016, 2017 and 2021 are below the respective annual mean objectives.

4.4 Receptor Identification

Proposed receptor locations within the development site, selected for the assessment of suitability for residential use, are provided in Table 3 and Figure 5.

Construction Phase

Existing residential areas are located in proximity to the proposed development boundaries and approach roads. There are no statutory designated ecological sites within 50 m of the proposed development, therefore ecological sites were not considered as part of the construction phase dust assessment.

The closest sensitive 'human' receptors are located along Midland Road, which are existing residential properties located adjacent to the south-eastern site boundary of the proposed development and at 'Scholars Gate', off Ruston Drive, which borders the site.

Other receptors are located in proximity to the proposed development boundary on The Lane to the east of the site, in addition to Well Hill Grove and Station Road to the west and Queensway to the northwest. As the distance to a human receptor is less than 350 m, a dust assessment was conducted in accordance with the IAQM guidance.

Professional judgement was applied to determine the approximate number of receptors within the identified distance bandings contained within Table A3, Table A4 and Table A5 of Appendix A.

Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 350 m from the development boundary. These are summarised in Table 8 and Figure 3.

Table 8 Earthworks and construction dust sensitive receptors

Distance from Site Boundary (m)	Approximate Number of Receptors		Type(s) of Receptors
	Human Receptors	Ecological Receptors	
Up to 20	10 - 100	-	Residential; Place of Worship
Between 20 and 50	10 – 100	-	Residential; Place of Worship
Between 50 and 100	More than 100	-	Residential; Place of Worship; Primary School

Distance from Site Boundary (m)	Approximate Number of Receptors		Type(s) of Receptors
	Human Receptors	Ecological Receptors	
Between 100 and 200	More than 100	-	Residential; Places of Worship; Primary Schools
Up to 350	More than 100	-	Residential; Places of Worship; Primary Schools

Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50 m from the road network within 500 m of the site access. These are summarised in Table 9 and presented in Figure 4. For the purpose of the assessment it was assumed construction phase traffic would access the site from The Lane.

Table 9 Trackout dust sensitive receptors

Distance from Site Boundary (m)	Approximate Number of Receptors		Type(s) of Receptors
	Human Receptors	Ecological Receptors	
Up to 20	10 - 100	0	Residential; Place of Worship
Up to 50	10 - 100	0	Residential; Place of Worship

5. Impact Assessment

5.1 Construction Phase

Construction of the proposed development will include the following activities:

- Construction of 80no. residential dwellings
- Material import and export
- Temporary stockpiling of materials
- Landscaping works
- Associated vehicle movements (including track-out of material by construction phase movements).

The main potential air quality impacts that may arise from the aforementioned activities are:

- Dust deposition, resulting in the soiling of surfaces
- Dust plumes, affecting visibility and amenity
- Fugitive dust releases and exhaust emissions from non-road mobile machinery (NRMM) and other vehicles accessing the site.

The potential for sensitive receptors to be affected is dependent on the scale, location, and nature of the operations within the development site, in addition to prevailing meteorological conditions and mitigation controls adopted.

If demolition and construction operations were unmitigated, the effects of dust generated during dry and windy conditions could lead to dust generation and fugitive releases in proximity to that operation.

The background PM_{10} and $PM_{2.5}$ concentrations for the local area (see Table 7) encompassing the proposed development are well below the respective annual mean objectives. It is highly unlikely that the short-term and relatively low impact construction operations would cause the annual mean objective to be either approached or exceeded at sensitive receptors near to the site.

The potential overall risk of impacts to human health and dust soiling from construction activities prior to mitigation is summarised in Table A8 of Appendix A.

The results from the construction phase dust assessment indicate that the proposed development site is considered to be:

- Dust Soiling – *Medium Risk* in terms of construction and earthworks activities and *Low Risk* in terms of trackout activities; and
- Human Health – *Low Risk* in terms of construction and earthworks activities and *Negligible* in terms of trackout activities

These risks are identified prior to mitigation measures being applied.

5.2 Operation Phase

Operation of the proposed development is expected to generate an additional 467 AADT trips to the local road network, with negligible HDV movements given the proposed land use. As such, vehicle emissions generated by the development are predicted to have a negligible local air quality impact within the context of existing vehicle flows on the local road network (e.g. >7,000 AADT on Midland based on 2016 baseline data) and existing air quality conditions.

5.3 Suitability for Residential Land Use

The DMRB screening methodology (Ref 21) was used to estimate contributions of vehicle exhaust emissions to annual and short term NO_2 and PM_{10} concentrations for the existing and future baseline (*without* development) scenarios considered in the assessment. A Gap Analysis was subsequently undertaken in accordance with the Highways Agency Interim Advice Note 170/12 v3 (Ref 22) to take into account the impact of future alternative NO_2 projections.

The results of the suitability assessment at each of the proposed receptor locations are presented in Table 10. All concentrations include background contributions.

Table 10 Predicted existing and future baseline NO_2 and PM_{10} annual mean concentrations ($\mu g.m^{-3}$) at the proposed development site

Receptor	Base year 2016		Future base year 2017		Future base year 2021	
	NO_2	PM_{10}	NO_2	PM_{10}	NO_2	PM_{10}
PR1	17.3	15.5	17.1	15.3	16.6	14.9
PR2	16.9	15.4	16.7	15.2	16.3	14.8
PR3	16.4	15.3	16.2	15.1	15.8	14.7
PR4	16.5	15.3	16.4	15.1	15.9	14.7
PR5	17.5	15.6	17.4	15.4	16.9	15.0
PR6	16.8	15.4	16.7	15.2	16.2	14.8
Objective	**40 $\mu g.m^{-3}$ (NO_2 and PM_{10})**					

The results of the DMRB screening for the baseline (2016) and future baseline *without* development (2017 and 2021) scenarios indicate that annual mean concentrations of NO_2 and PM_{10} are predicted to be well below the respective objectives at all proposed receptor locations within the development site.

Exceedances of the 1-hour mean objective for NO_2 are unlikely as the predicted annual mean concentrations are substantially below 60 $\mu g.m^{-3}$ (Ref 11). The short term PM_{10} objective is predicted to be met at all modelled locations. With a worst-case assumption that 100% of PM_{10} is within the $PM_{2.5}$ fraction, all predicted concentrations would still be well below the annual mean objective (25 $\mu g.m^{-3}$).

Based on the results of the DMRB local air quality assessment at proposed receptor locations, the proposed development site is considered suitable for residential land use.

6. Mitigation

6.1 Construction Phase

A summary of the risk category associated with each identified source of construction phase dust is provided within Appendix A.

Step three of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to whether the site is classed as '*low risk*', '*medium risk*' or '*high risk*'.

The following mitigation measures are typical for a development of this nature and are consistent with IAQM guidance. Particular attention should be paid to operations that unavoidably take place in the immediate vicinity of existing sensitive receptors. The mitigation identified is based on the summary risk table for all construction sites, as defined in Table A8. Further guidance, including mitigation measures that are specific to each relevant construction activity, can be found within the IAQM document.

Mitigation for all sites – *Communications:*

- Implementation of a stakeholder's communications plan that includes community engagement before work commences on site.

Mitigation for all sites – *Dust Management:*

- Implementation of a Dust Management Plan (DMP), which may include measures to control other emissions.
- Implementation of on-site and off-site inspection
- Avoiding site runoff of water or mud
- Removal of materials that have a potential to produce dust from site as soon as possible, unless being re-used on site.
- Covering, compacting, seeding or fencing material stockpiles to prevent wind whipping
- Provision of an adequate water supply on the site for effective dust suppression
- Using enclosed chutes, conveyors and covered skips as applicable
- Minimising drop heights from loading or handling equipment, with use of fine water sprays on such equipment where appropriate
- Ensuring equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods
- Avoiding bonfires and burning of waste materials.

Appropriate provision of the above mitigation measures is expected to result in, at worst, temporary and intermittent *slight adverse* local air quality impacts during the construction phase of the proposed development.

6.2 Operation Phase

The proposed development is predicted to have a *negligible* local air quality impact and is considered suitable for residential use within the context of existing and future baseline air quality conditions. As such, mitigation measures specific to air quality are not considered necessary for the operation phase.

However, BMBC has identified the potential for a 'creeping baseline', in terms of air quality, as a key issue within Royston due to future development. Therefore, the developer of the site (Kier Living) will consider and – where feasible and commensurate to the scale of development – incorporate best practice measures at the detailed design stage to contribute to BMBC's local air quality management within Royston. Such measures being considered include:

- Provision of onsite electric vehicle charging infrastructure
- Provision of incentives for future residents at the site for uptake of low emissions vehicles and/or use or public transport
- Support for, and promotion of, car clubs.

Further to this, the proposed development will include the provision of travel information packs for occupiers of new dwellings, which will detail connections to local footways, cycle ways, and public transport services applicable to the site.

7. Conclusion

This report documents the air quality assessment for the proposed residential development located on land off Midland Road in Royston. It considers the impacts associated with the construction and operation phases of the proposed development and the suitability of the site for residential use in relation to local air quality.

7.1 Baseline Air Quality

A review of existing air quality conditions local to the proposed development site demonstrated that the site is not located within an AQMA and none of the relevant air quality objectives – set for the protection of human health – are being or are predicted to be exceeded at the development site.

7.2 Construction Phase

The potential for dust from demolition and construction activities will vary depending on the duration and intensity of the activities, their location on-site and the prevailing local meteorological conditions.

A construction phase assessment was undertaken in accordance with guidance provided by the IAQM. Effective implementation of appropriate measures for dust management and control would assist in mitigating potential effects of fugitive dust emissions. Given the nature and location of the proposed development, at worst, temporary and intermittent *slight adverse* impacts with respect to local air quality are predicted during the construction phase with mitigation applied.

Appropriate control and management of plant, equipment and vehicles within the site would ensure that emissions from non-road mobile machinery used during construction are not significant.

7.3 Operation Phase

Potential air quality impacts during the operational phase of the proposed development may occur due to exhaust emissions associated with vehicles travelling to and from the site on the local road network.

Operation of the proposed development is expected to generate a relatively minor number of vehicle trips to the local road network within the context of existing flows. Furthermore, the proposed development would generate a significantly lower number of vehicle movements compared to a previous planning application at the site, which was granted in 2012.

As such, vehicle emissions generated by the proposed development are predicted to have a *negligible* local air quality, with mitigation measures specific to air quality not considered necessary for the operation phase. However, the developer of the site (Kier Living) will consider and – where feasible and commensurate to the scale of development – incorporate best practice measures at the detailed design stage to contribute to BMBC's local air quality management within Royston.

7.4 Suitability for Residential Land Use

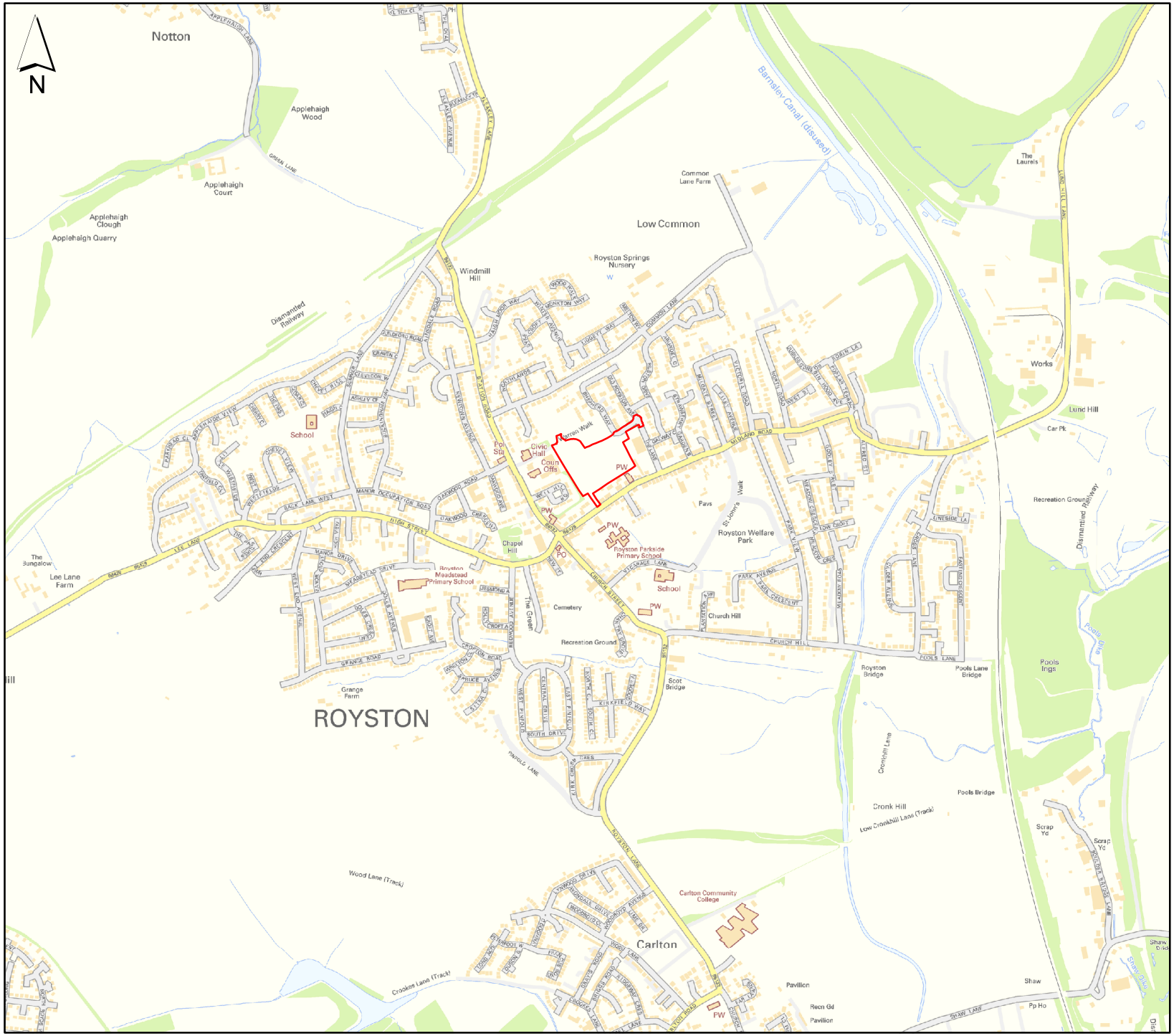
A DMRB screening assessment of local air quality was completed for sensitive receptor locations proposed at the development site, based on existing and future baseline vehicle flows on the local road network. The results of the assessment predicted that concentrations of traffic-related pollutants – NO_2, PM_{10} and $PM_{2.5}$ – would continue to remain below the respective air quality objectives.

As such, the proposed development site is considered *suitable for residential land use*.

8. References

Reference	Title
Ref 1	European Parliament (1996) Council Directive 96/62/EC on *Ambient Air Quality Assessment and Management*
Ref 2	European Parliament (2008) Council Directive 2008/50/EC on *Ambient Air Quality and Cleaner Air for Europe*
Ref 3	Department for Environment, Food and Rural Affairs (Defra) (2007) *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland,* London: HMSO
Ref 4	Her Majesty's Stationary Office (HMSO) (2000) *Statutory Instrument 2000 No. 928,* *The Air Quality (England) Regulations 2000,* London: HMSO
Ref 5	HMSO (2002) *Statutory Instrument 2002 No. 3043,* *The Air Quality (England) (Amendment) Regulations 2002,* London: HMSO
Ref 6	HMSO (2010) *Statutory Instrument 2010 No. 1001,* *Air Quality Standards (England) Regulations 2010,* London: HMSO
Ref 7	Department for Communities and Local Government (DCLG) (2012) *National Planning Policy Framework*
Ref 8	Barnsley Metropolitan Borough Council (2011) *Barnsley Local Development Framework Core Strategy*
Ref 9	Barnsley Metropolitan Borough Council (2014) *Local Plan Consultation 2014*
Ref 10	Barnsley Metropolitan Borough Council (2014) *Air Quality and Emissions Good Practice Planning Guidance*
Ref 11	Department for the Environment Food and Rural Affairs (Defra) (2016) *Local Air Quality Management Technical Guidance Document LAQM.TG (16),* London: Defra
Ref 12	Barnsley Metropolitan Borough Council (2013) *Barnsley Metropolitan Borough Council Air Quality Action Plan*
Ref 13	Local Air Quality Management 1km x 1km (1km^2) grid background pollutant maps http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2013, accessed July 2016
Ref 14	Interactive Monitoring Networks Map http://uk-air.defra.gov.uk/interactive-map, accessed July 2016
Ref 15	MAGIC Interactive Ecological Map http://magic.defra.gov.uk/, accessed July 2016
Ref 16	Barnsley Metropolitan Borough Council (2016) *Barnsley MBC 2016 Air Quality Annual Status Report (ASR)*
Ref 17	Institute of Air Quality Management (2014) *Guidance on the assessment of dust from demolition and construction works*
Ref 18	Institute of Air Quality Management (2015) Guidance on land-use p*lanning and development control: Planning for air quality 2015*
Ref 19	Department for Transport (2007) *Guidance on Transport Assessment*
Ref 20	Barnsley Metropolitan Borough Council (2016) *Barnsley MBC 2016 Air Quality Annual Status Report (ASR)*
Ref 21	Highways Agency (2007) *Design Manual for Roads and Bridges HA207/07 Volume 11, Section 3, Part 1 'Air Quality'*
Ref 22	Highways England (2013) IAN 170/12 *Updated air quality advice on the assessment of future NO_x and NO_2 projections for users of DMRB Volume 11, Section 3, Part 1 'Air Quality*

Figures



Key

Proposed Development Boundary

Title

Site Location Plan

Project

Proposed Residential Development
Midland Road, Royston

Figure

Figure 1

Date

01/08/16

Client

Kier Living

Scale

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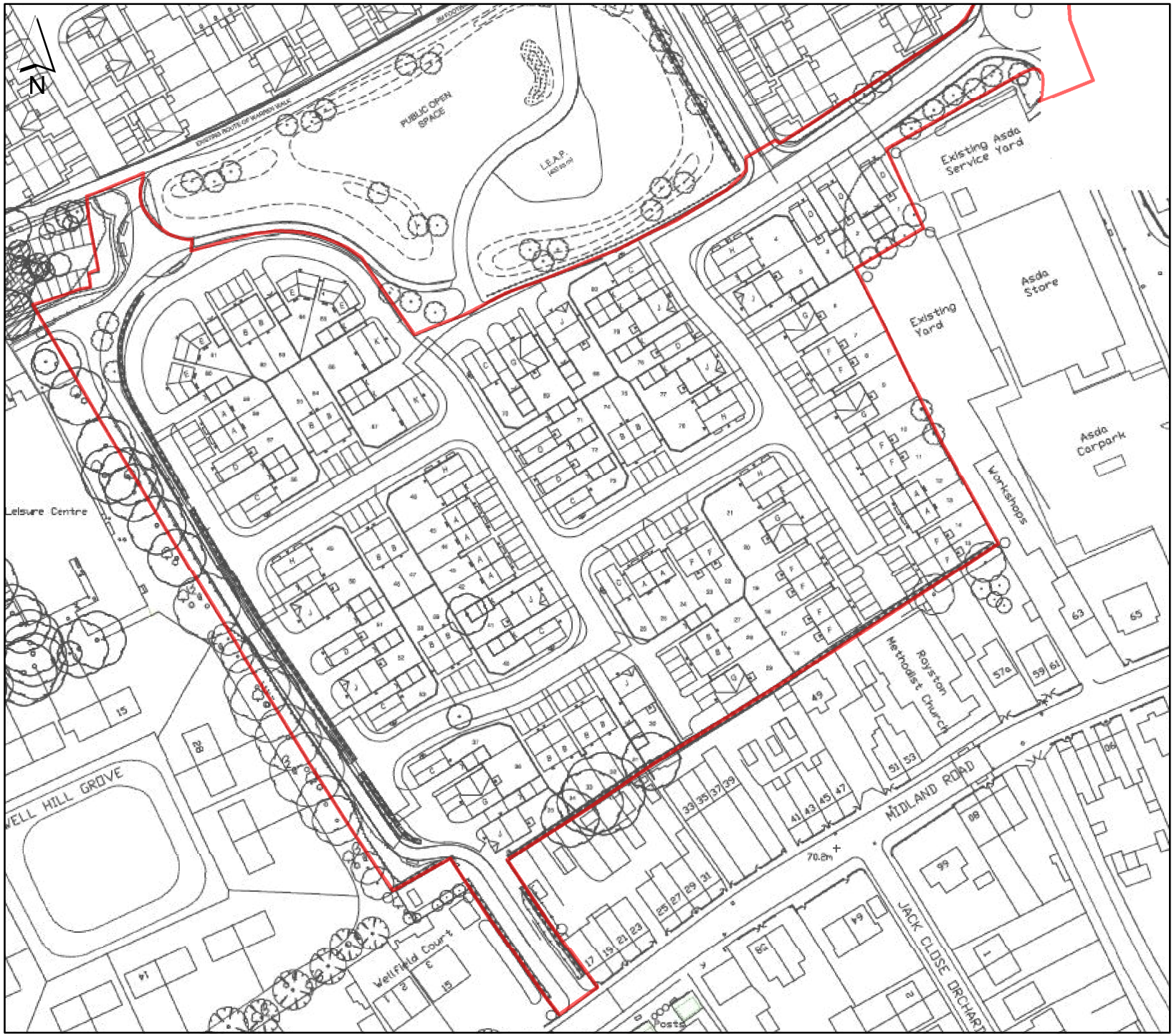
mouchel
building great relationships



Key

Proposed Development Boundary

Title

Proposed Development Layout

Project

Proposed Residential Development
Midland Road, Royston

Figure

Figure 2

Date

03/08/16

Client

Kier Living

Scale

NTS @ A4

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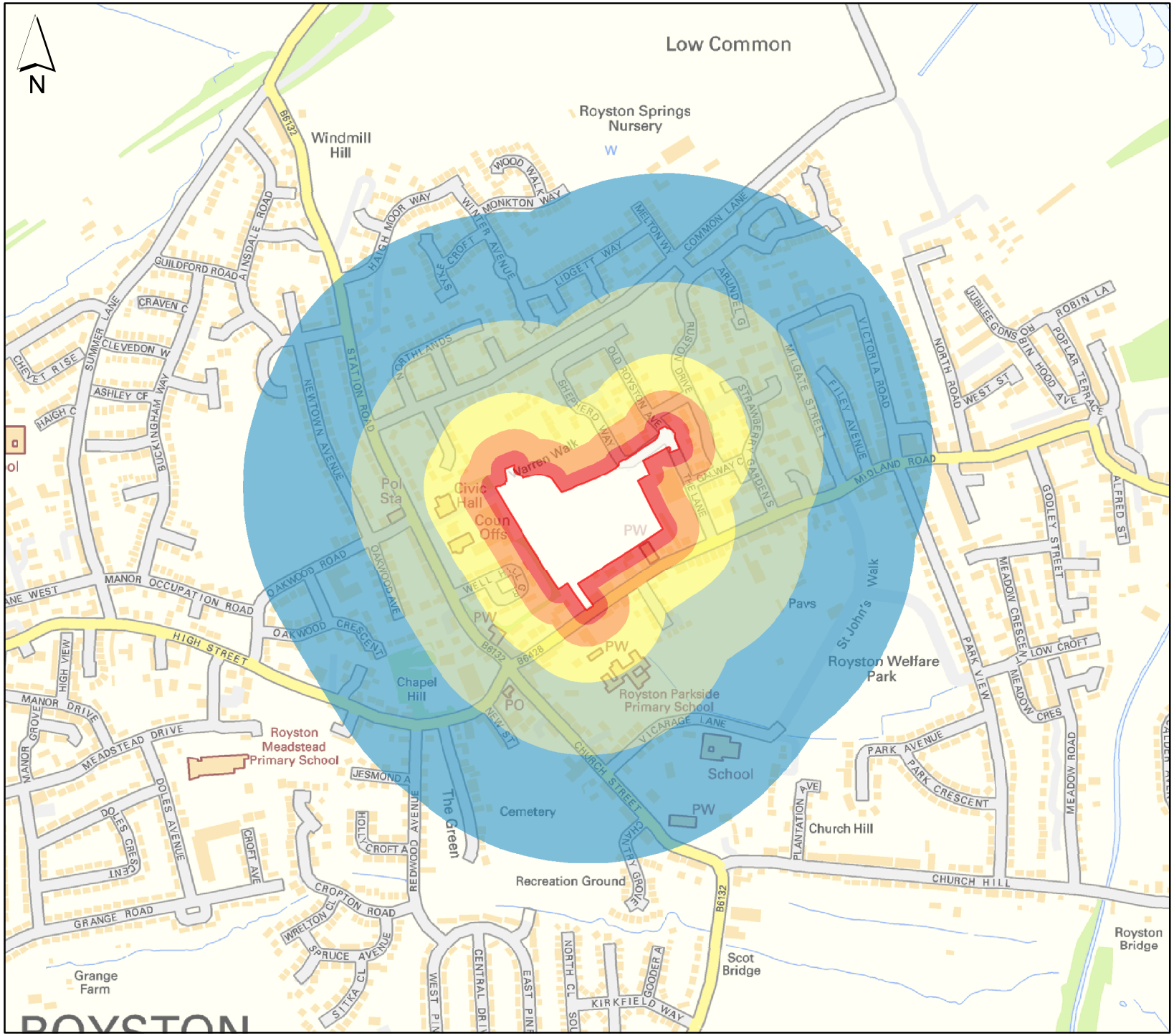

Key

Proposed Development Boundary

Construction Phase Dust Distance Bandings

- Less than 20m
- Between 20m and 50m
- Between 50m and 100m
- Between 100m and 200m
- Up to 350m

Title

Construction Phase Dust Distance Bandings
Earthworks and Construction Activities

Project

Proposed Residential Development
Midland Road, Royston

Figure

Figure 3

Date

01/08/16

Client

Kier Living

Scale

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Key

Proposed Development Boundary

Construction Phase Dust Distance Bandings

Less than 20m

Between 20m and 50m

Title

Construction Phase Dust Distance Bandings
Trackout Activities

Project

Proposed Residential Development
Midland Road, Royston

Figure

Figure 4

Date

01/08/16

Client

Kier Living

Scale

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Key

Proposed Development Boundary

Proposed Receptor Location

Title
Sensitive Receptor Location Plan

Project
Proposed Residential Development
Midland Road, Royston

Figure
Figure 5

Date
03/08/16

Client
Kier Living

Scale
1:5,000 @ A4

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Appendix A Construction Phase Assessment

Construction Phase Assessment

The following section outlines guidance provided by the Institute of Air Quality Management (IAQM) for the assessment of air quality impacts arising from demolition and construction activities (Ref 17).

The assessment procedure is split up into five steps and is summarised below:

Step One Screen the Need for a Detailed Assessment

An assessment of construction phase dust emissions will normally be required where there are:

- 'Human receptors' within 350 m of the site boundary and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).
- Ecological receptors' within 50 m of the site boundary and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

A 'Human receptor', refers to any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to PM_{10} over a time period relevant to the air quality objectives, as defined in the Government's technical guidance for Local Air Quality Management (Ref 11).

An 'Ecological receptor' refers to any sensitive habitat affected by dust soiling and includes locations with a statutory designation such as a Site of Specific Scientific Interest (SSSI), Special Area of Conservation (SACs), Special Protection Areas (SPAs) and RAMSAR sites, as designated under the RAMSAR convention.

Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is *negligible* and that any effects will not be significant.

Step Two Assess the Risk of Dust Impacts

The risk of dust arising in sufficient quantities to cause annoyance and/or health and/or ecological impacts should be determined using four risk categories: negligible, low, medium and high risk. A site is allocated to a risk category based on two factors:

- The scale and nature of the works, which determines the potential dust emission magnitude as small, medium or large (Step Two (A)); and
- The sensitivity of the area to dust impacts (Step Two (B)) which is defined as low, medium or high sensitivity.

These two factors are combined to determine the risk of dust impacts with no mitigation applied. Depending on the activities undertaken, risk category designations may be required for each of the four categories outlined by the IAQM (demolition, construction, earthworks and trackout).

Step Two (A) Define the Potential Dust Emission Magnitude

The dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium, or Large. **Table A1** describes the potential dust emission magnitude criteria for each outlined construction activity.

Table A1 Dust Emission Magnitude Criteria

Activity	Dust Emission Magnitude Criteria		
	Small	**Medium**	**Large**
Demo-lition	Total building volume less than 20,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber) demolition activities less than 10m above ground level; demolition during wetter months	Total building volume between 20,000m^3 – 50,000m^3, potentially dusty construction material; demolition activities between 10m and 20m above ground level	Total building volume more than 50,000m^3, potentially dusty construction material (e.g. concrete); on-site crushing and screening; demolition activities more than 20m above ground level
Earth-works	Total site area less than 2,500m$^{2;}$ soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <20,000 tonnes, earthworks during wetter months	Total site area between 2,500m^2 to 10,000m^2; moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4m - 8m in height, total material moved 20,000 tonnes – 100,000 tonnes	Total site area more than 10,000m^2; potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), more than 10 heavy earth moving vehicles active at any one time, formation of bunds more than 8m in height, total material moved more than 100,000 tonnes
Const-ruction	Total building volume less than 25,000m^3; construction material with low potential for dust release (e.g. metal cladding or timber).	Total building volume between 25,000 m^3 and 100,000m^3; potentially dusty construction material (e.g. concrete), on- site concrete batching;	Total building volume More than 100,000m^3; on-site concrete batching, sandblasting;
Track-out	Less than 25 HDV trips in any one day; surface material with low potential for dust release; unpaved road length less than 50m	Between 25 to 100 HDV trips in any one day; moderately dusty surface material (e.g. high clay content); unpaved road length between 50 and 100m	More than 100 HDV trips in any one day; potentially dusty surface material (e.g. high clay content); unpaved road length more than 100m

Table A1 details the risk of impacts for the potential dust nuisance, health effects and ecosystem from demolition; earthworks; general construction activities and trackout respectively. They assume that no mitigation measures are applied and are dependent on the available information on the construction phase of works and professional judgement.

A summary of the dust emission magnitude for each construction activity contained as part of this assessment is outlined in **Table A2**.

Table A2 Dust Emission Magnitude Classification for Assessment

Activity	Dust Emission Magnitude	Justification
Demolition	Not Applicable	The site was the former Royston High School grounds, however the site was cleared prior to this assessment and is now vacant.
Earthworks	Medium	The size of the area to be developed is to be approximately 6.3 acres (25,495 m^2), incorporating the entirety of the Kier Living land ownership boundary. It is assumed that there will be between than 5 and 10 heavy earth moving vehicles active at any one time. It is predicted that total material moved is between 20,000 tonnes and 100,000 tonnes. It is also assumed that minor stockpiling activities will be undertaken due to the size of the proposed development area.
Construction	Medium	The proposed development occupies approximately 6.3 acres of land and will comprise 80no residential dwellings. An Appraisal Layout plan for the site indicates that the total accommodation schedule will be 75,796 sq.ft (7,042 m^2). Total building volume therefore anticipated to be between 25,000 m^3 and 100,000 m^3; potentially dusty construction material to be used (e.g. concrete) for development.
Trackout	Small	Anticipated to be less than 25 HDV trips in any one day; unpaved road lengths are anticipated to be less than 50m in account of the size of the proposed development and its suburban setting. Nearest residential properties are located along Midland Road, 'Scholars Gate', off Ruston Drive / Old Royston Avenue, The Lane to the east of the site, in addition to Well Hill Grove and Station Road to the west and Queensway.

Step Two (B) Define the Sensitivity of the Area

The sensitivity of the area takes into account a number of factors:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM_{10}, the local background concentration; and
- Site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

The significance of dust effects associated with the construction phase was defined using the criteria detailed in **Tables A3, A4, and A5.** The sensitivity is derived for each of the four considered activities and the highest level recorded as part of the assessment. (See Box Six to Box Nine of the IAQM Guidance (Ref 17)).

Table A3 IAQM Sensitivity of the Area to Dust Soiling Effects of People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table A4 IAQM Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	No of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 $\mu g.m^{-3}$ (>18 $\mu g.m^{-3}$ in Scotland)	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 $\mu g.m^{-3}$ (16-18 $\mu g.m^{-3}$ in Scotland)	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 $\mu g.m^{-3}$ (14-16 $\mu g.m^{-3}$ in Scotland)	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 $\mu g.m^{-3}$ (<14 $\mu g.m^{-3}$ in Scotland)	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table A5 IAQM Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table A6 below provides the outcome of defining the sensitivity of the area as part of this assessment. **Table A7** provides further clarification with regard to the receptor sensitivity of the surrounding area and the number of approximate sensitive receptors.

Table A6 IAQM Outcome of Defining the Sensitivity of the Area

Potential Impact	Sensitivity of the Surrounding Area				
	Receptor Sensitivity	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	Not Applicable	High		
Human Health	High	Not Applicable	Low		
Ecological	The nearest ecological designation within proximity to the proposed development is Notton Wood Local Nature Reserve (LNR). The LNR is located approximately 1.5 km to the west of the proposed development IAQM guidance (Ref 20) provides a guidance value of 50m as a threshold within which ecological receptors may be affected by dust raising activities. As such, it was not necessary to proceed to step two of the construction phase assessment for Notton Wood LNR and therefore ecological designations were not considered as part of this assessment.				

Step Two (C) Define the Risk of Impacts

The dust emission magnitude determined using **Table A1** and justified in **Table A2** is then combined with the sensitivity of the area determined through the implementation of **Tables A3, A4, and A5** to determine the risk of impacts with no mitigation applied.

The matrices in **Table A6** provide a method of assigning the level of risk for each activity. This should be used to determining the level of mitigation that must be applied. Mitigation is discussed in Step Three of this appendix. For those cases where the risk category is *negligible*, no mitigation measures beyond those required by legislation will be required.

Table A7 IAQM Outcome of Defining the Sensitivity of the Area

Sensitivity of Area	Dust Emission Magnitude		
	Small	Medium	Large
Demolition			
Low	Negligible	Low Risk	Medium Risk
Medium	Low Risk	Medium Risk	High Risk
High	Medium Risk	Medium Risk	High Risk
Earthworks and Construction			
Low	Negligible	Low Risk	Low Risk
Medium	Low Risk	Medium Risk	Medium Risk
High	Low Risk	Medium Risk	High Risk
Trackout			
Low	Negligible	Low Risk	Low Risk
Medium	Negligible	Low Risk	Medium Risk
High	Low Risk	Medium Risk	High Risk

Table A8 provides a summary of the risk of dust impacts for the four activities and allows for site-specific mitigation measures to be specified for inclusion in this assessment (See Step Three).

Table A8 Summary of Risk for Definition of Mitigation Measures

Aspect	Summary of Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Not Applicable	Medium Risk	Medium Risk	Low Risk
Human Health		Low Risk	Low Risk	Negligible
Ecological	Not Applicable			

Step Three Site-specific Mitigation

The dust risk categories for each of the four activities determined in step two should be used to define the appropriate, site-specific, mitigation measures to be adopted. Local authorities may have a Code for Construction Practice, or equivalent document, that should be taken into account during the development of the mitigation measures and incorporated within the mitigation measures identified within the IAQM guidance (Ref 17).

The mitigation measures have been divided into general measures applicable to all site and measures applicable specifically to demolition, earthworks, construction and trackout, for consistency with the assessment methodology. More information on the site-specific mitigation identified as part of this air quality assessment can be found in the 'Mitigation' section of this report.

Step Four Determine Significant Effects

Once the risk of dust impacts has been determined in step two and the appropriate dust mitigation measures identified in step three, the final step is to determine whether there are significant effects arising from the construction phase of the proposed development. This is based on professional judgement but should take account of the significance of the effects for each of the four activities.

For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.

There may be cases where, for example, there is inadequate access to water for dust suppression to be effective, and even with other mitigation measures in place there may be a significant effect. Therefore, it is important to consider the specific characteristics of the site and the surrounding area to ensure that the conclusion of no significant effect is robust.

Appendix B Traffic Data

Table B1 Traffic Data provided by Pell Frischmann for Air Quality Assessment

Road Section	From	To	2016 Base Year				2017 Without Development				2017 With Development				2021 Without Development				2021 With Development			
			AADT	% HDV	LDV	HDV	AADT	% HDV	LDV	HDV	AADT	% HDV	LDV	HDV	AADT	% HDV	LDV	HDV	AADT	% HDV	LDV	HDV
High Street	High Street	Midland Road	7886	2	7728	158	8006	2	7846	160	8195	2	8031	164	8486	2	8316	170	8676	2	8502	174
Station Road	Oakwood Road	Church Street Rbt	3956	3	3837	119	4016	3	3896	120	4066	3	3944	122	4258	3	4130	128	4307	3	4178	129
Midland Road	Midland Road	Midland Road (2)	7307	3	7088	219	7418	3	7195	223	7743	3	7511	232	7864	3	7628	236	8189	3	7943	246
Church Street	Church Street	Church Street Rbt	7517	2	7367	150	7632	2	7479	153	7717	2	7563	154	8089	2	7927	162	8174	2	8011	163
Midland Road (2)	Midland Road (3)	Midland Road (2)	7025	2	6850	175	7132	2	6954	178	7456	2	7270	186	7560	2	7372	188	7884	2	7688	196
The Lane	Site Access	Midland Road Rbt	3691	2	3617	74	3747	2	3672	75	4215	2	4131	84	3972	2	3893	79	4440	2	4351	89
Midland Road (3)	Midland Road (3)	Midland Road (2)	5692	2	5550	142	5779	2	5635	144	5922	2	5775	147	6125	2	5972	153	6269	2	6113	156

Table B2 Percentage Change in Development Flows

Road Section	2017 Development Flows			2021 Development Flows		
	AADT	% HDV	AADT % Change	AADT	% HDV	AADT % Change
High Street	189	0	2.4	190	0	2.2
Station Road	50	0	1.2	49	0	1.2
Midland Road	325	0	4.4	325	0	4.1
Church Street	85	0	1.1	85	0	1.1
Midland Road (2)	324	0	4.5	324	0	4.3
The Lane	468	0	12.5	468	0	11.8
Midland Road (3)	143	0	2.5	144	0	2.4