South West Milton Keynes

Addendum Environmental Statement

Main Report

AUGUST 2016

CONTENTS

APPENDICES

1. INTRODUCTION

1.1 Duplicate planning applications were submitted to Aylesbury Vale District Council (AVDC) and Milton Keynes Council (MKC) in January 2015 for the development of South West Milton Keynes (SWMK). The planning applications were accompanied by an Environmental Statement (ES) prepared in accordance with the Town & Country Planning (Environmental Impact Assessment) Regulations 2011.

1.2 The planning applications have the references 15/00314/AOP (AVDC) and 15/00619/AOP (MKC) and have been given the following descriptions of development in reflection of the elements of the proposed development that fall within the respective local authority administrative areas:

15/00314/AOP

Outline planning application with all matters reserved except for access for a mixed-use sustainable urban extension on land to the south west of Milton Keynes to provide up to 1,855 mixed tenure dwellings; an employment area (B1); a neighbourhood centre including retail (A1/A2/A3/A4/A5), community (D1/D2) and residential (C3) uses; a primary and a secondary school; a grid road reserve; multi-functional green space; a sustainable drainage system; and associated access, drainage and public transport infrastructure.

15/00619/AOP

Physical improvements to the Tattenhoe and Bottledump roundabouts and a new Aylesbury Vale District reference 15/00314/AOP.

1.3 The applications have been subject to consultation and the SWMK Consortium has been in negotiation with the local planning authorities through the mechanism of a planning performance agreement.

1.4 Revisions have now been proposed to the scheme to address matters raised during the formal consultation process. They are described below. These revisions have been formally submitted to both local planning authorities and are addressed in the following material:

- Revised application drawings;
- An Addendum to the submitted Environmental Statement and Non-Technical Summary;
- A new Transport Assessment (appendix to the Addendum ES);

- A revised Landscape and Visual Impact Assessment (appendix to the Addendum ES);
- An Ecological Assessment with a particular focus on potential Bat Roosts.

2. ADDENDUM TO THE ENVIRONMENTAL STATEMENT

2.1 This Addendum to the ES must be read in conjunction with the submitted ES (January 2015). There is no change in the overall approach to the assessment that is described in the submitted ES (January 2015) (Section 4). The Addendum sets out the revisions that have been made to the proposed development below. In light of these the applicant in conjunction with its consultant team has identified the need to reassess the scheme with regard to the following topics of the submitted ES (January 2015):

- Section 9 – Landscape & Visual;
- Section 10 – Traffic and Transport;
- Section 11 – Air Quality;
- Section 12 - Noise & Vibration.

2.2 Advice from the consultant team has confirmed that the proposed revisions do not affect the assessment of the development in relation to the other topics as presented in the submitted ES (January 2015); and that there have been no changes to appropriate methodologies, guidance or standards since the original assessment that would indicate a need to reassess the environmental impact of the scheme in relation to these topics, notwithstanding the proposed revisions.

2.3 Topics where the revisions to the proposed scheme do not lead to a change in the assessment as described in the submitted ES (January 2015) are the following:

- Section 6 – Agricultural Land;
- Section 7 – Ecology;
- Section 8 – Drainage;
- Section 13 – Socio-Economics;
- Section 14 – Services & Utilities;
- Section 15 – Waste;
- Section 16 – Ground Conditions & Contamination.

2.4 Finally, in light of the assessment of the proposed development as revised, this Addendum ES identifies and draws appropriate conclusions on the assessment of the likely significant effects that arise.

3. PROPOSED REVISIONS TO THE DEVELOPMENT

3.1 The proposed revisions to the scheme are as follows.

- Revisions to the proposed site access arrangements:
  - Improvements to the Bottledump Roundabout, including an equestrian crossing and links to Redway routes to the north of the A421 and within the site;
  - Revision of the proposed junction with the A421 from a 'left in and left out' arrangement to a 'left in' only arrangement and consequent amendments to the disposition of land uses immediately adjacent to the junction;
  - Revision of the proposed traffic light controlled junction with Buckingham Road to a roundabout junction;

- The incorporation of 1.69 Ha of green space (ecological corridor and land effected by archaeological constraints) situated between the proposed satellite secondary school and housing at Far Bletchley within the boundary of the school site;

- Changes to the Whaddon Road corridor to provide for a widening of the landscape corridor along the western boundary of the scheme, removal of the proposed bunding, a general increase in the extent of planting and accommodation of the Milton Keynes Boundary Walk to the internal edge of the landscape corridor;

- Changes to the corridor adjacent to the southern boundary with the relocation of the woodland planting to the northern edge of the proposed SUDs features and changes to the overall design concept for the development parcels in the south east quadrant of the site which incorporates new east-west 'ribbons' of green infrastructure;

- An increase in the number of LEAP (now 9No), the sizes of LEAP and NEAP increased to meet RoSPA guidance and their disposition across the site to maximise coverage in reflection of Fields in Trust guidance;

- Identification of a parcel of land (0.2 Ha) to the rear of the proposed neighbourhood centre to be used either for employment purposes (B1) or to accommodate a 6GP practice (D1) developed over two floors with associated car parking.

3.2 The Development Framework Plan (drawing reference SWMK03-073 Revision K (July 2016)) provides a revised Land Use Budget for the scheme. It is repeated below.

Table 1 – Land Use Budget

LAND USE	AREA (Ha)
Allotments	1.18
Employment	2.07
Green Open Space	53.67
Grid Road Reserve	7.28
Infrastructure	4.78
Local Centre	0.67
Primary School	3.00
Secondary School	5.12
Secondary School Green Infrastructure	1.69
Water Attenuation	5.08
Residential	54.70
SUB-TOTAL	**139.26**
Highway Improvements	5.21
TOTAL	**144.46**

3.3 Other than as outlined above, the scheme parameters remain as originally submitted and described in the ES. However the following drawings have been prepared to illustrate the revisions and Table 2 below lists the drawings have been prepared and which replace the drawings that were originally submitted. For the avoidance of doubt the following drawings are not replaced:

- Constraints Plan – SWMK03-87 Rev D 11/14
- Phasing Plan – SWMK03-131 Rev B 09/14

3.4 Similarly for the avoidance of doubt, the Public Transport drawing (SWMK03-83 Rev E 07/16) has not previously been submitted.

Table 2 - Drawings

Drawing Description	Reference	Revision	Date
Development Framework Plan	SWMK03-073	K	07/16
Parameter Plan	SWMK03-074	N	06/16
Open Space Plan	SWMK03-076	I	07/16
Illustrative MP in Context	SWMK08-001	N/A	06/16
Application Site Boundary	SWMK03-079	E	06/16
Residential Density	SWMK03-082	E	07/16
Ground Remodelling	SWMK03-148	B	06/16
Building Heights	SWMK03-149	D	06/16
Indicative Landscape Plan	3126-L-01	J	07/16

4. PLANNING POLICY CONTEXT

4.1 There has been no material change in the statutory development plan context since the planning applications were submitted.

4.2 Milton Keynes Council is preparing a Site Allocations Plan. A draft 'preferred options' document was published by the Council for public consultation purposes in October 2015. The replacement of the adopted Core Strategy (2012), Plan:MK, is also in preparation. A 'Strategic Development Directions' consultation document was published by the Council in January 2016.

4.3 Aylesbury Vale District Council has published a draft of its Vale of Aylesbury Local Plan for public consultation purposes (July 2016). Policy D3 'Delivering Sites Adjacent to Milton Keynes' allocates land for 4,274 dwellings on the edge of Milton Keynes at four sites, one of which, reference NLV001, is the application site.

5. LANDSCAPE & VISUAL (Section 9 of submitted Environmental Statement)

Introduction

5.1 A revised and updated Landscape & Visual Impact Assessment (LVIA, July 2016) to reflect the changes to the Proposed Development has been prepared. This is a freestanding Appendix to the Addendum ES.

5.2 The purpose of the LVIA is to review landscape character and visual amenity and to assess the resulting landscape and visual effects of the Proposed Development on the receiving landscape receptors and visual receptors.

5.3 A draft of this LVIA was submitted to AVDC on the 1 April 2016 for review and this was discussed at a subsequent Project Meeting on the 14 April 2016, which was attended by AVDC's Landscape Officer.

5.4 This addendum chapter supersedes Chapter 9: Landscape & Visual and Appendix 9 of the South West Milton Keynes Environmental Statement (January 2015).

5.5 The chapter summarises the findings of the LVIA.

Planning Policy Context

Local Planning Context

5.6 The majority of the site is located within the district of Aylesbury Vale. The development plan is the Aylesbury Vale District Local Plan AVDLP (2004) and this includes the following 'saved' polices in respect of landscape matters.

5.7 Policy GP.35 Design of New Development Proposals*:*

> *"The design of new development proposals should respect and complement:*
>
> *a) the physical characteristics of the site and the surroundings;*
>
> *b) the building tradition, ordering, form and materials of the locality;*
>
> *c) the historic scale and context of the setting;*
>
> *d) the natural qualities and features of the area; and*
>
> *e) the effect on important public views and skylines."*

5.8 Policy GP.38 Landscaping of new development proposals*:*

> *"Applications for new development schemes should include landscaping proposals designed to help buildings fit in with and complement their surroundings, and conserve existing natural and other features of value as far as possible.*

Hard landscaping should incorporate materials appropriate to the character of the locality. New planting should be with predominantly native species. Conditions will be attached to relevant planning permissions to require the submission of landscaping schemes and implementation of the approved arrangements."

5.9 Policy GP.39 Existing trees and hedgerows*:*

"In considering applications for development affecting trees or hedges the Council will:

a) require a survey of the site and the trees and hedges concerned;

b) serve tree preservation orders to protect trees with public amenity value; and

c) impose conditions on planning permissions to ensure the retention or replacement of trees and hedgerows of amenity, landscape or wildlife importance, and their protection during construction."

5.10 Policy GP.40 Retention of existing trees and hedgerows*:*

"In dealing with planning proposals the Council will oppose the loss of trees, particularly native Black Poplars, and hedgerows of amenity, landscape or wildlife value"

5.11 Policy RA.8. Development in the Areas of Attractive Landscape and Local Landscape Areas*:*

"The Proposals Map defines Areas of Attractive Landscape, identified in the County Structure Plan, and Local Landscape Areas, defined by the District Council, which have particular landscape features and qualities that are considered appropriate for particular protection.

"Development proposals in these areas should respect their landscape character. Development that adversely affects this character will not be permitted, unless appropriate mitigation measures can be secured. Where permission is granted the Council will impose conditions or seek planning obligations to ensure the mitigation of any harm caused to the landscape interest."

5.12 As the Aylesbury Vale District Local Plan is now time expired, AVDC have sought to prepare a new district wide development plan known as the Vale of Aylesbury Plan (VAP). The VAP was submitted to the Secretary of State for independent examination in August 2013 and, following a response from the Inspector, AVDC withdrew the

VAP and the policies can no longer be afforded any weight in the decision making process.

5.13 AVDC have commenced consultation on the content and scope of a new Vale of Aylesbury Local Plan (VALP). The Vale of Aylesbury Local Plan, Draft Plan for Summer 2016 Consultation locates the site within a strategic development allocation as part of draft "D3 Delivering sites adjacent to Milton Keynes".

5.14 With regards to landscape matters, the chapter on Natural Environment notes the following:

> *Landscape Character and Locally Significant Landscape*
>
> *All the landscape in the district is considered to have character and particular distinctive features to be conserved, positive characteristics to be enhanced and detracting features to be mitigated or removed. The 2008 Landscape Character Assessment is the primary evidence base which divides the entire landscape (beyond towns and Areas Of Natural Beauty) into Landscape Character Areas and Landscape Character Types. The assessment sets out landscape conservation guidelines for each Landscape Character Area. Therefore all the landscape in the district is considered to have innate value as referred to in the National Policy Planning Framework (NPPF)28 That said, of the locally significant landscape, the Areas of Attractive Landscapes (AALs) are of the greatest significance followed by the Local Landscape Areas (LLAs).* (§ 9.15)

5.15 Draft Policy "*NE3 Landscape character and locally important landscape*", states the following:

> "*To ensure that the district's landscape character is maintained, development must have regard to the individual character and distinctiveness of particular Landscape Character Areas set out in the Assessment. Development should consider the role of the landscape character area and:*
>
> *a) Be grouped where possible with existing buildings to minimise impact on visual amenity*
>
> *b) Be located to avoid the loss of important on-site views and off-site views towards important landscape features*
>
> *c) Reflect local character and distinctiveness in terms of settlement form and field pattern, spacing, height, scale, plot shape and size, elevations, roofline and pitch, overall colour, texture and boundary treatment (walls, hedges, fences and gates)*

d) Minimise the impact of lighting to avoid blurring the distinction between urban and rural areas, and in areas which are intrinsically dark and to avoid light pollution to the night sky

e*) Ensure that the buildings and any outdoor storage and parking areas are not visually prominent in the landscape*

f) Not generate an unacceptable level and/or frequency of noise in areas relatively undisturbed by noise and valued for their recreational or amenity value

The first stage in mitigating impact is to avoid the identified harmful impact. Where it is accepted there will be harm to the landscape character, specific on-site mitigation will be required and, as a last resort, compensation will be required as part of a planning application. Applicants must consider the enhancement opportunities identified in the Aylesbury Vale Landscape Character Assessment and how they apply to a specific site.

The policies map defines Areas of Attractive Landscape (AALs) and Local Landscape Areas (LLAs) which have particular landscape features and qualities considered appropriate for articular conservation and enhancement opportunities. Of the two categories, the Areas of Attractive Landscape have the greater significance. Development in AALs and LLAs should have particular regard to the character identified in the report 'Defining the special qualities of local landscape designations in Aylesbury Vale District' (Final Report, 2016) and Aylesbury Vale Landscape Character Assessment (2008). Development that adversely affects this character will not be permitted unless appropriate mitigation can be secured. Where permission is granted, the council will require conditions or Section 106 agreements to best ensure the mitigation of any harm caused to the landscape interest to the Aylesbury Vale Landscape Character Assessment 2008 (as amended 2015)."

National Planning Context

5.16 The National Planning Policy Framework (NPPF) (2012) sets out the Government's planning policies and how these are expected to be applied. At the heart of the NPPF is the presumption in the favour of sustainable development.

"The purpose of the planning system is to contribute to the achievement of sustainable development." (§ 6)

5.17 The three dimensions to delivering sustainable development are economic, social and environmental. With regards to environmental matters the NPPF states:

> *" An environmental role- contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy."* (§ 7)

5.18 The core planning principles include the following:

> *"Always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings;*
>
> *take account of the different roles and character of different areas, promoting the vitality of our main urban areas, protecting the Green Belts around them, recognising the intrinsic character and beauty of the countryside and supporting thriving rural communities within it;"* (§ 17)

5.19 The NPPF seeks to conserve and enhance the natural environment.

> *"The planning system should contribute to and enhance the natural and local environment by:*
>
> *Protecting and enhancing valued landscapes, geological conservation interests and soils'" (§ 109)*

5.20 The Planning Practice Guidance (PPG) (2014) is an online planning resource which provides guidance on the NPPF, although the NPPF continues to be the primary document for decision making. With regard to landscape issues the PPG records within the Natural Environment chapter that:

> *"One of the core principles in the National Planning Policy Framework is that planning should recognise the intrinsic character and beauty of the countryside. Local plans should include strategic policies for the conservation and enhancement of the natural environment, including landscape. This includes designated landscapes but also the wider countryside" (§001 Reference ID: 8-001-20140306)"*

<u>Other related documents</u>

5.21 The Aylesbury Vale Green Infrastructure Strategy 2011-2026 (2011) draws from the vision and guidance of the earlier Buckinghamshire Green Infrastructure Strategy (2009). Its strategic aims are:

> *"...to ensure that high quality GI is delivered, which is accessible and attractive for residents and visitors to the Vale which conserves and enhances the Vale's special natural and historic environment, its wildlife and its landscape. GI offers the opportunity to engage with the community to build a*

strong sense of place and to achieve cohesion between new and existing settlements. GI has an important role in providing a wide range of formal and informal health and recreational benefits at little or no cost to its users by delivering economically sustainable GI"

5.22 It defines a series of strategic principles for Green Infrastructure (GI). These are:

- *GI should contribute to the management, conservation and improvement of the landscape.*
- *GI should contribute to the protection, conservation and management of historic landscapes, archaeological and built heritage assets.*
- *GI should maintain and enhance biodiversity and ensure that development and its implementation results in a net gain of biodiversity as identified in Biodiversity Action Plan habitats and species plans.*
- *GI should deliver the enhancement of existing woodlands and create new woodlands and tree features.*
- *GI should create new recreational facilities, particularly those that present opportunities to link urban and countryside areas.*
- *GI should take account of and integrate with natural processes and systems.*
- *GI should be managed to provide cost effective and multi-functional delivery and funded in urban areas to accommodate nature, wildlife, historic and cultural assets, economic benefits and provide for sport and recreation activities.*
- *GI should be designed to high standards of sustainability to deliver social and economic, as well as environmental benefits.*
- *GI should provide focus for social inclusion, community cohesion and development and lifelong learning."* (page 15)

Assessment Methodology

5.23 This chapter and the LVIA and has been prepared using the Guidelines for Landscape and Visual Impact Assessment, GLVIA3 (Landscape Institute and the Institute of Environmental Management and Assessment, April 2013). It is also prepared in accordance with the FPCR Methodology & Assessment Criteria (2016) contained in the LVIA.

5.24 The following paragraphs provide a summary of the approach that has been adopted.

5.25 GLVIA3 states that:

> *"Landscape and Visual Impact Assessment (LVIA), is a tool used to identify and assess the significance of, and the effects of, change resulting from development on both landscape as an environmental resource in its own right and on people's views and visual amenity"* (§1.3)

5.26 There are two components that are described separately-these are:

> *"Assessment of landscape effects; assessing effects on the landscape as a resource in its own right; and*
>
> *Assessment of visual effects; assessing effects on specific views and on the general visual amenity experienced by people."* (§ 2.21)

5.27 The components of this chapter include: baseline studies; a description and details of the Proposed Development; an identification and description of likely effects arising from the Proposed Development; and an assessment of the significance of these effects.

5.28 The judgements that are made in respect of landscape and visual effects are a combination of the sensitivity of the receptors and the magnitude of the effect, alongside professional qualitative judgment which - as expressed by GLVIA3 - is a very important part of the LVIA process.

Assessment of Landscape Effects

5.29 GLVIA3 states that:

> *"An assessment of landscape effects deals with the effects of change and development on landscape as a resource".* (§ 5.1)

5.30 The baseline landscape is described by reference to existing landscape character assessments and by a description of the site and its context. This provides an understanding of the area that may be affected.

5.31 Landscape receptors (i.e. landscape resources that have the potential to be affected) are assessed in terms of their sensitivity. This combines judgements on the susceptibility of the receptor to the type of change or development that is specifically proposed, and the value that is attached to the landscape.

5.32 A range of landscape effects can arise through development. These can include:

- Change or loss of elements, features, aesthetic or perceptual aspects that contribute to the character and distinctiveness of the landscape;
- Addition of new elements that influence character and distinctiveness of the landscape; and
- Combined effects of these changes.

5.33 Each effect on landscape receptors are assessed in terms of size or scale, geographical extent of the area influenced and its duration and reversibility. In terms of size or scale, the judgement takes account of the extent of the existing landscape elements that will be lost or changed, and the degree to which the aesthetic or perceptual aspects or key characteristics of the landscape will be altered by removal or through the addition of new elements.

Assessment of Visual Effects

5.34 The baseline visual study includes an understanding of the area in which the Proposed Development may be visible. It considers the groups of people who may experience views, the viewpoints where they may be affected, and the nature of these views.

5.35 The first stage in the assessment is to identify approximate visibility/visibility mapping. This is ether done by a computerised Zone of Theoretical Visibility (ZTV), which is a desk study exercise and treats the world as 'bare earth' (i.e. it does not take into account factors other than terrain that influence actual visibility, such as buildings, woodland and hedges), or by manual methods using map study and field evaluation to establish a Representative Visual Envelope (RVE).

5.36 The assessment considers both susceptibility to change in views and visual amenity, and the value attached to particular views. GLVIA3 states that:

"The visual receptors most susceptible to change are generally likely to include:

"Residents at home;

- *People, whether residents or visitors who engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focused on the landscape and on particular views;*
- *Visitors to heritage assets or other attractions, where views of surroundings are an important contributor to the experience; and*
- *Communities where views contribute to the landscape setting enjoyed by residents in the area."* (§ 6.33)

5.37 Travellers on road, rail or other transport routes tend to fall into an intermediate category of susceptibility to change, although where travel involves recognised scenic routes awareness of views is likely to be particularly high. GLVIA3 notes that:

"Visual receptors likely to be less sensitive to change include:

- *People engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the landscape; and*
- *People at their place of work whose attention may be focused on their work or activity, not on their surroundings, and where the setting is not important to the quality of working life…"*(§ 6.34)

5.38 An assessment of visual effects deals with the area in which the development may be visible and effects of change on these views to people and their visual amenity. Each of the visual effects is evaluated in terms of its size or scale, the geographical extent of the area influenced and its duration or reversibility. In terms of size or scale, the magnitude of visual effects takes account of:

"*The scale of the change in the view with respect to the loss or addition of features in the view and changes in its composition, including proportion of the view occupied by the proposed development;*

- *The degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of form, scale and mass, line height, colour and texture; and*
- *The nature of the view of the proposed development, in terms of the relative amount of time over which it will be experienced and whether views will be full, partial or glimpses.*

The geographical extent of the visual effect in each viewpoint is likely to reflect:

- *The angle of view in relation to the main activity of the receptor;*
- *The distance of the viewpoint from the proposed development; and*
- *The extent of the area over which the changes would be visible"* (GLVIA3 § 6.39-6.40).

Overall Landscape and Visual Effects

5.39 Conclusions on the level of effects, and whether these are adverse or beneficial, are drawn from separate judgements on the sensitivity of the receptors and the

magnitude of the effects. GLVIA3 observes that it is not essential to establish a series of thresholds for the different levels of effects, although the distinction between levels can be helpfully defined by using a word scale such as major, moderate, minor and negligible.

5.40 This chapter and the LVIA use the following criteria and thresholds that has been established by FPCR and which are based upon the principles and guidance within GLVIA3.

- *Major*: An effect that will fundamentally change and be in direct contrast to the existing landscape or views;
- *Moderate*: An effect that will markedly change the existing landscape or views but may retain or incorporate some characteristics/ features currently present;
- *Minor*: An effect that will entail limited or localised change to the existing landscape or views or will entail more noticeable localised change but including both adverse and beneficial effects and is likely to retain or incorporate some characteristics/features currently present;
- *Negligible*: An effect that will be discernible yet of very limited change to the existing landscape or views.

5.41 Where it is determined that the assessment falls between or encompasses two of the defined thresholds, then the judgement may be described, for example, as: *Major-Moderate* or *Moderate-Minor*. This indicates that the effect is assessed to lie between the respective definitions or to encompass aspects of both.

Judging Overall Significance

5.42 A judgement is reached on whether an effect is considered to be significant or not through the exercise of professional qualitative judgment. GLVIA3 Statement of Clarification 1/13 (2013) notes that:

> *"Concerning 'significance', it is for the assessor to define what the assessor considers significant…Depending on the means of judgment and terminology (which should be explicitly set out), effects of varying degrees of change (or levels of change), may be derived. The assessor should then establish (and it is for the assessor to decide and explain) the degree or level of change that is considered to be significant*." (GLVIA Statement of Clarification, § 3)

5.43 In terms of significant landscape effects GLVIA3 makes it clear that:

"There are no hard and fast rules about what makes a significant effect, and there cannot be a standard approach since circumstances vary with the location and landscape context and with the type of proposals. At opposite ends of a spectrum it is reasonable to say that:

- *Major loss or irreversible negative effects, over an extensive area, on elements and/or aesthetic and perceptual aspects that are key to the character of nationally valued landscapes are likely to be of the greatest significance;*
- *Reversible negative effects of short duration, over a restricted area, on elements and/or aesthetic and perceptual aspects that contribute to but are not key characteristics of the character of the landscapes of community value are likely to be of the least significance and may, depending on circumstances, be judged as not significant;*
- *Where assessments of significance place landscape effects between these extremes, judgements must be made about whether or not they are significant with full explanations of why these conclusions have been reached."* (§5.56)

5.44 In relation to significant visual effects GLVIA3 states that:

"There are no hard and fast rules about what makes a significant effect, and there cannot be a standard approach since circumstances vary with the location and context and with the type of proposal. In making a judgment about the significance of visual effects the following points should be noted:

- *Effects on people who are particularly sensitive to changes in views and visual amenity are more likely to be significant.*
- *Effects on people at recognised and important viewpoints or from recognised scenic routes are more likely to be significant.*
- *Large-scale changes which introduce new, non-characteristic or discordant or intrusive elements into the view are more likely to be significant than small changes or changes already involving features already present within the view"* (§ 6.44)

Summary

5.45 Those effects that are considered to be significant by the assessor, based upon professional qualitative judgment are identified within the chapter and the LVIA.

Landscape Character Baseline Conditions

Designations

5.46 The site is not covered by any landscape quality designation at either a national or local level. The nearest landscape designation is the Whaddon-Nash Valley Local Landscape Area (LLA) which lies around 1.8km to the north-west of the site (at its closest point) beyond woodland at Thinbare and Thickbare Wood (LVIA, Figure 4).

5.47 The village of Newton Longville lies around 0.5 km to the south-east of the site. It contains a Conservation Area and a number of Listed Buildings, as does the village of Whaddon to the north-west, around 1.8km from the site.

5.48 Within the urban area of Milton Keynes, to the north, are Scheduled Monuments at Tattenhoe (around 0.5km from the site) and at Howe Park Wood (around 1km from the site).

National Landscape Character

National Character Area NCA Profile

5.49 Landscape character is assessed at a national level by Natural England through the use of National Character Area (NCA) profiles. The assessment provides a contextual understanding of these substantial landscapes areas.

5.50 The site lies within the extensive Bedfordshire & Cambridgeshire Claylands NCA that covers some 260,560 hectares of the landscape. The key characteristics of the NCA and the Statement of Environmental Opportunity are identified in full within the LVIA.

Local Landscape Character

Aylesbury Vale Landscape Character Assessment

5.51 The Aylesbury Vale Landscape Character Assessment AVLCA (2008) is the most up to date landscape characterisation at a local level. It replaces a number of previous documents to include the Landscape Plan for Buckinghamshire (2001).

5.52 The report identifies thirteen Landscape Character Types (LCTs) and seventy-nine Landscape Character Areas (LCAs) across the district.

5.53 The substantial majority of the site lies within the Newton Longville-Stoke Hammond Claylands Landscape Character Area (LCA), part of the much larger Undulating Clay Plateau Landscape Character Type (LCT).

5.54 The Newton Longville-Stoke Hammond Claylands LCA covers a sizeable landscape area to the south of Bletchley, comprising land between the A421 and the village of Stoke Hammond in (LVIA, Figure 4).

5.55 The key characteristics of the LCA are:

- *"Gently undulating to rolling landform*
- *Heavy clay soils with mixed agricultural use*
- *Nucleated settlement pattern*
- *Parliamentary enclosures with thorn hedges"*

5.56 Distinctive Features are recorded as:

- *"Pre-medieval archaeology*
- *Rectilinear field pattern*
- *Fossilised strip fields on west edge of village*
- *Clipped hedgerows with hedgerow trees*
- *Disused railway north west of Newton Longville"*

5.57 Intrusive Elements are noted as:

- *"Suburban edge of Bletchley*
- *Former Brickworks site at Newton Longville*
- *Suburban fringe of Newton Longville*
- *Stoke Hammond Bypass*
- *West coast mainline railway"*

5.58 The report goes on to assess "*condition*" and "*sensitivity"* and provides a series of "*landscape guidelines"*. This is described below:

"Condition

Overall the condition of the landscape is considered to be moderate. There is scant woodland cover, however, trees are a feature of some hedgerows. There are some visual detractors including the fringe of the former brickworks at Newton Longville and the west coast mainline railway at Stoke Hammond. However, there is a sense of development pressure on the northern and eastern fringes of the area. The pattern of elements remain coherent albeit that the area exhibits loss of field pattern at its

fringes where new highway development is eroding the cultural and functional integrity and where arable intensification is leading to loss of hedgerows.

The settlements of Newton Longville and Stoke Hammond have expanded significantly as a result of new housing development. Ecological integrity is moderate due to the levels of connectivity and occurrence of habitats of District significance. Overall the functional integrity is coherent."

Sensitivity

The area retains its local distinctiveness however, continuity is disrupted. Strength of character is considered to be weak. The degree of visibility is moderate as this varies with the undulating landform and the general lack of tree cover. Overall the degree of sensitivity remains low.

Landscape Guidelines - Enhance and Reinforce

- *"Promote management of hedgerows by traditional cutting regimes and the establishment of new hedgerow trees.*
- *Maintain the existing condition and extent of unimproved and semi-improved grassland wherever possible. Encourage good management practices.*
- *Encourage the establishment of buffer zones of semi-natural vegetation along watercourses in arable areas to enhance biodiversity, interconnectivity and landscape quality.*
- *Promote connectivity of habitats.*
- *Conserve and enhance the distinctive character of settlements and individual buildings.*
- *New housing and alterations to existing housing should be designed to reflect the traditional character of the area and be consistent in the use of locally occurring traditional materials.*
- *Consider encouraging the establishment of new woodlands within the historic landscape pattern to provide some mitigation for the visually intrusive elements.*
- *Encourage landowners to improve ecological diversity by and maintaining varied land maintenance regimes to benefit landscape and habitats.*
- *Identify key views from publicly accessible locations and promote the management and enhancement of these viewpoints.*

- *Protect the fossilised strip fields alongside Newton Longville village.*
- *Encourage arable reversion on important archaeological sites under cultivation."*

5.59 Lying in relative proximity to the site are the Whaddon Chase, Horwood Claylands, and Mursley - Soulbury Claylands LCAs that are all within Undulating Clay Plateau LCT. The condition, sensitivity and landscape guidelines for these LCAs are described within the LVIA.

Local Landscape Character Baseline Conditions

Site Context (LVIA Figure 1-3)

5.60 The site is defined to the north by the dual carriageway of the A421 (H8 Standing Way) and the B4044 Buckingham Road. The urban area of Milton Keynes lies to north of the site and includes the Snelshall West and Snelshall East employment area, Windmill Hill Golf Course, and the residential neighbourhoods of Tattenhoe, Emerson Valley, Westcroft, Kingsmead and Tattenhoe Park -which is currently been built.

5.61 Around 1.8km to the north-west of the site is the village of Whaddon. Mixed mature woodland occupies landscape to the south of the village, to include Thinbare Wood, Thickbare Wood, Coddimoor Hill Wood and Hogpound Wood that form part of Whaddon Chase- a former royal hunting forest.

5.62 The site's western boundary is defined by Whaddon Road and the properties of Bletchley Leys Farm and The Leys. To the west and south-west the agricultural landscape includes further blocks woodland at Thrift Wood, Broadway Wood and Salden Wood, together a number of farmsteads and individual properties such as those at Chase Farm, Lower Salden Farm and Springfield Farm.

5.63 The southern boundary of the site is defined by a disused railway line that lies on a well-treed embankment. South of the embankment is Manor Farm and Thick Thorn Farm near the village of Newton Longville, which is around 0.5km from the site. Some further distance to the south are the villages of Drayton Parslow and Mursley.

5.64 Immediately east of the site is the established settlement edge of the town of Bletchley that forms part of the wider urban area of Milton Keynes. Modern residential properties at Thirsk Gardens, Haydock Close, Cartmel Close, Hamilton Lane, Aintree Close and Fontwell Drive border the site's eastern perimeter.

Site Elements

5.65 The site forms a regular and rectilinear pattern of comparatively large open fields that are predominantly managed for arable uses. The field pattern is characterised by parliamentary field enclosures with hedgerows primarily concentrated within the northern part of the site. The site's hedgerows vary in terms of their form and quality, although a number are judged by the Ecological Assessment (Chapter 7 of the ES) as being 'important' in ecological terms on account of their structure and species diversity.

5.66 A number of mature trees are located within the boundary hedgerows and intermittently along Weasel Lane, which is located more or less centrally within the site. A small woodland belt lies within the northern part of the site and there is further mature tree cover alongside the A421 and near the former railway line.

5.67 The Milton Keynes Boundary Walk recreational path runs through the eastern part of site and onto Weasel Lane (which itself is a right of way) before heading northward along Whaddon Road.

Landform (LVIA Figure 3)

5.68 The local and surrounding landscape is broadly undulating in its character with a series of shallow valleys, gentle slopes and local rises. The more pronounced ridgeline of The Brickhills lies to the south-east of Bletchley.

5.69 Weasel Lane lies on a localised east-west rise with the highest point of the site on Weasel Lane, near The Leys, (120m Above Ordnance Datum (AOD). The site steadily descends south of Weasel Lane to a low point near the railway line (95m AOD). The landscape begins to gently rise beyond the railway line at Newton Longville (c100-115 AOD).

5.70 Much of northern part of the site (beyond Weasel Lane) is comparatively level, although it gently falls to the north-west near the A421. The landform rises north of the A421 with the residential neighbourhood of Tattenhoe Park (Milton Keynes) at 120m AOD and the village of Whaddon on higher ground at around 140m AOD.

5.71 The wider landscape to the west and south-west of the site is rolling in character with the villages of Drayton Parslow (c130m AOD) and Mursley (c150m AOD) occupying gentle rises within the landscape.

Landscape Value

5.72 Landscape value can apply to a landscape area as a whole, or to the individual elements, features and aesthetic or perceptual dimensions which contribute to the character of the landscape.

5.73 Neither the site itself nor the surrounding local landscape is subject to any landscape quality designation. Whilst landscape designations are not an exclusive indicator of value, and that the lack of a designation does not render a landscape of no value, designated landscapes are considered to be of particular importance in landscape terms. The nearest landscape designation is the Whaddon-Nash Valley Local Landscape Area (LLA) that lies some distance from the site (c1.8km at its closest point) on the far side of woodland at Briary Plantation, Thickbare Wood and Coddimoorhill Wood.

5.74 In all landscapes there will be variations in the level of value depending on a number of factors. GLVIA3 (§5.27) describes those factors that are generally agreed to influence value which are: landscape quality (condition), scenic quality, rarity, representativeness, conservation interests, recreation value, perceptual aspects and associations. A commentary on each element is described below and this results in an overall conclusion on the landscape value of the site (and its immediate landscape) based upon a word scale of *high, medium* or *low* as described in the criteria outlined in the methodology (LVIA)

Landscape Quality (condition)

5.75 Both the site and the immediate landscape show no apparent sign of degradation or dereliction and the fabric and elements of the landscape are considered to be relatively intact. Overall, the condition of the site and the immediate landscape is judged to be in a reasonable and moderate condition. This corresponds with the conclusions reached by the Aylesbury Vale Landscape Character Assessment which judged the Newton Longville-Stoke Hammond Claylands LCA (in which the site is located) to be in a "*moderate*" condition.

Scenic Quality

5.76 The site and the immediate landscape is considered to be pleasant due to the nature of open fields, hedgerows and intermittent mature trees, although the settlements of Milton Keynes, Bletchley and Newton Longville have an influence, to varying degrees, on this landscape. This is noted by the Aylesbury Vale Landscape Character Assessment which observes, that the "*Suburban edge of Bletchley"* and the "*Suburban fringe of Newton Longville*" are "*intrusive elements*" within this LCA.

5.77 The site is not judged to be special or a particularly noteworthy landscape, and does not display any pronounced sense of scenic quality. It is not, for example, located within an AAL or LLA designation that are evaluated by the Aylesbury Vale District Local Plan as being: *"Special Landscape Areas*" of "*distinctive quality".*

Rarity

5.78 The site's landscape character is considered typical of much of the surrounding agricultural landscape within the context of the settlement edge of Milton Keynes and Bletchley. It does not lie within a rare Landscape Character Type and it is does not contain any particularly unusual landscape features.

Representativeness

5.79 The site's landscape is broadly representative of the National Character Area Profile and the Newton Longville-Stoke Hammond Claylands LCA. It includes a number of the LCA's characteristics, features and intrusive elements, such as:

"Gently undulating to rolling landform",

"Heavy clay soils with mixed agricultural use",

"Parliamentary enclosures with thorn hedges",

"Rectilinear field pattern",

"Disused railway north west of Newton Longville" and

"Suburban edge of Bletchley".

Conservation Interest

5.80 The site is not subject to any heritage or statutory ecological designations. The network of parliamentary field enclosures, hedges, mature trees and the presence of Weasel Lane provide some local conservation and heritage interest.

5.81 The Newton Longville Conservation Area, which is centred on St Faith's Church, is effectively obscured from the site by surrounding modern development. The Whaddon Conservation Area is some distance away (1.8km) and behind intervening woodland at Thickbare and Thinbare Wood.

Recreation Value

5.82 The site is used for informal recreation and contains the Milton Keynes Boundary Walk that connects with Weasel Lane. There are a number of other local rights of way within the surrounding landscape to include the recreational routes of the

Midshires & Swan's Way to the west of Whaddon Road and the North Buckinghamshire Way in the vicinity of Whaddon.

Perceptual Aspects

5.83 It is judged that the site does not exhibit any marked sense of tranquillity or, indeed, any feeling of wildness given the relative proximity of the A421, Milton Keynes and Bletchley and the associated influences that these have on this landscape.

Associations

5.84 In so far as it is known, the site and the immediate landscape are not subject to any specific cultural associations in terms of artists or writers, for example. Nor are they known to have been part of any notable events in history.

Landscape Value: Summary

5.85 In summary, the site is not subject to any landscape designation. It contains no significant or rare landscape features, displays no marked feeling of scenic quality or tranquillity and it has no known cultural associations.

5.86 Its landscape fabric are considered to be generally intact and of reasonable to moderate condition. Its hedgerows and mature trees provide some local landscape value and conservation interest -albeit these are commonplace elements within this landscape.

5.87 The site lies alongside the settlement edge of Milton Keynes and Bletchley and, as a consequence, the landscape is influenced to varying degrees by its intervisibility and relationship with the built-up area.

5.88 The site provides some recreational value with the Milton Keynes Boundary Walk and Weasel Lane forming part of a wider network of rights of way that can be found within the surrounding landscape. It is also considered to have some local value for the adjacent communities - as is often the case for any farmland/green fields on the edge of settlements.

5.89 In examination of the above factors, it is judged that the site and the immediate landscape is of *medium –low* landscape value. In conclusion, it is not assessed as being a landscape of high value, nor is it interpreted to be a 'valued landscape' in the context of the NPPF.

Visual Amenity Baseline Conditions

5.90 The availability of views of the site for visual receptors has been undertaken in parallel with the baseline landscape study. This has determined those visual receptors within the landscape that have views of the site, taking into account the

combination of landform, vegetation and buildings that determine actual visibility across the landscape.

Visual Receptors

5.91 Visual receptors include residents, users of public rights of way, users of open spaces and recreational facilities, highways users and people at their place of work. In general, the first two categories (residents and rights of way users) are normally of higher susceptibility to change, although the surrounding context can, in some cases, have a bearing on susceptibility.

Representative Viewpoints

5.92 During the pre-application stage a series of suggested viewpoint locations to represent the experience for visual receptors was submitted to AVDC for consideration. There was confirmation that these were appropriate. In the process of preparing this chapter and LVIA, representative photographs from ES Chapter 9, Landscape and Visual (2015) have been used, together with some additional and replacement photographs taken in February 2016 (LVIA Figures 6-19). All of the photographs are taken in the winter months, thus providing a 'worst-case' scenario when there is a normally a greater degree of visibility across the landscape.

Visual Amenity: Summary

5.93 Views of the site for visual receptors within the wider landscape are effectively restricted or prevented by a combination of:

- The surrounding built-up area of Milton Keynes and Bletchley,
- Blocks of mature woodland such as at Broadway Wood and Thrift Wood;
- The rolling landform of the landscape; and
- Intervening hedgerows, mature trees and buildings.

5.94 In conclusion, visibility of the site, in terms of clear views, is primarily confined to a comparatively limited number of visual receptors that are localised to the site. These are judged to be:

- Residents on the edge of Newton Longville;
- Residents on the edge of Bletchley that border the site to the east;
- Individual properties at Bletchley Leys Farm and The Leys;
- Right of way users on Weasel Lane and the Milton Keynes Boundary Walk; and

- Highway users travelling on the adjacent A421, Buckingham Road and Whaddon Road.

5.95 For all of these receptors the extent of actual visibility (i.e. whether views are full, partial or glimpsed) varies. It is assessed that residents and rights of way users are the most sensitive to change.

Construction Methods

5.96 It is expected that all construction works would be carried out in accordance with best practice procedures to minimise adverse impact. This will include appropriate methods to protect retained trees and hedgerows following guidance contained within BS 5837. Similarly, all construction works would be carried out in accordance with best practice procedures to protect and to minimise, as far as practicable, adverse impacts on visual amenity during the construction phases.

Likely Significant Effects

Assessment of Landscape Effects

5.97 The Landscape Effects Table (LVIA Appendix B) provides an assessment of the landscape effects on landscape receptors. The LVIA evaluates the level of effects during the construction phase, on completion of the development and at 15 years after completion of the development. The assessment process takes into account the susceptibility to change, landscape value and the magnitude of effect. It also provides a judgment on whether effects are considered to be significant.

Landscape Susceptibility to Change

5.98 The susceptibility to change is the ability of the landscape receptor (e.g. the site) to accommodate change arising from the Proposed Development, as outlined in Chapter 2 of the ES and as presented on the Parameters Plans.

5.99 In all landscapes there will be variances in the susceptibility to change, depending on the type of change and/or development that is proposed. Through the process of the LVIA, and in evaluation of the change that is proposed, it is concluded that the site and the immediate landscape is of *medium* susceptibility to change and has the capacity to accept the type of development proposed.

Landscape Sensitivity

9.100 Landscape sensitivity is defined through a combination of the susceptibility of the landscape receptor to the type of change/development that is proposed, and the value that attached to the landscape. This is addressed alongside professional qualitative judgement. The site and the immediate landscape is judged be of *medium* susceptibility and of *medium-low landscape* value. In conclusion, it is

judged that the site and its immediate landscape are of *medium–low* landscape sensitivity.

Magnitude of Landscape Effects

9.101 The following considers landscape change on landscape receptors.

5.100 As a consequence of its overall scale, the level of change (and effect) on the NCA Profile of the Bedfordshire and Cambridge Claylands would be inconsequential.

5.101 The Proposed Development would result in change and alteration to the characteristics and features upon part of the Newton Longville-Stoke Hammond LCA. It is judged that the degree of change would be *medium – low* and that much of the wider LCA would not be changed. It is evaluated that the key characteristics and elements across the wider landscape of the neighbouring LCAs, would not be fundamentally altered as a result of the Proposed Development and that the overall degrees of change on the Whaddon Chase, Horwood Claylands LCAs would be *low-negligible*, and for the Mursley-Soulbury Claylands LCA this would be *negligible.*

5.102 As a result of the alteration from agricultural use to built development a more pronounced magnitude of change would arise on the site itself, which is judged to be *high*. The site's landscape would evidently be altered. This would be tempered, somewhat, by the fact that the Proposed Development of built-uses, such as new housing would be located within the context of the existing built-up area of Milton Keynes and Bletchley that is an inherent part of this landscape receptor in this locality. And that new elements introduced as part of the scheme, such as woodland, trees and hedges would be characteristic of this landscape.

Landscape Effects : Construction

5.103 The landscape effects during the construction phase on the extensive landscape receptor of Bedfordshire and Cambridge Claylands NCA are assessed as being *negligible*, whilst the effects on the Whaddon Chase, Horwood Claylands and Mursley-Soulbury Claylands LCA's are considered to be no more than *minor adverse.*

5.104 The more marked effects during the construction phase would be restricted to direct effects upon part of the Newton Longville-Stoke Hammond LCA (assessed as being *moderate-minor adverse*), and, more particularly, upon the site itself which is judged to be *major adverse.*

5.105 None of these effects would be permanent and would be over the short to medium term in duration.

Landscape Effects: On Completion

5.106 It is judged that the direct impacts on the landscape would be restricted to the site. The Proposed Development would lead to loss of the site's agricultural fields which, in the main, are used for arable production. Although the loss would be both permanent and irreversible, arable fields are considered to be commonplace within this landscape and are assessed as being of comparatively limited value in much wider landscape terms. The Proposed Development would also result in some disruption in the landscape fabric of the site with the loss of some of its landscape elements (hedges and trees), to facilitate the construction of new access junctions, and the laying out of development parcels and streets etc.

5.107 The proposed green infrastructure (GI) framework which covers around 62 hectares is imbedded within the Parameters Plan and the Proposed Development as part the primary mitigation measures to minimise landscape impact and the level of adverse effects. The approach includes:

- Compensating for the relatively minor losses in vegetation/habitat that would occur through the provision of new replacement habitats such as the planting hedges and trees etc.

- Ensuring that the majority of the site's landscape elements such as mature trees, hedges and rights of way are retained and appropriately conserved within the layout within dedicated areas of greenspace; and

- Delivering an extensive structural framework of connected landscape habitats to include, amongst other things, new broadleaved woodland and accessible multifunctional greenspace.

5.108 It is judged that on the completion of the Proposed Development the landscape impact on the site would result in a *major- moderate adverse* effect, which is assessed as being a significant effect. In the longer term (15 years after completion) the GI would be fully established and landscape habitats such as woodland, hedgerows and trees would be maturing/matured. In conclusion it is judged that the benefits provided by the GI would reduce the level of landscape effects such that the effects on the site would lessen from *major-moderate* at the outset to *moderate adverse* in the longer term. Whilst there would remain a degree of harm, it is judged that these effects would not be significant and that the Proposed Development would be providing substantial environmental benefits in accordance with the "*Enhance and Reinforce*" landscape guidelines of the Newton Longville- Stoke Hammond LCA.

Landscape Effects: Summary

5.109 Given the conclusions on the site's susceptibility to change, its landscape value and its sensitivity (none of which are concluded as being high) it is considered that the site's landscape could accommodate the Proposed Development without resulting in any significant long term landscape harm.

Visual Effects

Assessment of Visual Effects

5.110 The assessment evaluates the level of effects during the construction phase, on completion of the development and at 15 years after completion of the development. The assessment takes into account the susceptibility to change, the value of views and the magnitude of effects. It also provides a judgment on those effects that are determined to be significant. (see Visual Effects Table, LVIA)

5.111 The Visual Appraisal plan (LVIA Figure 5) identifies the visual receptors and the photograph viewpoint locations. The photographs (LVIA Figures 6-20) are representative of the views for receptors and they assist in the evaluation on the level of change and the subsequent effect.

Visibility Mapping

5.112 A digitally generated Zone of Theoretical Visibility (ZTV) has been prepared to assist in understanding the potential visibility of the Proposed Development (LVIA Figure 5). The ZTV is a desk based study that treats the world as 'bare earth' and does not take into account factors, other than terrain, that can influence actual visibility.

5.113 The baseline fieldwork has reviewed those elements within the landscape of the ZTV that restrict or obscure views of the site for visual receptors such as mature woodland (e.g. Broadway Wood) and the built-up area of Milton Keynes and Bletchley and this results in a more refined Representative Visual Envelope (RVE) (LVIA Figure 5). This illustrates the potential area of the landscape in which the Proposed Development is likely to be visible for those visual receptors that are within that area. It is considered that some views may potentially occur outside the RVE although distance and intervening elements in are likely to reduce prominence and perceptibility of the Proposed Development.

5.114 The RVE is comparatively limited in its size and visual receptors that would experience views of the Proposed Development would either be those within the site (e.g. rights of way users), or those within close proximity to it (e.g. residents on the edge of Bletchley).

Visual Effects: Construction

5.115 Those visual receptors that have full views of the site, such as users on Weasel Lane, for example, would experience close range views of general construction activity. This would include views of vehicles and associated machinery, site compounds, earthworks and ground modelling etc. It is expected that all construction works would be carried out in accordance with best practice procedures to protect and to minimise, as far as practicable, adverse impacts on visual amenity during the construction phases.

5.116 Effects on the various receptors during the construction phase are contained within the Visual Effects Tables (LVIA Appendix C). None of the visual effects for receptors during the construction phase would be permanent and these would be over the short to medium term in duration.

Visual Effects: On completion

5.117 The following summaries the key findings of the LVIA and focuses on those receptors identified as having the greatest level of change and effect. A full analysis of all of the visual receptors is addressed within the Visual Effects Table (LVIA).

Residents

Bletchley: Visual Receptors A

5.118 Residents in properties on the western edge of Bletchley, such as those within Haydock Close, Cartmel Close, Aintree Close and at New Leys and Dagnall House have views of the site. In some instances views of the site are obscured or filtered by the existing hedgerow along the site boundary which is tall and thick and contains a number of mature trees. Elsewhere, where the hedgerow is cropped and 'gappy' views of the site are more apparent.

5.119 Viewpoint 1 (LVIA Figure 6) taken from the end of Hamilton Lane and more generally Viewpoints 11-12 (LVIA Figure 11) that look back towards the residential edge, provide a reasonable barometer of the existing view and context that is experienced for these receptors.

5.120 To minimise the visual impact upon these receptors the proposed built elements of the scheme are positioned some distance away from these existing properties with the eastern part of the Proposed Development comprising playing fields of the proposed Secondary School, the provision of allotments, and a corridor of greenspace and new planting along the site boundary. Given their proximity, these receptors would have views of the Proposed Development (to include built elements) resulting in a marked degree of change. This is considered to be *major-moderate adverse* on completion and is judged to be a significant effect.

5.121 The layout of built of uses together with introduction of landscape habitats is considered to be an appropriate design solution for the interface between the existing settlement edge and the new development. Once established, maturing hedgerows and trees would assist in filtering and 'softening' views of the built development, such that the visual effects in the longer term are concluded to reduce in level to *moderate adverse* and are not judged to be significant.

Newton Longville: Visual Receptors B

5.122 Newton Longville lies on gently rising ground and, as a result, some receptors on the edge of the village have views across the landscape to the north. This includes views of the site's south facing slopes and the hedgeline along Weasel Lane, together with some views of the residential edge of Bletchley.

5.123 There would be views of the Proposed Development for some receptors within Newton Longville, primarily those residents and highway users on the northern fringes of the village as represented by Viewpoints 2-3 (LVIA Figure 6-7) taken from Berry Way and Whaddon Road. In some instances receptors would experience views of the Proposed Development within the context and backdrop of the built-up area of Bletchley. Effects are judged to be *major – moderate adverse* on completion and are considered to be significant.

5.124 To minimise impacts, the proposed built elements of the scheme are located away from the more visible upper slopes of the site in the vicinity of Weasel Lane. This area of the site would be designed as a substantial area of greenspace and new woodland planting. To further 'break-up' views of the proposed built form tree planting would be introduced within the southern development parcel.

5.125 In conclusion, it is evaluated that the effects on these receptors in the longer term would lessen to *moderate adverse* and would not be significant on account of the green infrastructure proposals and maturing planting that would '*soften'* and filter views of the built components.

Bletchley Leys Farm – The Leys: Visual Receptors C

5.126 There are a few individual properties that lie within the immediate confines of site. Residents would have close range views of the Proposed Development and Viewpoint 4 (LVIA Figure 7) is broadly representative of the view and context that is gained from Bletchley Leys Farm.

5.127 It is judged that visual effects would be *major-moderate adverse* on completion and that these effects, in this context, are concluded to be significant. The green infrastructure framework includes greenspace and new planting within the vicinity of these properties, whilst proposed built components are located some distance back

from these receptors. Although the Proposed Development would be apparent, the mitigation approach is considered be an appropriate design response that would minimise visual effects upon these receptors. Once planting has matured, views of the built form would be 'softened' by vegetation. The level of effects is judged to diminish to *moderate adverse* in the longer term and is not considered to be significant.

Rights of Way Users

Milton Keynes Boundary Walk: Visual Receptors G

5.128 The Milton Keynes Boundary Walk is a long distance recreational route. In the wider landscape, receptors walk through a landscape on edge of the urban area of Milton Keynes, and, as consequence, this includes fluctuating views of built features on the urban edge, as well views of agricultural land, hedges, trees and woodland. Within the context of the site, the route runs between Whaddon Road and Newton Longville via Weasel Lane.

5.129 Heading south from Weasel Lane towards Newton Longville, receptors have close range views of the site -principally the easternmost field. In the main, the adjacent tall hedgerow tends to restrict views to the west, although where one or two gaps in the hedgeline, as demonstrated by Viewpoint 10 (LVIA Figure 10), there are views across the site towards Whaddon Road. It is judged that primary focus for receptors is the landscape to the south and east and this includes views of residential properties in Bletchley that border the site, the well-treed embankment of the disused railway line, the village of Newton Longville that occupies a gentle rise in the landscape, and more distant views of The Brickhills (LVIA Figure 11, Viewpoint 11)

5.130 As the route exits Weasel Lane and veers northwards along the Whaddon Road it follows the course of the highway. Receptors have close range views of the site and the surrounding agricultural landscape to the west. Passing traffic is another part of the experience in addition to views of Bletchley Leys Farm and the urban area of Milton Keynes on higher land to the north at Tattenhoe Park (LVIA Figure 18, Viewpoint 24).

5.131 Users would be able to continue to walk through the site and access the surrounding countryside, although there would be a *high* level of change in the nature of the route as they pass through the site. Views of open arable fields would, for example, be replaced by views of new housing and built development. The effects on these receptors is considered to be *major adverse* on completion of the development and judged to be significant.

5.132 The Milton Keynes Boundary Walk would be retained and would form a principal component of the GI framework. It would be located within a wide and largely

contiguous green corridor which would include the reinforcement of the existing hedgerows with the planting of new trees, hedges and shrubs to create a pleasant - albeit different walking experience. As it reaches Whaddon Road the route would be accommodated within a broad corridor of accessible greenspace and planting that is proposed along the western perimeter of the site.

5.133 It is assessed that the GI provision and the design strategy that is embraced by the Parameters Plan would lessen the effect upon these receptors in the longer term to *moderate adverse*. It is judged that walking through a largely residential development would be a different experience than currently exists, but would not be so harmful that it would result in any significant long term effects. Whilst there would be views of built components these would ultimately be 'softened' and filtered by overlapping maturing vegetation and, in some instances, the built form would be seen within the context of built features that are already apparent (e.g. houses on the Bletchley (see Viewpoint 10-11)) that are an inherent component of this part of the route.

Weasel Lane: Visual Receptors G

5.134 Weasel Lane is bordered by hedgerows and intermittent mature trees. There are locations along on the route where receptors gain clear views across the site looking south towards Newton Longville, as well as views of the site's northern fields and the tree line along the A421 (LVIA Figure 12, Viewpoint 13,). There are also fluctuating glimpsed views of buildings on the edge of Bletchley (LVIA Viewpoint 12, Figure 11) and those in Milton Keynes at Tattenhoe Park (LVIA Figure 13, Viewpoint 14).

5.135 With the Proposed Development in place there would be a *high* magnitude of change in the visual experience for these receptors. The nature of the route and the experience along would be very different to what currently exists. The effects on these receptors is assessed as being *major adverse* on completion and judged to be significant.

5.136 The approach adopted by the Parameters Plan and the GI framework is to minimise the effects on these receptors by locating the lane within an extensive and broad swathe of multifunctional greenspace. This includes retaining the lane's existing hedges and trees and introducing new woodland, trees, shrubs and hedgerows, in addition to the setting out of large areas of open space for play and recreation to create an attractive 'green route'. Once established and matured, this landscape structure would assist in 'softening' and filtering views of the built elements as users move along the lane. It is concluded that in the longer term the benefits of the maturing GI would diminish the level of effects on these receptors to *moderate adverse*. Similar to the evaluation that is reached on the Milton Keynes Boundary Walk it is judged that the experience of walking within a broad corridor of

greenspace, framed by existing and new planting and within the context of a residential environment would be different, but would not be so harmful that it would result in any significant long term effects on receptors.

Highway Users

Whaddon Road: Visual Receptors N

5.137 These receptors are travelling at speed and have transient views on the landscape. They are assessed as being of lower susceptibility to change. Depending on the undulating character of the route which in, some places, limits visibility, highway users experience close range views of the site and the surrounding landscape. They also have views of residential buildings at Tattenhoe Park and the residential edge of Bletchley (LVIA Figure 18, Viewpoint 24-25).

5.138 To lessen the impact on these receptors, and to create a sensitive interface with the surrounding countryside, the proposed built development would be located some distance back from Whaddon Road behind an intervening corridor of greenspace that would be around 40-60m in depth. This includes the proposal to strengthen the existing roadside hedgerow, together with the planting of new trees, hedges and blocks of woodland.

5.139 Given their proximity to the site, there would be clear views for receptors of the Proposed Development as they pass by. Whilst the new road junction would be an apparent element it is judged this would not be an uncharacteristic or an unexpected feature for these receptors as it would comparable to other junctions that they have passed within the locality and would be observed within the context of the existing highway.

5.140 Overall, the effects on receptors are judged to be *major-moderate adverse* on completion and are considered to be significant. Once the proposed planting has become established along the Whaddon Road, views of new housing for example, would be filtered and '*softened'* by intervening woodland and tree cover. In the long term, the visibility of built elements would diminish and effects on receptors would reduce to *moderate adverse* with these effects not judged to be significant.

Visual Effects: Summary

5.141 The fieldwork has concluded that there would be limited views of the Proposed Development from receptors in the wider landscape, largely as a result of:

- The built form of Milton Keynes and Bletchley that defines and contain the site to the north and east;

- Mature woodland within the surrounding landscape, such as at Broadway Wood, Thrift Wood, and Coddimoorhill Wood;
- Overlapping hedges and mature trees to include tree cover along the A421; and
- Gentle variations in the landform.

5.142 There are a comparatively modest number of visual receptors that would have clear views of the Proposed Development and that marked effects would be limited to localised receptors. Whilst there would evidently be a level of change and effect for some receptors, e.g. users of Weasel Lane and the Milton Keynes Boundary Walk, built development within this landscape would not be uncharacteristic element given the proximity of the site to the settlement edge of Milton Keynes and Bletchley and that built elements are often discernible within this landscape context. Furthermore, it is judged that the effects - which are deemed to be significant for some receptors on completion of the development - would reduce in the longer term on account of the containment created by scheme's maturing framework of woodland, trees and hedgerows that would assimilate the built development within the landscape. In conclusion, none of the effects on visual receptors in the longer term (15 years after completion) are judged as being significant.

Night Time Effects

5.143 The impact and the consequential effects of the Proposed Development as a result of lighting and illumination on night time skies have been considered.

5.144 In terms of existing landscape character, the urban area of Milton Keynes and Bletchley illuminates and imparts a level of sky glow on this landscape. The Proposed Development would seek to minimise the impact of lighting on the night skies by embracing best practice guidance and standards on lighting installation to minimise sky glow.

5.145 Whilst there would clearly be some degree of adverse effect, the lighting effects associated with the Proposed Development would be observed within the contextual setting of an already well-illuminated landscape on the urban edge, and, in conclusion, it is considered that Proposed Development would not lead to any significant effects on the night time landscape.

Mitigation Measures

5.146 Design and mitigation measures are adopted to ensure that the Proposed Development is appropriately and sensitively assimilated into the landscape so that the impact and consequential effects on landscape and visual receptors are minimised.

Mitigation During Construction

5.147 The location and design of temporary construction compounds, lighting, signage and perimeter screen fencing would seek to ensure that the landscape and visual effects are minimised during the construction phase. Construction working methods would adopt best practice procedures and it is expected that a Construction Environmental Management Plan (CEMP), or similar, would be prepared and agreed with the Local Planning Authority to ensure good working methods.

5.148 Landscape and visual impacts addressed by the Construction Environment Management Plan are expected to address the following:

- Soil movement and management strategies;
- Implementation of measures to protect exiting and new planting;
- The nature and placement of hoardings and signboards;
- The feasibility of erecting temporary screen fences;
- The control of working hours; and
- Minimisation of light spill.

Design Principles

5.149 The design process has taken into account, amongst other things, the 'saved' polices of the Aylesbury Vale District Local Plan that are pertinent to landscape matters, the emerging Vale of Aylesbury Plan, the guidelines of the Aylesbury Vale Landscape Character Assessment, and the principles of the Aylesbury Vale Green Infrastructure Strategy. The design process seeks to accord with the aspirations for good design and green infrastructure (GI) contained within the NPPF.

5.150 The baseline landscape and visual analysis has informed the following landscape principles that prevent/avoid and mitigate landscape and visual effects through primary measures such as the masterplanning approach and GI provision.

1) To embrace the GI landscape principles within:

    a) The NCA Profile of the Bedfordshire & Cambridgeshire Claylands;

    b) The Newton Longville-Stoke Hammond Claylands LCA; and

    c) The Aylesbury Vale Green Infrastructure Strategy.

2) To minimise impacts on landscape and visual receptors, through a well-considered masterplanning approach that addresses, amongst other things:

   a) The appropriate quantum and location of built development within the site and the landscape;

   b) The considered and appropriate use of scale and height in relation to the site's landscape context;

   c) Using materials, colours and details that relate and respond to local character;

   d) The conservation and reinforcement of existing landscape elements that are considered to be of value;

   e) The introduction of a variety of extensive interconnected landscape habitats to provide environmental enhancement;

   f) To sensitively assimilate the built form into the landscape.

3) To adopt a 'ground up' approach to masterplanning, whereby the intrinsic elements of the site such as its woodland, mature trees, hedges and rights of way are retained and enhanced to form a primary 'green' framework in which the built development can be accommodated.

4) To strengthen and enhance those elements that are assessed as being of particular value, such as woodland and mature trees, and to locate these within appropriate and sensitively designed areas of greenspace.

5) To establish a GI that is interconnected and multifunctional so that it encourages long term benefits for biodiversity and recreation.

6) To deliver a diverse range of new habitats to maximise biodiversity. To include, for example,

   a) The planting of broadleaved woodland, treed orchards and species rich hedgerows (which can all be based upon locally occurring species),

   b) The creation of species rich grassland and grassland meadows, wet habitats and ponds a part of a sustainable drainage strategy, and

   c) The use of native hedges, trees and shrubs within the built development/plot design.

7) To ensure that there are appropriate landscape and urban design strategies that address the interrelationship between the Proposed Development and the existing settlement edge of Milton Keynes and Bletchley and those individual properties within the vicinity of the site, such as Dagnall House, The Leys and Bletchley Leys Farm. This includes, for example, the introduction of greenspace and new tree planting along the site's eastern perimeter adjacent to properties on the edge of Bletchley.

8) To safeguard and to utilise Weasel Lane and the Milton Keynes Boundary Walk as principal recreational routes within broad corridors of accessible greenspace. This includes a substantial area of greenspace (c70-140m in depth) to the south of Weasel Lane.

9) To provide a sensitive and well-designed relationship with the surrounding landscape to the west and south with the introduction of a woodland, trees and natural greenspace along the perimeter of the site. This includes:

   a) The creation of a wide corridor of contiguous greenspace around 40-60m in depth along Whaddon Road. This would be designed with new trees, hedges and woodland to provide benefits for biodiversity, as well as filtering and 'softening' views of the built form. Furthermore, the proposals would provide an improved corridor in which to accommodate the Milton Keynes Boundary Walk, which is presently confined to the narrow roadside verge.

   b) To 'break up' the view of the built form on the site's south facing slopes for receptors within Newton Longville. This includes a wide (c80m) area of greenspace and planting to the south near the railway line, new east-west corridors of tree planting along the proposed Secondary Streets that follow the contours, and a substantial area of greenspace and new planting on the more visible higher slopes near Weasel Lane.

11) To provide extensive areas of open space that are easily accessible for the new community. This includes the provision of sports pitches, allotments, and children's play facilities.

12) To establish a series of recreational walking and cycling routes that connect with the existing rights of way as well as providing movement routes through the scheme.

13) To explore opportunities in which to 'green' the built environment with the use of street trees, 'pocket parks', and native/semi-ornamental garden trees, hedgerows and shrubs; and

14) To ensure that there is an appropriate mechanism in place so that the long term maintenance and management of the GI can either be adopted by AVDC or by a landscape management company.

Green Infrastructure

9.148 An integral part of the Proposed Development is its green infrastructure (GI) framework which covers in the order of 62 hectares or the equivalent of around 43% of the site. The GI is identified on the Parameters Plan and the GI Framework Plan – Indicative Landscape Principles (LVIA Figure 21). The purpose of this latter drawing is to illustrate the overall design character of the GI and to guide the detailed design of reserved matters submissions. The final design of the GI, to include, for instance, the selection of species can be explored and agreed with AVDC as a part of the detailed stages of the application.

5.151 The principal strategy for the GI is founded upon the conservation of existing site elements (e.g. hedges and trees) and the provision of new landscape habitats to strengthen these features and to provide long term environmental enhancement.

5.152 The scheme's GI approach embraces Natural England's environmental recommendations for development growth as outlined in the Statement of Environmental Opportunity 3 of the Buckinghamshire & Cambridgeshire Claylands (NCA) Profile,

"Plan and create high-quality green infrastructure to help accommodate growth and expansion, linking and enhancing existing semi-natural habitats."

5.153 The NCA Profile notes that this can be achieved through the following means - which are adopted by the development's GI approach.

"*Supporting the creation and expansion of native woodlands, orchards, parkland, grasslands, and hedgerows to improve habitat connectivity within the landscape and provide increased benefits;*

Creating new woodland as appropriate on urban fringes to help screen and integrate new developments, and provide biodiversity and green infrastructure benefits.

Ensuring that any new developments incorporate well-designed green infrastructure, to include improved access and recreation opportunities for local communities and visitors."

5.154 At a local level, the Proposed Development follows the "*Enhance and Reinforce*" guidelines of the Newton Longville-Stoke Hammond Claylands LCA. For example;

- The Proposed Development would deliver additional trees across the site that would accord with the guideline of "…*the establishment of new hedgerow trees*".

- It would deliver interconnected greenspaces and wildlife habitats to meet the guideline of: "*connectivity of habitats*", and

- The proposals for new woodland would provide additional tree cover and would assist in assimilating the built components of the scheme into the landscape. This would meet the guidelines of "*encouraging the establishment of new woodlands within the historic landscape pattern to provide some mitigation for the visually intrusive elements*"

5.155 The Proposed Development would satisfy some of strategic principles of the Aylesbury Vale Green Infrastructure Strategy, to include,

- *"Deliver the enhancement of existing woodlands and create new woodland and tree features"* ; and

- *Create new recreational facilities, particularly those that present opportunities to link urban and countryside areas"*

Residual Effects

5.156 The residual effects consider the effects after the incorporation of mitigation measures. In the context of the landscape and visual impact assessment, the majority of these measures are an integral part of the scheme design as shown on the Parameters Plan and the residual effects are effectively described as the logn term effect (at Year 15) in the preceding Operational Effects section.

Cumulative Effects

5.157 Cumulative effects have been considered in relation to the effects of the Proposed Development in conjunction with other developments within the local environment. Two schemes have been considered which are:

- Development at Tattenhoe Park; and
- Development at Newton Leys

<u>Tattenhoe Park</u>

5.158 The development of Tattenhoe Park is a new neighbourhood to the north of the A421 forming an extension to the south-western edge of Milton Keynes. The development comprises some 1,310 new homes, retail and community facilities, a new primary school and GI provision. It is reasonable to assume that the development proposals have sought to minimise effects on landscape and visual receptors through its master planning and GI approach.

5.159 Tattenhoe Park lies within the vicinity of the site and within the site's landscape context. It is located on gently rising land to the north of the A421 and lies alongside and within the context of the settlement edge of Milton Keynes.

5.160 The Proposed Development and development Tattenhoe Park would be visible for some visual receptors on Weasel Lane and highway users on the Whaddon Road (see LVIA Figure 13. Viewpoint 15 and Figure 18, Viewpoint 24).

5.161 In conclusion, whilst there would be a level of change and landscape and visual effects it is judged that the cumulative effects of the Proposed Development and the Tattenhoe Park would not result in any significant long term effects on landscape character and visual amenity.

Newton Leys

5.162 Newton Leys is a mixed use development comprising housing up to 1,650 homes with employment areas, retail, a combined school, community facilities, new park, hotel and leisure facilities. It is reasonable to assume that development proposals for Newton Leys have sought to minimise effect on landscape and visual receptors through its masterplanning and GI approach.

5.163 As a result of distance and intervening trees, hedgerows, settlements and topography, the site does not form part of the landscape and visual context of the Newton Leys development.

5.164 In conclusion, whilst there would be a level of change and landscape and visual effects for these developments, it is judged that the cumulative effects of the Proposed Development and the Newton Leys development would not result in any significant long term effects on landscape character and visual amenity.

Interactive Effects

5.165 The GI proposals have been prepared in collaboration with other disciplines (included in this ES) to ensure the Proposed Development minimises adverse impacts and provides opportunities for environmental benefits. This has taken into account environmental perspectives such as landscape, visual, ecological, drainage, heritage and urban design matters.

Summary

5.166 The chapter (and the LVIA) assesses landscape character and visual amenity and the resulting landscape and visual effects of the Proposed Development on landscape and visual receptors.

Baseline Landscape Character & Visual Amenity

5.167 The site and the immediate landscape are not covered by any national or local landscape designations.

5.168 The site falls within the Newton Longville-Stoke Hammond Claylands Landscape Character Area LCA that is recorded by the Aylesbury Vale Landscape Assessment as being of "*moderate condition*" and of "*low*" landscape sensitivity. The landscape guidelines for this area are to "*Enhance and Reinforce*".

5.169 The site's landscape character is represented by a series of gently sloping, open agricultural fields on the edge of Milton Keynes and Bletchley. The site's fabric is in a reasonable to moderate condition with its hedges, trees and rights of way of some local landscape value, albeit these area commonplace elements within this landscape.

5.170 It is judged that the site conveys no pronounced sense of scenic quality or tranquillity and contains no rare landscape features. It has no significant conservation interests and is not known for any cultural associations. The site has some recreational value on account of the rights of way that run through the site and has some value for the adjacent communities – as is typical of farmland/green fields on the edge of settlements.

5.171 Overall, it is concluded that the site is *medium-low* landscape value, *medium* susceptibility to change and *medium-low* sensitivity.

5.172 In conclusion, visibility of the site is comparatively limited in terms of the number of visual receptors and these are generally localised to the site. These being

- Residents on the edge of Newton Longville;
- Residents on the edge of Bletchley that border the site to the east;
- Individual properties at Bletchley Leys Farm and The Leys;
- Rights of Way users Weasel Lane and the Milton Keynes Boundary Walk; as they move through the site; and
- Highway users travelling on the adjacent A421, Buckingham Road and Whaddon Road.

Design

5.173 The Proposed Development minimises impacts on landscape and visual receptors through a responsive master planning approach and the adoption of an extensive GI framework. The design and mitigation addresses, amongst other things,

- The conservation and reinforcement of existing landscape elements that are considered to be of value; and
- The introduction of a variety of extensive interconnected landscape habitats to provide environmental enhancement;
- And to sensitively assimilate the built form into the landscape.

Landscape Effects

5.174 There will be a level of change and effect on the site as a result of the alteration from agricultural land to built development. There would be permanent and irreversible loss of the site's agricultural fields and some disruption/loss in vegetation as a result of the construction of new access junctions and the provision of development parcels and streets etc. The GI proposals minimise the level of impacts by ensuring that the majority of the site's hedgerows, mature trees and rights of way are retained and that new landscape habitats are introduced to provide compensation for disruption/losses in vegetation.

5.175 On the completion of the Proposed Development it is judged a *major-moderate adverse* landscape effect would occur on the site, which is concluded as being a locally significant effect.

5.176 In the longer term, 15 years after completion, the GI would be represented by a mature framework of overlapping woodland, trees and hedges. In addition, other elements such as sports, parks, greenspace and recreational routes would be delivering considerable environmental benefits in accordance with the "*Enhance and Reinforce*" guidelines of the Newton Longville -Stoke Hammond LCA, and the strategic principles of the Aylesbury Vale Green Infrastructure. It is assessed that these benefits would assist in reducing the degree of harm to *moderate adverse* and would not be significant.

Visual Effects

5.177 Opportunities in which to views the Proposed Development from the wider landscape would be limited as a result of the containment that is created by the built up area of Milton Keynes and Bletchley, together with overlapping woodland and the undulating character of the landscape.

5.178 Marked adverse effects would be limited to receptors that are either within the site (e.g. users of Weasel Lane) or within the immediate landscape (e.g. residents on the edge of Bletchley). There would be a level of change and adverse effects for these receptors, although this is moderated somewhat by the existing presence and visibility of built features in Milton Keynes and Bletchley that are often discernible. As such, it is assessed that the Proposed Development of building, streets and green

spaces would not be an uncharacteristic feature within this landscape given the site's proximity to the established settlement edge. In the longer term, as the development's GI becomes fully established and mature, the framework of woodland, trees and hedgerows around the perimeter of the site -and within the layout - would help to 'soften' and filter views of the built form. As a result, it is concluded that the level of effects and degree of harm on all visual receptors would lessen in the longer term, and none of the visual effects on receptors are judged to be significant.

Conclusion

5.179 It is assessed that the design and mitigation approaches adopted by the Proposed Development through its master planning approach and GI provision would minimise impacts on landscape and visual receptors, and, in conclusion, the residual long term effects would not result in significant landscape and visual harm.

6. TRAFFIC AND TRANSPORT (S4ection 10 of Submitted Environmental Statement)

Introduction

6.1 This chapter of the Addendum ES assesses the likely environmental impacts of the Proposed Development in terms of traffic and transport. The accompanying Transport Assessment (TA) which is a freestanding Appendix to the Addendum ES provides full details of the impact of the proposed development on the local and strategic highway network.

6.2 This chapter describes the assessment methodology for considering the environmental impacts; the baseline conditions at the Application Site and surroundings; the nature of the impacts; the mitigation measures required to prevent, reduce or offset any significant adverse impacts; and the likely residual impacts once these measures have been employed.

Planning Policy Context

6.3 The Proposed Development will comply with the policies outlined in the following documents:

- Aylesbury Vale District Local Plan (AVDLP), January 2004
- Draft Vale of Aylesbury Local Plan (VALP), July 2016
- Milton Keynes Local Plan (MKLP), December 2005
- Milton Keynes Core Strategy (MKCS), July 2013
- National Planning Policy Framework (2012)
- National Planning Practice Guidance (2014)
- A Transport Vision and Strategy for Milton Keynes: Local Transport Plan 3 - 2011 to 2031
- Buckinghamshire's Local Transport Plan 2011-2016

6.4 A review of individual policies and compliance is provided in Section 2 of the TA. There are certain themes running through both national and local policy that the proposed development should respond to. Development proposals should be such that they encourage the use of sustainable modes of transport and give priority to pedestrian and cycle movements, and have access to high quality public transport facilities. This enables best use to be made of existing infrastructure.

6.5 The National Planning Policy Framework (NPPF) encourages and promotes sustainable development and states that:

> *"Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe".*

6.6 Appropriate mitigation has been discussed and agreed with BCC and MKC to ensure that the residual cumulative impact of traffic generated by the proposed development is not severe.

6.7 Improvements are required by the local and strategic highway authorities to enable general growth forecasts (without the proposed development) to be accommodated. In this regard, the proposed development is able to facilitate and act as a catalyst for implementing those required infrastructure improvements.

6.8 The TA demonstrates that the proposed development will comply with the:

- Current Development Plan Policy;
- NPPF and the National Planning Policy Guidance (NPPG); and
- Positively responds to the movement aspirations of Aylesbury Vale District Council (AVDC) and Milton Keynes Council (MKC).

Assessment Methodology

6.9 The methodology adopted in assessing the likely traffic and transport impacts is based upon the Institute of Environmental Assessment document 'Guidance Notes No. 1: Guidelines for the Environmental Assessment of Road Traffic' (GEART), 1993, and in accordance with the Government's planning policies for England as set out in the NPPF.

6.10 Although the Guidance in GEART is over twenty years old, it is still relevant in that it has not been superseded or revoked. It therefore still provides guidance for the "*best current practice*" and is "*specifically designed to cover the aspects of road traffic associated with major new developments" (GEART paragraph 1.6).*

6.11 The assessment recognises that an increase in traffic during the construction and operational phases of development has the potential to result in the following impacts:

1. Increased risk of accidents – any increase in traffic numbers has the theoretical potential to increase the risk of accidents;

2. Severance, Intimidation and Pedestrian Delay – an increase in vehicle numbers, particularly HGVs through the area, could result in additional delays to pedestrians wishing to cross local roads. For example, Heavy Goods Vehicle (HGV) traffic could reduce the existing amenity of cycling and walking routes to the extent that these vulnerable road users become intimidated by traffic;

3. Dust and Dirt – construction HGVs have the potential to distribute dust and dirt from construction sites on to the local highway network. Such effects would be most pronounced in the immediate vicinity of the site entrance.

6.12 In addition to this document, a separate Transport Assessment (TA) and a Framework Travel Plan (FTP) have also been prepared as part of the planning application. These documents have been prepared in accordance with Local Development policies, the NPPF and NPPG.

6.13 The TA considers the transport and traffic impact of the Proposed Development in detail and reference should be made to that document for full details of the various impacts and the potential infrastructure improvements associated with the development.

6.14 The FTP includes further details of the measures that will be implemented to promote sustainable travel to and from the Proposed Development and how these will be monitored, reviewed and revised as necessary.

6.15 An assessment of the traffic-related air quality and noise impacts associated with the Proposed Development is considered separately in Chapters 7 and 8 of the Addendum ES respectively.

Significance Criteria

6.16 The IEMA Guidelines identify two broad rules-of-thumb to be used as a screening process in determining the scale and extent of the assessment.

1. Rule 1 – include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%)

2. Rule 2 – include any other specifically sensitive areas where traffic flows have increased by more than 10% (Sensitive areas may include accident black-spots, conservation areas, hospitals, links with high pedestrian flows etc)

6.17 The Guidelines go on to state that:

> *"Traffic forecasting is not an exact science and the accuracy of projections is open to debate. It is generally accepted that accuracies greater than 10% are not achievable. It should also be noted that the day-to-day variation of traffic on a road is frequently at least some + or -10%. At a basic level, it should therefore be assumed that projected changes in traffic of less than 10% create no discernible environmental impact."*

6.18 The Guidelines identify that the most discernible environmental impacts of traffic are noise, severance, pedestrian delay and intimidation and they provide additional information on how those impacts should be assessed:

> *"At low flows, increases in traffic of around 30% can double the delay experienced by pedestrians attempting to cross a road (DOT,*

1983). Whether this is significant in absolute terms requires further consideration (see 3.19). Severance and intimidation are, however, much more sensitive to traffic flow and the Department of Transport, in its MEA, has assumed that 30%, 60% and 90% changes in traffic levels should be considered as "slight", "moderate" and "substantial" impacts respectively."

6.19 In order to undertake a relative assessment of the increase in road traffic, the criteria outlined in Tables 6.1 and 6.2 have been used to determine the magnitude of impact and receptor sensitivity respectively. However, consideration should also be given to the local characteristics, such as the volume of traffic, pavement widths and availability of crossing facilities.

Table 6.1 Magnitude of Traffic Impact Criteria

Change in Traffic Flow	Magnitude of Impact
Change in total traffic or HGV flows over 90%	Major
Change in total traffic or HGV flows of 60 - 90%	Moderate
Change in total traffic or HGV flows of 30 - 60%	Minor
Change in total traffic or HGV flows of less than 30%	Negligible

Table 6.2 Receptor Sensitivity

Receptor Sensitivity	Receptor Type
Major	Receptors of greatest sensitivity to traffic flow: schools, colleges, playgrounds, accident black spots, retirement homes, urban/residential roads without footways that are used by pedestrians.
Moderate	Traffic flow sensitive receptors including: congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, unsegregated cycle ways, community centre, parks, recreational facilities.
Minor	Receptors with some sensitivity to traffic flow: places of worship, public open space, nature conservation areas, listed buildings, tourist attractions and residential areas with adequate footway provision.
Negligible	Receptors with low sensitivity to traffic flow and those with sufficient distance from affected roads and junctions.

Significance of Impact

6.20 The magnitude of change and sensitivity of the receptor can then be compared in order to determine the overall traffic effect significance, as shown in Table 6.3.

Table 6.3 Determination of Significance of Traffic Effects

Sensitivity of Receptor	Magnitude of Effect			
	Negligible	Minor	Moderate	Major
Major	Minor	Moderate	Major	Major
Moderate	Negligible	Minor	Moderate	Major
Minor	Negligible	Negligible	Minor	Moderate
Negligible	Negligible	Negligible	Negligible	Minor

6.21 The potential effects are, therefore, considered to be of either major, moderate, minor or of negligible significance. Effects of major and moderate significance are considered to be significant in EIA terms.

Baseline Conditions

Traffic Data

Two separate methodologies have been used to assess the impact of traffic generated by the proposed development on the local highway network in accordance with the requirements of the highway authorities, as set out in more detail in Section 7 of the TA.

6.22 For Milton Keynes Council (MKC) and Highways England (HE), the Milton Keynes Traffic Model (MKTM) has been used to determine junctions of importance. Local capacity models have then been used to assess traffic flow data from the MKTM at a number of key junctions.

6.23 For Buckinghamshire County Council (BCC), a series of static junction models have been developed. The models include traffic survey data collected in October 2015 as a base and have been used to assess the future impact of the development on the local highway network in 2026. The network of assessments for BCC also includes a calculation of the traffic flows towards Milton Keynes and Bletchley.

6.24 The BCC methodology accounts for traffic growth to 2016 based on assumptions from TEMPRO, including a review to ensure that the planning assumptions within TEMPRO are broadly consistent with the forecast number of households and jobs within Aylesbury Vale to 2026. The traffic growth applied to 2015 base data therefore includes for committed and allocated developments expected in the area before 2026.

6.25 The two way AADT flows for 2026 in the base scenario along key corridors in the vicinity of the proposed development are provided in Table 6.4.

Table 6.4 2026 AADT Base Scenario

Road	2 Way AADT
	2026 Forecast Base
A421 (between Whaddon Crossroads and Bottle Dump Roundabouts)	30127
Whaddon Road through Newton Longville	8557
A421 Standing Way (between Bottle Dump and Tattenhoe Roundabouts)	31527
Buckingham Road	10988

Personal Injury Collision Data

6.26 Personal injury collision data to cover the last five years have been obtained from both Buckinghamshire County Council and Milton Keynes Council. The area of interest in Buckinghamshire County Council's administrative area is from A421 Whaddon Crossroads in the west, along A421 up to and including Bottle Dump Roundabout, Whaddon Road into Newton Longville and Stoke Road to the roundabout at the northern end of A4146 Stoke Hammond bypass. The data covers the period from 1st January 2011 to 31st December 2015.

6.27 The personal injury collision data obtained from Milton Keynes Council covers a large area of interest including the following roundabouts and the road links between them; Bottle Dump, Tattenhoe, Kingsmead, Westcroft, Furzton, The Bowl, Elfield Park, Emerson and Windmill Hill. The collision data covers the 5 year period, 1st July 2009 to 30th June 2014, with collisions between Bottle Dump and Tattenhoe also included to August 2015.

6.28 The collision data from both BCC and MKC is fully assessed within Section 3 of the TA. Table 6.5 provides an overview for the roads in the immediate vicinity of the Application Site as this is where the greatest impact of traffic is likely to be.

Table 6.5 Personal Injury Collision Data

Location	Number of PIAs		
	Slight	Severe	Fatal
Whaddon Crossroads	8	0	0
Whaddon Road/Stoke Road through Newton Longville	12	0	0
Bottle Dump and Tattenhoe Roundabouts	17	0	0
H8 to Windmill Hill Roundabout	6	3	0

Likely Significant Effects

6.29 The impacts of the proposed development are described in detail in Section 9 of the TA, with a summary provided below.

During Construction

6.30 It is envisaged that the site will be developed over a period of 9 years. Subject to planning approval it is anticipated that infrastructure construction will start in 2017 with house building beginning in 2018 for a period of 7 years until 2025. In terms of working hours it is envisaged that construction will be undertaken between 0800 and 1800 on Monday to Friday and between 0800 and 1300 on Saturday.

6.31 The exact number of vehicle movements associated with the demolition and construction works i.e. deliveries, removal of waste, construction staff vehicles etc. cannot be determined precisely at this stage. However, Buckingham Road and Whaddon Road are likely to provide the main site entrances i.e. most likely to be used by the construction traffic. Currently these roads have an Average Annual Daily Traffic (AADT 24hr) flow of around 11,000 and 8,500 vehicles respectively. The IEMA Guidelines state that where a predicted increase in traffic flows is lower than 30% the effects can be stated to be low or insignificant. A 30% increase relates to 3,300 vehicle movements a day on Buckingham Road and 2,550 on Whaddon Road.

6.32 There is no real risk that construction traffic will exceed these levels and as such the traffic impact associated with the construction of the Proposed Development will be negligible.

6.33 Construction traffic is likely to increase the number of HGV movements along these roads and again the IEMA Guidelines state that where the predicted increase in the number of HGVs is less than 30% the effects can be stated to be low or insignificant, and between 30-60% as minor. Currently Buckingham Road carries around 560 HGVs per day and Whaddon Road around 350. A 'negligible' 30% increase in these levels relates to 170 HGV movements per day on Buckingham Road and 100 on Whaddon Road, and a 'minor' 60% increase would generate 360 HGVs on Buckingham Road and 200 on Whaddon Road. The level of HGVs required to exceed a 'Minor' impact is not likely to occur given the timescales over which the development will be constructed.

6.34 Again, there is no real risk that HGV traffic related to construction will exceed these levels and as such the traffic impact associated with the construction of the Proposed Development will be negligible.

Impacts of Completed Development

6.35 The trips generated by the Proposed Development when fully occupied are calculated using the MKTM with the addition of trips for the secondary education (which are not included within the MKTM). The trips rates used within the MKTM are robust and are agreed with the local highway authorities and Highways England. The methodology is described in detail in Section 7 of the TA.

Evaluation of Significance of Traffic Flow Changes

6.36 The percentage change in traffic over and above the 2026 Base flows has been determined and is shown in Table 6.6 below.

Table 6.6 Percentage Differences between 2026 AADT Base and Base + Development Scenarios

Road	2026 Base	2026 Base + Development	% Change
A421 (between Whaddon Crossroads and Bottle Dump Roundabouts)	30127	31993	6%
Whaddon Road through Newton Longville	8557	10108	18%
A421 Standing Way (between Bottle Dump and Tattenhoe Roundabouts)	31527	33979	8%
Buckingham Road	10988	14621	33%

6.37 In order to determine the significance of changes in traffic flows it is necessary to first determine the sensitivity of the receptors under consideration. All receptors are considered to have minor sensitivity apart from Whaddon Road through Newton Longville and Buckingham Road in Bletchley which are considered to have moderate sensitivity due to the more urban nature of the area. The significance of changes in traffic flows is shown in Table 6.7.

Table 6.7 Significance of Change in Traffic Flows

Road	Sensitivity of Receptor	Magnitude of Impact for % change	Magnitude of Effect
A421 (between Whaddon Crossroads and Bottle Dump Roundabouts)	Minor	Negligible	Negligible
Whaddon Road through Newton Longville	Moderate	Negligible	Negligible
A421 Standing Way (between Bottle Dump and Tattenhoe Roundabouts)	Minor	Negligible	Negligible
Buckingham Road	Moderate	Minor	Minor

6.39 As already noted in paragraph 6.21, the IEMA Guidelines state that the magnitude of the effect is considered significant if the magnitude is either moderate or major. On all links in the vicinity of the Proposed Development, the impact of traffic on the surrounding highway network is either negligible or minor, therefore it is deemed not to be significant in EIA terms.

Mitigation Measures

6.40 The mitigation proposed as part of the development is described and assessed in detail in Section 10 of the TA, with a summary provided below.

During Construction

6.41 In order to minimise construction traffic impacts, the key mitigation measure will be the implementation of a Construction Traffic Management Plan with an agreed route for construction traffic as associated with each phase. Provision will also be made for wheel wash facilities and road sweeping, in order to minimise any impacts from dust and dirt.

6.42 There will be a dedicated point of contact for enquiries/complaints, whereby neighbours and the local authorities will be kept fully informed of the construction programme and associated activities.

Completed Development

6.43 The South West Milton Keynes Consortium is committed to the implementation of the Travel Demand Management Strategy for the Proposed Development. This strategy is aimed, primarily by the implementation, maintenance and monitoring

of Travel Plans for all significant generators of traffic, at reducing generated traffic from the Proposed Development below that predicted within the TA.

6.44 The Framework Travel Plan submitted (and agreed with BCC, MKC and Highways England) as part of the planning application includes details of the initial targets that will be set with regard to modal shift and details of the measures that will be put into place to achieve this modal shift. The Public Transport Strategy is also a key element of the mitigation strategy as is the focus on providing excellent linkages and provision for pedestrians and cyclists.

6.45 There will be improvements to the local highway network implemented through implementation of the development or through a s278 Agreement at the following locations:

- Whaddon Road – new access junction;
- Buckingham Road – new access roundabout with associated footway/cycleway and Toucan Crossing link to existing Redway;
- A421 Standing Way – new access junction (left-in only);
- Bottle Dump Roundabout – improved flare lane widths on A421 west and Whaddon Road approaches, and Pegasus crossing to the south of Pearce Recycling; and
- Resurfacing of a section of the Public Right of Way (PROW) at Weasel Lane throughout the Application Site and to the west of Whaddon Road.

6.46 Junction capacity improvements on the local highway network will also be implemented by BCC and MKC on behalf of the Applicant through a financial contribution secured by a s106 planning obligation. The equivalent cost of works to achieve a 'nil detriment' operational performance in 2026 will be secured via a suitably worded obligation to cover theoretical improvements at the following junctions:

- A421/Coddimoor Lane/Whaddon Road (Whaddon Crossroads);
- A421/Warren Road;
- A421/Shucklow Hill/Little Horwood Road;
- A421/Nash Road/Winslow Road;
- A421 Emerson Roundabout;
- A421 Elfield Park Roundabout; and
- A421 Bleak Hall Roundabout.

6.47 Further financial contributions secured as a s106 planning obligation will also be provided by the Applicant for the following improvements:

- Traffic calming measures through Newton Longville;

- Extension of Bus Route 8 to provide services from the Application Site to Central Milton Keynes Station; and
- Provision of additional cycle parking at Bletchley Station.

Residual Effects

6.48 It is acknowledged that there will be an increase in traffic generation as a result of the Proposed Development. Notwithstanding this, the impact of additional traffic will be mitigated by the provision of the Travel Demand Management Strategy including the implementation, monitoring and maintenance of Travel Plans for various land uses and by the proposed highway/sustainable travel improvements. As a result of the comprehensive mitigation package agreed in principle with BCC and MKC, the residual cumulative impact of the proposed development (i.e. following the implementation of the agreed mitigation measures), would be minimal and will therefore not be significant in EIA terms.

Summary

6.49 The assessment of the likely environmental effects of traffic generated by the Proposed Development has demonstrated that overall there will be a negligible/minor impact, both during the construction and operational phases of the development.

7. AIR QUALITY (Section 11 of submitted Environmental Statement)

Introduction

7.1 This chapter describes the potential air quality impacts associated with the Proposed Development. This section represents an update to the air quality chapter of the submitted ES (January 2015) prepared for planning application reference 15/00314/AOP, accounting for subsequent changes to the scheme and updates to the guidance and tools used in carrying out the assessment.

7.2 The Proposed Development will lead to an increase in traffic on local roads, which may impact upon air quality at existing residential properties. The new residential properties will also be subject to the impacts of road traffic emissions from the adjacent road network. The main air pollutants of concern related to traffic emissions are nitrogen dioxide and fine particulate matter (PM_{10} and $PM_{2.5}$).

7.3 Network Rail has announced plans to re-open the disused railway line adjacent to the southern boundary of the application site as part of the East West Rail Link. Defra guidance (Ref 7.1) outlines an approach to assessing the potential for exceedances of the nitrogen dioxide objective as a result of emissions from diesel (and steam) locomotives. The distance criterion for stationary (diesel or steam) locomotives is exposure within 15m, while that for moving locomotives is 30m. There will be a buffer of at least 70m between the railway line and any residential properties developed as part of the scheme, thus the development site falls outside these criteria. In addition, it is likely that the majority of locomotives operating on the rail link will be electric and therefore zero-emission. Emissions from railway locomotives are, therefore, not considered further.

7.4 There is also the potential for the construction activities to impact upon both existing and new properties. The main pollutants of concern related to construction activities are dust and PM_{10}.

7.5 This report describes existing local air quality conditions (2014 and 2015), and the predicted air quality in the future assuming that the proposed development does, or does not proceed. The assessment of traffic-related impacts focuses on 2018, which is the anticipated earliest year of first occupation of any of the units within the development. The assessment of construction dust impacts focuses on the anticipated duration of the works.

7.6 This report has been prepared taking into account all relevant local and national guidance and regulations.

Planning Policy

Development Plan Documents

Aylesbury Vale District Local Plan

7.7 Aylesbury Vale District Council (AVDC) is currently working on a new Vale of Aylesbury Local Plan. On pollution, the draft Vale of Aylesbury Local Plan (Ref 7.2) states that:

"The council will ensure that no development creates or triggers unacceptable levels of pollution and land instability that could impact on human health, property and the wider environment, including environmental designations. Consideration must be given to adopting environmental best practice measures in all cases".

7.8 Specifically on air quality the document states that:

"Developments requiring planning permission that may have an adverse impact on air quality will be required to prove through a submitted Air Quality Impact Assessment that:

- *The effect of the proposal would exceed the National Air Quality Strategy Standards (as replaced) or*
- *The surrounding area would not be materially affected by existing and continuous poor air quality.*

Large, potentially polluting developments will be required to assess their air quality impact with detailed air dispersion modelling and appropriate monitoring. Air Quality Impact Assessments are also required for development proposals that would generate an increase in air pollution and are likely to have a significantly adverse impact on biodiversity. Required mitigation will be secured through a planning condition or Section 106 Agreement".

7.9 Until the new Vale of Aylesbury Local Plan is adopted the saved policies of the Aylesbury Vale District Local Plan (Ref 7.3) will remain the relevant planning policy in the area. This Plan contains relatively little in terms of air quality, although it does state the following with regard to new development:

"New development may generate increased levels of traffic. This can affect local congestion levels, pollution levels and road safety. An integral element of the Plan is a concern to maintain and enhance the safety, amenity and accessibility of all those using highways. It is important, therefore, that roads, footways and cycleways in new developments are designed and maintained to a standard that provides a safe, convenient and accessible environment."

Milton Keynes Core Strategy

7.10 The Milton Keynes Core Strategy (Ref 7.4) was adopted in July 2013. Policy CS12 states that:

"New developments and major redevelopments must be designed to support sustainable lifestyles for all. This will include… Appropriately locating development to maintain and improve…air quality standards".

National Guidance

National Planning Policy Framework

7.11 The National Planning Policy Framework (NPPF) (Ref 7.5) sets out planning policy for England in one place. It places a general presumption in favour of sustainable development, stressing the importance of local development plans, and states that the planning system should perform an environmental role to minimise pollution. One of the twelve core planning principles notes that planning should *"contribute to…reducing pollution"*. To prevent unacceptable risks from air pollution, planning decisions should ensure that new development is appropriate for its location. The NPPF states that the *"effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account*".

7.12 More specifically the NPPF makes clear that:

"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan".

National Planning Policy Guidance

7.13 The NPPF is now supported by Planning Practice Guidance (PPG) (Ref 7.6), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that *"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values"* and *"It is important that the potential impact of new development on air quality is taken into account … where the national assessment indicates that relevant limits have been exceeded or are near the limit"*. The role of the local authorities is covered by the LAQM regime, with the PPG stating

that local authority Air Quality Action Plans *"identify measures that will be introduced in pursuit of the objectives"*. In addition, the PPG makes clear that *"Odour and dust can also be a planning concern, for example, because of the effect on local amenity"*.

7.14 The PPG states that *"Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)".*

7.15 The PPG sets out the information that may be required in an air quality assessment, making clear that *"Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality".* It also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that *"Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact".*

Air Quality Strategy

7.16 The Air Quality Strategy published by the Department for Environment, Food, and Rural Affairs (Defra) provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment (Ref 7.7). It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

National Air Quality Plans

7.17 Defra has produced Air Quality Plans to reduce nitrogen dioxide concentrations in major cities throughout the UK (Ref 7.8). Along with a suite of national measures, the Air Quality Plans identify the need to establish Clean Air Zones within five Zones (Birmingham, Leeds, Southampton, Nottingham and Derby) where exceedences of the EU limit values for nitrogen dioxide have been forecast in 2020 and beyond. Within these Zones, lower-emission vehicles will be encouraged. The precise nature of these Clean Air Zones is still to be decided. In Greater London, Defra will continue

to support and monitor the delivery of the Mayor's plans for improving air quality to meet the EU limit value for nitrogen dioxide by 2025. The study area is not in an affected Zone.

Non-Statutory Policy Documents

Buckinghamshire and Milton Keynes Regional Air Quality Strategy

7.18 The Bucks Air Quality Management Group has produced a Regional Air Quality Strategy (Ref 7.9) which sets out the plans and actions drawn up to improve air quality in Buckinghamshire and Milton Keynes.

7.19 The strategy aims to ensure a uniform approach to air quality management and has identified key areas where it may influence and advance measures to improve air quality, including land use and transport planning, education and advice, alternative transport modes and through enforcement.

Buckinghamshire Local Transport Plan

7.20 Buckinghamshire's Local Transport Plan 2011-2016 (Ref 7.10) recognises the role of transport in tackling air quality problems. The document also contains a section on air quality under 'Key Transport Issues', which outlines where the main air quality issues are in the county and the measures that will be taken to improve air quality.

7.21 Milton Keynes Council's (MKC) A Transport Vision and Strategy for Milton Keynes (Ref 7.11) also recognises that transport planning can help improve air quality, and includes air quality as an indicator within its Performance Management Plan under objectives on Safety, Security and Health and Quality of Life.

Aylesbury Vale Air Quality Action Plan

7.22 AVDC has declared AQMAs for nitrogen dioxide that cover three areas in Aylesbury Town Centre. The Council has since developed an Air Quality Action Plan for Aylesbury (Ref 7.12). The Action Plan focuses on a borough wide approach to improving air quality in Aylesbury, with additional specific measures for the AQMAs. The general measures focus on promoting awareness and behavioural change, transport and land use planning and infrastructure changes to improve traffic flow and the use of sustainable transport modes, and ensuring an understanding of the impact of future town growth and the effectiveness of mitigation.

Assessment Criteria

7.23 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out

the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality Regulations, 2000, Statutory Instrument 928 (Ref 7.13) and the Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043 (Ref 7.14).

7.24 The objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The $PM_{2.5}$ objective is to be achieved by 2020. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded where the annual mean concentration is below 60 $\mu g/m^3$ (Ref 7.1). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level. Measurements have also shown that the 24-hour PM_{10} objective could be exceeded where the annual mean concentration is above 32 $\mu g/m^3$ (Ref 7.1). The predicted annual mean PM_{10} concentrations are thus used as a proxy to determine the likelihood of an exceedence of the 24-hour mean PM_{10} objective. Where predicted annual mean concentrations are below 32 $\mu g/m^3$ it is unlikely that the 24-hour mean objective will be exceeded.

7.25 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance (Ref 7.1). The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc. The 24-hour objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

7.26 The European Union has also set limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$. The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one (Ref 7.15). In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded.

7.27 The relevant air quality criteria for this assessment are provided in Table 7.1.

Table 7.1: Air Quality Criteria for Nitrogen Dioxide, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Objective
Nitrogen Dioxide	1-hour mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual mean	40 µg/m^3
Fine Particles (PM_{10})	24-hour mean	50 µg/m^3 not to be exceeded more than 35 times a year
	Annual mean	40 µg/m^3 [a]
Fine Particles ($PM_{2.5}$) [b]	Annual mean	25 µg/m^3

[a] While the annual mean PM_{10} objective is 40 µg/m^3, 32 µg/m^3 is the annual mean concentration above which an exceedence of the 24-hour mean PM_{10} concentration is possible, as outlined in LAQM.TG16 (Ref 7.1). A value of 32 µg/m^3 is thus used as a proxy to determine the likelihood of exceedence of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Ref 7.16).

[b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Construction Dust Criteria

7.28 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the Institute of Air Quality Management (IAQM)[1] (Ref 7.17) has therefore been used. Full details of this approach are provided in Appendix 7.1.

Descriptors for Air Quality Impacts and Assessment of Significance

Construction Dust Significance

7.29 Guidance from IAQM (Ref 7.17) is that, with appropriate mitigation in place, the impacts of construction dust will be 'not significant'. The assessment thus focuses on determining the appropriate level of mitigation so as to ensure that impacts will normally be 'not significant'.

[1] The IAQM is the professional body for air quality practitioners in the UK.

Operational Significance

7.30 There is no official guidance in the UK in relation to development control on how to describe air quality impacts, nor how to assess their significance. The approach developed jointly by Environmental Protection UK (EPUK) and IAQM (Ref 7.16) has therefore been used. This includes defining descriptors of the impacts at individual receptors, which take account of the percentage change in concentrations relative to the relevant air quality objective, rounded to the nearest whole number, and the absolute concentration relative to the objective. The overall significance of the air quality impacts is determined using professional judgement, taking account of the impact descriptors. Full details of the EPUK/IAQM approach are provided in Appendix 11.2. The approach includes elements of professional judgement, and the experience of the consultants preparing the chapter is set out in Appendix 11.3.

7.31 It is important to differentiate between the terms impact and effect with respect to the assessment of air quality. The term impact is used to describe a change in pollutant concentration at a specific location. The term effect is used to describe an environmental response resulting from an impact, or series of impacts. Within this chapter, the air quality assessment has used published guidance and criteria described in the following sections to determine the likely air quality impacts at a number of sensitive locations. The potential significance of effects has then been determined by professional judgement, based on the frequency, duration and magnitude of predicted impacts and their relationship to appropriate air quality objectives.

Assessment Methodology

Study Area

7.32 The study area for the air quality assessment is defined by the study area of the transport assessment, from which all roads potentially affected by the scheme have been identified; and in addition, any major industrial air pollution sources within a 1 km radius of the application site have also been considered.

Existing Conditions

7.33 Existing sources of emissions within the study area have been defined using a number of approaches. Industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Ref 7.18) and the Environment Agency's website 'what's in your backyard' (Ref 7.19). Local sources have also been identified through examination of the Council's Air Quality Review and Assessment reports.

7.34 Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority. This covers both the study area and nearby sites, the latter being used to provide context for the assessment. The

background concentrations across the study area have been defined using the national pollution maps published by Defra (Ref 7.20). These cover the whole country on a 1x1 km grid.

7.35 Exceedences of the annual mean EU limit value for nitrogen dioxide in the study area have been identified using the maps of roadside concentrations published by Defra for 2014 (Ref 7.21) and for 2020 (Ref 7.22). These are the maps used by the UK Government, together with the results from national AURN monitoring sites that operate to EU data quality standards, to report exceedences of the limit value to the EU. The maps are currently available for the past years 2001 to 2014 and the future years 2020, 2025 and 2030. The national maps of roadside PM_{10} and $PM_{2.5}$ concentrations, which are available for the years 2009 to 2014, show no exceedences of the limit values anywhere in the UK in 2014.

Construction Impacts

7.36 The construction dust assessment considers the potential for impacts within 350 m of the site boundary; or within 50 m of roads used by construction vehicles. The assessment methodology is that provided by IAQM (Ref 7.17). This follows a sequence of steps. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the site. Step 2b defines the sensitivity of the area to any dust that may be raised. Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation. Step 3 uses this information to determine the appropriate level of mitigation required to ensure that there should be no significant impacts. Appendix 7.1 explains the approach in more detail.

Road Traffic Impacts

Sensitive Locations

7.37 Concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ have been predicted at a number of locations both within, and close to, the proposed development. Receptors have been identified to represent worst-case exposure within these locations. When selecting these receptors, particular attention has been paid to assessing impacts close to junctions, where traffic may become congested, and where there is a combined effect of several road links. The receptors have been located on the façades of the properties closest to the sources.

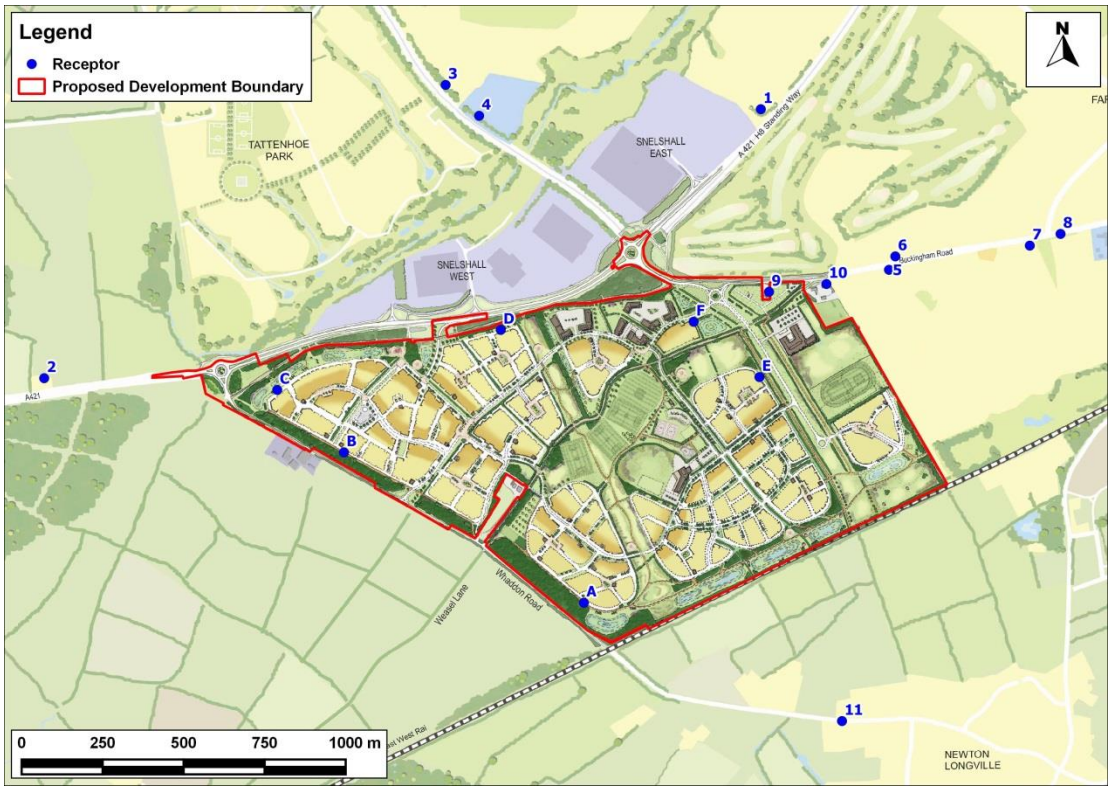
7.38 Eleven existing residential properties have been identified as receptors for the assessment. Six additional receptor locations have also been identified within the new development, which represent worst-case exposure to existing sources. These locations are described in Table 7.2 and shown in Figure 7.1.

Table 7.2:Description of Receptor Locations

Receptor	Description [a]
Existing properties	
1	Residential property at 13 Penlee Rise
2	Residential property at Woodpond Farm
3	Residential property at 19 Lands End Grove
4	Giles Brook School
5	Residential property at 34 Thrisk Gardens
6	Residential property at 89 Windmill Hill Drive
7	Residential property at 1 Ascot Place
8	Residential property at 19-24 Knaresborough Court
9	Residential property at New Leys
10	Residential property at Dagnall House
11	Residential property at 84 Whaddon Road
New properties	
A	Residential Area within the proposed development.
B	Residential Area within the proposed development.
C	Residential Area within the proposed development.
D	Residential Area within the proposed development.
E	Residential Area within the proposed development.
F	Residential Area within the proposed development.

[a] All receptors modelled at a height of 1.5 m.

Figure 7.1: Receptor Locations



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Assessment Scenarios

7.39 Predictions of nitrogen dioxide, PM_{10} and $PM_{2.5}$ concentrations have been carried out for a base year (2015), and a future year (2018). For 2018, predictions have been made assuming both that the development does proceed (With Scheme), and does not proceed (Without Scheme). In addition to the set of 'official' predictions, a sensitivity test has been carried out for nitrogen dioxide that involves assuming much higher nitrogen oxides emissions from certain vehicles than have been predicted by Defra, using the CURED tool (Ref 7.23). This is to address the potential under-performance of emissions control technology on modern diesel vehicles (Ref 7.24).

Modelling Methodology

7.40 Concentrations have been predicted for the baseline and future years using the ADMS-Roads dispersion model. Details of the model inputs and the model verification are provided in Appendix 7.4, together with the method used to derive current and future year background pollutant concentrations.

Traffic Data

7.41 Traffic data for the assessment have been provided by Mouchel, who have undertaken the Transport Assessment for the proposed development. Further details of the traffic data used in this assessment are provided in Appendix 7.4.

Uncertainty in Road Traffic Modelling Predictions

7.42 There are many components that contribute to the uncertainty of modelling predictions. The road traffic emissions dispersion model used in this assessment is dependent upon the traffic data that have been input, which will have inherent uncertainties associated with them. There are then additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms.

7.43 Predicting pollutant concentrations in a future year will always be subject to great uncertainty. It is necessary to rely on a series of projections provided by DfT and Defra as to what will happen to traffic volumes, background pollutant concentrations and vehicle emissions.

7.44 Historically, large reductions in nitrogen oxides emissions have been projected, which has led to significant reductions in nitrogen dioxide concentrations from one year to the next being predicted. Over time, it was found that trends in measured concentrations did not reflect the rapid reductions that Defra and DfT had predicted (Ref 7.25). This was evident across the UK, although the effect appeared to be greatest in inner London; there was also considerable inter-site variation. Emission projections over the 6 to 8 years prior to 2009 suggested that both annual mean nitrogen oxides and nitrogen dioxide concentrations should have fallen by around 15-25%, whereas monitoring data showed that concentrations remained relatively stable, or even showed a slight increase. Analysis of more recent data for 23 roadside sites in London covering the period 2003 to 2012 showed a weak downward trend of around 5% over the ten years (Ref 7.26), but this still falls short of the improvements that had been predicted at the start of this period.

7.45 The reason for the disparity between the expected concentrations and those measured relates to the on-road performance of modern diesel vehicles. New vehicles registered in the UK have had to meet progressively tighter European type approval emissions categories, referred to as "Euro" standards. While the nitrogen oxides emissions from newer vehicles should be lower than those from equivalent older vehicles, the on-road performance of some modern diesel vehicles has often been no better than that of earlier models. This has been compounded by an increasing proportion of nitrogen dioxide in the nitrogen oxides emissions, i.e. primary nitrogen dioxide, which has a significant effect on roadside concentrations (Ref 7.25) (Ref 7.26).

7.46 A detailed analysis of emissions from modern diesel vehicles has been carried out (Ref 7.24). This shows that, where previous standards had limited on-road success, the 'Euro VI' and 'Euro 6' standards that new vehicles have had to comply with from 2013/16[2] are delivering real on-road improvements. A detailed comparison of the predictions in Defra's latest Emission Factor Toolkit (EFT v6.0.2) against the results from on-road emissions tests has shown that Defra's latest predictions still have the potential to under-predict emissions from some vehicles, albeit by less than has historically been the case (Ref 7.24). In order to account for this potential under-prediction, a sensitivity test has been carried out in which the emissions from Euro IV, Euro V, Euro VI, and Euro 6 vehicles have been uplifted as described in Paragraph 11.4.5 in Appendix 7.4, using the CURED tool (Ref 7.23). The results from this sensitivity test are likely to over-predict emissions from vehicles in the future (Ref 7.24) and thus provide a reasonable worst-case upper-bound to the assessment.

7.47 It must also be borne in mind that the predictions in 2018 are based on worst-case assumptions regarding the increase in traffic flows, such that all committed developments and the proposed development, are assumed to be fully operational. In reality, the proposed development is not expected to be complete until at least 2026. This will have overestimated the traffic emissions and hence the concentrations in 2018.

Baseline Conditions

Industrial sources

7.48 A search of the UK Pollutant Release and Transfer Register (Ref 7.18) and Environment Agency's 'what's in your backyard' (Ref 7.19) websites identified the Bletchley Landfill Site within 1 km of the proposed development. The active filling area of the landfill is over 1 km from the application site, and is downwind of the application site with regard to the prevailing wind. It is, therefore, considered highly unlikely that there will be dust impacts at the application site, and any odour emissions are considered unlikely to cause annoyance to future residents of the scheme at such a distance.

7.49 Food processing operations with releases to air have been identified at Steinbeck Crescent, to the north of the application site on the other side of the A421; however, pollutant emissions are low and are unlikely to significantly affect air quality at the proposed development.

[2] Euro VI refers to heavy duty vehicles, while Euro 6 refers to light duty vehicles. The timings for meeting the standards vary with vehicle type and whether the vehicle is a new model or existing model.

Air Quality Review and Assessment

7.50 AVDC has investigated air quality within its area as part of its responsibilities under the LAQM regime. AVDC has declared AQMAs for nitrogen dioxide that cover three areas in Aylesbury Town Centre. The existing AQMAs are approximately 18 km south of the application site, and will not be affected by development traffic.

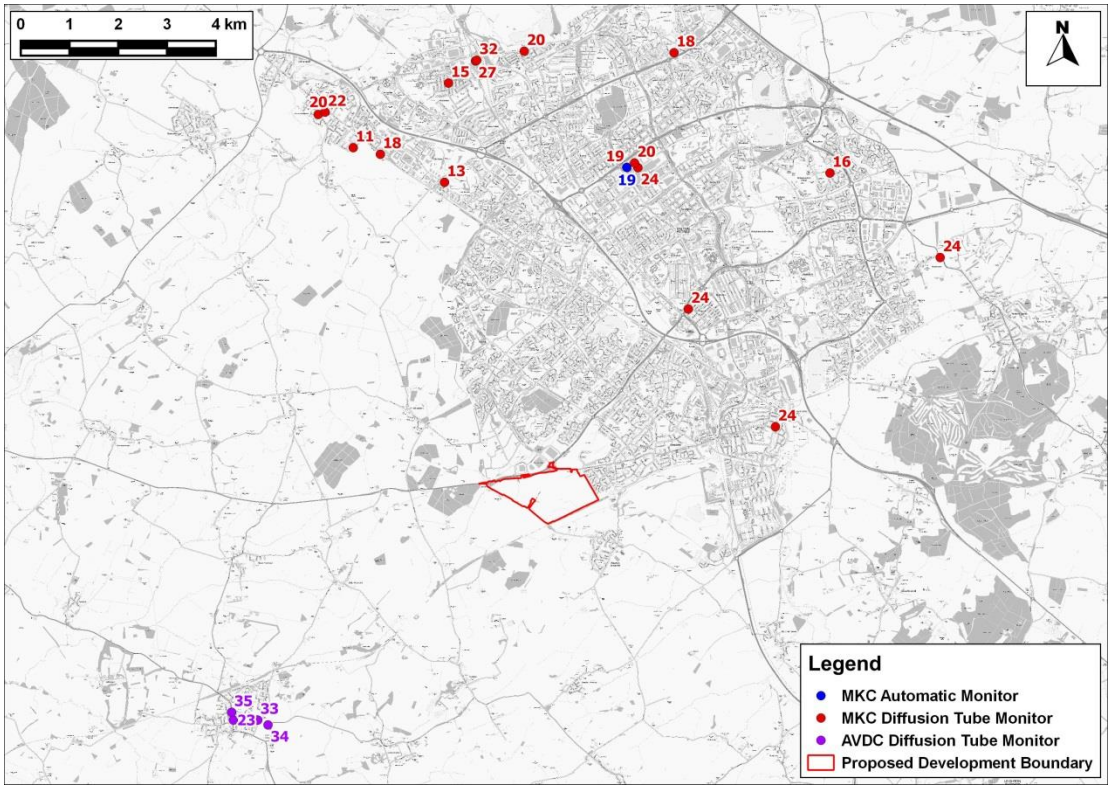
7.51 MKC has declared an AQMA in the centre of Olney that covers the High Street South, and parts of Bridge Street and Market Place. Olney is approximately 20 km north of the application site, and will not be affected by development traffic.

7.52 In terms of PM_{10}, AVDC and MKC concluded that there are no exceedences of the objectives. It is therefore highly unlikely that existing PM_{10} levels will exceed the objectives within the study area.

Local Air Quality Monitoring

7.53 AVDC operates two automatic monitoring stations within its area. These are in Aylesbury, over 18 km from the proposed development. AVDC also operates a number of nitrogen dioxide monitoring sites; however, none of these are close to the application site either, with the nearest being in Winslow, over 6 km away. MKC operates three automatic monitoring stations; again none of these sites are especially close to the application site. None of MKC's diffusion tube monitoring sites are located close to the application site either, with the nearest being some 4 km away. The monitoring locations closest to the proposed development are shown in Figure 7.2 along with their measured annual mean nitrogen dioxide concentrations in 2014 (the most recent data available). These data have been taken from AVDC's 2015 Updating and Screening Assessment (Ref 7.27) and MKC's 2015 Updating and Screening Assessment (Ref 7.28).

Figure 7.2: Monitoring Locations & 2014 Annual Mean NO_2 Concentrations ($\mu g/m^3$)



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7.54 The monitoring results show that nitrogen dioxide concentrations in and around Milton Keynes are generally very low. Just one site in Milton Keynes measured an annual mean nitrogen dioxide concentration above 30 $\mu g/m^3$ in 2014 and there were no sites with an exceedence of the objective level of 40 $\mu g/m^3$. Concentrations were also all below the objective in Winslow, as measured by AVDC, in 2014.

7.55 Measured annual mean PM_{10} concentrations in Milton Keynes in 2014 were all below 20 $\mu g/m^3$, indicating that there is very little risk of an exceedence of the PM_{10} objectives in the study area. No monitoring of PM_{10} concentrations is undertaken by AVDC and no monitoring of $PM_{2.5}$ concentrations is undertaken by AVDC or MKC.

Background Concentrations

National Background Pollution Maps

7.56 In addition to these locally measured concentrations, estimated background concentrations in the study area have been determined for 2015 and the opening year 2018 (Table 7.3). The derivation of background concentrations is described in Appendix 7.4. The background concentrations are all well below the objectives.

Table 7.3: Estimated Annual Mean Background Pollutant Concentrations in 2015 and 2018 (µg/m^3)

Year	NO_2	PM_{10}	$PM_{2.5}$
2015	10.6 - 14.2	16.6 - 18.0	11.1 - 11.7
2018[a]	9.5 - 12.5	16.2 – 17.6	10.7 – 11.3
2018 Worst-Case Sensitivity Test[b]	*9.5 - 12.8*	*n/a*	*n/a*
Objectives	**40**	**40**	**25**[c]

n/a = not applicable. The range of values is for the different 1x1 km grid squares covering the study area.

[a] In line with Defra's forecasts.

[b] Assuming higher emissions from modern diesel vehicles as described in Appendix 7.4.

[c] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Exceedances of EU Limit Value

7.57 There are no AURN monitoring sites within the study area with which to identify exceedances of the annual mean nitrogen dioxide limit value. The national maps of roadside annual mean nitrogen dioxide concentrations (Ref 7.21), used to report exceedances of the limit value to the EU, do not identify any exceedances within the study area. Defra's mapping for 2020 (Ref 7.22), which takes account of the measures contained in its 2015 Air Quality Plan (Ref 7.8), does not identify any exceedances within the study area either.

Baseline Dispersion Model Results

7.58 Baseline concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ have been modelled at each of the existing receptor locations (see Figure 7.1 and Table 7.2). The results, which cover both the existing (2015) and future year (2018) baselines, are set out in Table 7.4 and Table 7.5. The predictions for nitrogen dioxide include a sensitivity test which accounts for the potential under-performance of emissions control technology on modern diesel vehicles.

Table 7.4: Modelled Annual Mean Baseline Concentrations of Nitrogen Dioxide at Existing Receptors (µg/m^3)

Receptor	2015 [a]	2018 Without Scheme [a]	*Worst-case Sensitivity Test* [b]	
			2015	*2018 Without Scheme*
1	14.3	12.6	*14.5*	*13.1*
2	15.2	13.1	*15.5*	*13.8*
3	12.1	10.7	*12.2*	*10.9*
4	13.6	12.0	*13.7*	*12.3*
5	13.7	12.1	*13.7*	*12.5*
6	15.0	13.3	*15.0*	*13.7*
7	15.8	14.0	*15.9*	*14.5*
8	15.7	13.9	*15.7*	*14.4*
9	12.9	11.4	*12.9*	*11.7*
10	13.4	11.9	*13.4*	*12.2*
11	12.8	11.2	*13.2*	*11.7*
Objective	**40**			

[a] In line with Defra's forecasts.

[b] Assuming higher emissions from modern diesel vehicles as described in Appendix 7.4.

Table 7.5: Modelled Annual Mean Baseline Concentrations of PM_{10} and $PM_{2.5}$ at Existing Receptors ($\mu g/m^3$)

Receptor	PM_{10}		$PM_{2.5}$	
	2015	2018 Without Scheme	2015	2018 Without Scheme
1	18.2	17.8	11.8	11.4
2	17.8	17.4	11.7	11.4
3	17.1	16.7	11.4	11.0
4	18.1	17.6	11.7	11.3
5	17.1	16.6	11.5	11.1
6	17.6	17.2	11.7	11.4
7	17.8	17.4	11.8	11.5
8	17.8	17.3	11.8	11.4
9	17.5	17.0	11.5	11.1
10	17.0	16.6	11.4	11.1
11	17.5	17.0	11.4	11.1
Objective / Criterion	**32** [a]	**32** [a]	**25** [b]	**25** [b]

[a] While the annual mean PM_{10} objective is 40 $\mu g/m^3$, 32 $\mu g/m^3$ is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} concentration is possible, as outlined in LAQM.TG16 (Ref 7.1). A value of 32 $\mu g/m^3$ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Ref 7.16).

[b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

7.59 The predicted baseline concentrations of all three pollutants are well below the objectives in 2015 and 2018 at all receptor locations. These results are consistent with the conclusions of AVDC and MKC in the outcomes of their air quality review and assessment work, which suggests that there should be no objective exceedances in the area.

Likely Significant Effects

Construction Impacts

7.60 The construction works will give rise to a risk of dust impacts during earthworks and construction, as well as from track out of dust and dirt by vehicles onto the public highway. Step 1 of the assessment procedure is to screen the need for a detailed assessment. There are receptors within the distances set out in the guidance (see Appendix 7.1), thus a detailed assessment is required. The following section sets out Step 2 of the assessment procedure.

Potential Dust Emission Magnitude

Demolition

7.61 There is no requirement for demolition on site.

Earthworks

7.62 The characteristics of the soil at the development site have been defined using the British Geological Survey's UK Soil Observatory website (Ref 7.29), as set out in Table 7.6. Overall it is considered that, when dry, this soil has the potential to be moderately dusty.

Table 7.6: Summary of Soil Characteristics

Category	Record
Soil layer thickness	Deep
Grain Size (and Soil Parent Material)	Mixed (Argillic [a] – Rudaceous [b])
European Soil Bureau Description	Glacial Till
Soil Group	Medium to Heavy
Soil Texture	Loam [c] to Clayey Loam

[a] Typical particle size < 0.06 mm

[b] Typical particle size > 2 mm

[c] a loam is composed mostly of sand and silt.

7.63 The site covers some 140 hectares and most of this will be subject to earthworks, involving the levelling and preparation of the site for construction. The earthworks will last approximately six months, and dust will arise mainly from vehicles travelling over unpaved ground and the handling of dusty materials. There will be up to 10 heavy earth moving vehicles active at any one time. Approximately 10-20,000 tonnes of material will be moved, and, as identified in Paragraph 7.62, the soil has

the potential to be moderately dusty. Most of the earthworks will though involve the removal of subsoil, which will largely be damp and not prone to creating dust. Based on the example definitions set out in Table A11.1.1 (Appendix 7.1), the dust emission class for the earthworks is considered to be *large*.

Construction

7.64 Construction will involve up to up to 1,855 dwellings, 2 Ha of employment use (B1), a neighbourhood area comprising retail and community use, a primary and secondary school, and all associated infrastructure. Dust will arise from vehicles travelling over unpaved ground, the handling and storage of dusty materials, and from the cutting of concrete. The construction will take place over a ten-year period. Based on the example definitions set out in Table A11.1.1 (Appendix 7.1), the dust emission class for construction is considered to be *large*.

Trackout

7.65 The number of vehicles accessing the site, which may track out dust and dirt, is currently unknown, but given the large size of the site it is likely that there will be between 25-100 vehicle movements per day. The site access for vehicles during the construction phase is also unknown. There are likely to be relatively large lengths of unpaved haul roads within the site. Based on the example definitions set out in Table A11.1.1 (Appendix 7.1), the dust emission class for trackout is considered to be *large.*

7.66 Table 7.7 summarises the dust emission magnitude for the proposed development.

Table 7.7: Summary of Dust Emission Magnitude

Source	Dust Emission Magnitude
Earthworks	Large
Construction	Large
Trackout	Large

Sensitivity of the Area

7.67 This assessment step combines the sensitivity of individual receptors to dust effects with the number of receptors in the area and their proximity to the site. It also considers additional site-specific factors such as topography and screening, and in the case of sensitivity to human health effects, baseline PM_{10} concentrations.

Sensitivity of the Area to Effects from Dust Soiling

7.68 The IAQM guidance explains that residential properties are 'high' sensitivity receptors to dust soiling (see Table A11.1.2 in Appendix 7.1). There are around 30 receptors within 20 m of the site boundary, and over 100 residential properties within 100 m of the site, although these are almost all clustered at the eastern boundary, with only two residential properties within 100 m elsewhere. There are a few medium sensitivity parks and places of work to the north of the site, within 100 m. Using the matrix set out in Table 7.1.3 (Appendix 7.1), the area adjacent to the eastern boundary of the site is of 'high' sensitivity to dust soiling, but most of the rest of the site is of 'low' sensitivity. As such, overall, the area surrounding the on-site works is considered to be of 'medium' sensitivity.

7.69 Table 7.7 shows that dust emission magnitude for trackout is 'medium' and Table 7.1.3 (Appendix 7.1) thus explains that there is a risk of material being tracked 200 m from the site exit. Most construction vehicles will use the A421, accessing it via one of the three proposed new access points to the application site. There are no residential properties at all along these roads within 200 m of these site access points. There are a few industrial units with associated parking, and some parkland, which would be classed as being of 'medium' sensitivity. Table 7.1.3 (Appendix 7.1) thus indicates that the area is of 'low' sensitivity to dust soiling due to trackout.

7.70 In summary, it is judged that the area surrounding the onsite works is of 'medium' sensitivity to dust soiling, while the area surrounding roads along which material may be tracked from the site is of 'low' sensitivity.

Sensitivity of the Area to any Human Health Effects

7.71 Residential properties are also classified as being of 'high' sensitivity to human health effects. The IAQM matrix in Table 7.1.4 (Appendix 7.1) requires information on the baseline annual mean PM_{10} concentration in the area. Receptor 9 in Table 7.2 and Figure 7.1 is the closest existing receptor to the site. The maximum predicted baseline PM_{10} concentration at this receptor is 17.5 $\mu g/m^3$ (Table 7.5), and this value has been used. Using the matrix in Table 7.1.4 (Appendix 7.1), the area surrounding the onsite works and the area surrounding roads along which material may be tracked from the site are both of 'low' sensitivity to human health effects.

Sensitivity of the Area to any Ecological Effects

7.72 The guidance only considers designated ecological sites within 50 m to have the potential to be impacted by the construction works. There are no designated ecological sites within 50 m of the site boundary or those roads along which material may be tracked, thus ecological impacts will not be considered further.

Summary of the Area Sensitivity

7.73 Table 7.8 summarises the sensitivity of the area around the proposed construction works.

Table 7.8: Summary of the Area Sensitivity

Effects Associated With:	Sensitivity of the Surrounding Area	
	On-site Works	Trackout
Dust Soiling	Medium Sensitivity	Low Sensitivity
Human Health	Low Sensitivity	Low Sensitivity

Risk and Significance

7.74 The dust emission magnitudes in Table 7.7 have been combined with the sensitivities of the area in Table 7.8 using the matrix in Table 7.1.6 (Appendix 7.1), in order to assign a risk category to each activity. The resulting risk categories for the four construction activities, without mitigation, are set out in Table 7.9. These risk categories have been used to determine the appropriate level of mitigation as set out later in this chapter (step 3 of the assessment procedure).

Table 7.9: Summary of Risk of Impacts Without Mitigation

Source	Dust Soiling	Human Health
Earthworks	Medium Risk	Low Risk
Construction	Medium Risk	Low Risk
Trackout	Low Risk	Low Risk

7.75 The IAQM does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally not be significant (Ref 7.17).

Operational Road Traffic Impacts

7.76 Predicted annual mean concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ are set out in Table 7.11 and Table 7.12 for both the “Without Scheme” and “With Scheme” scenarios. These tables also describe the impacts at each receptor using the impact descriptors given in Appendix 7.2. For nitrogen dioxide, results are presented for two scenarios so as to include a worst-case sensitivity test.

Table 7.10: Predicted Impacts on Annual Mean Nitrogen Dioxide Concentrations in 2018 (µg/m^3)

Receptor	Without Scheme [a]	With Scheme [a]	% Change [a,b]	Impact Descriptor [a]	*Worst-case Sensitivity Test* [c]			
					Without Scheme	*With Scheme*	*% Change* [b]	*Impact Descriptor*
1	12.6	12.8	0	Negligible	*13.1*	*13.3*	*1*	*Negligible*
2	13.1	13.3	0	Negligible	*13.8*	*14.0*	*1*	*Negligible*
3	10.7	10.8	0	Negligible	*10.9*	*11.0*	*0*	*Negligible*
4	12.0	12.1	0	Negligible	*12.3*	*12.5*	*0*	*Negligible*
5	12.1	12.4	1	Negligible	*12.5*	*12.8*	*1*	*Negligible*
6	13.3	13.4	0	Negligible	*13.7*	*13.9*	*1*	*Negligible*
7	14.0	14.3	1	Negligible	*14.5*	*14.9*	*1*	*Negligible*
8	13.9	14.1	1	Negligible	*14.4*	*14.7*	*1*	*Negligible*
9	11.4	11.7	1	Negligible	*11.7*	*12.1*	*1*	*Negligible*
10	11.9	12.1	1	Negligible	*12.2*	*12.5*	*1*	*Negligible*
11	11.2	11.5	1	Negligible	*11.7*	*12.1*	*1*	*Negligible*
Objective	**40**		**-**	**-**	***40***		**-**	**-**

[a] In line with Defra's forecasts.

[b] % changes are relative to the objective and have been rounded to the nearest whole number.

[c] Assuming higher emissions from modern diesel vehicles as described in Appendix 7.4.

Table 7.11: Predicted Impacts on Annual Mean PM_{10} Concentrations s in 2018 ($\mu g/m^3$)

Receptor	Annual Mean PM_{10} ($\mu g/m^3$)			
	Without Scheme	With Scheme	% Change [a]	Impact Descriptor
1	17.8	17.8	0	Negligible
2	17.4	17.5	0	Negligible
3	16.7	16.7	0	Negligible
4	17.6	17.7	0	Negligible
5	16.6	16.7	0	Negligible
6	17.2	17.2	0	Negligible
7	17.4	17.4	0	Negligible
8	17.3	17.4	0	Negligible
9	17.0	17.1	0	Negligible
10	16.6	16.6	0	Negligible
11	17.0	17.1	0	Negligible
Criterion	**32** [b]		**-**	-

[a] % changes are relative to the objective and have been rounded to the nearest whole number.

[b] While the annual mean PM_{10} objective is 40 $\mu g/m^3$, 32 $\mu g/m^3$ is the annual mean concentration above which an exceedence of the 24-hour mean PM_{10} concentration is possible, as outlined in LAQM.TG16 (Ref 7.1). A value of 32 $\mu g/m^3$ is thus used as a proxy to determine the likelihood of exceedence of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Ref 7.16).

Table 7.12: Predicted Impacts on Annual Mean $PM_{2.5}$ Concentrations in 2018 ($\mu g/m^3$)

Receptor	Annual Mean $PM_{2.5}$ ($\mu g/m^3$)			
	Without Scheme	With Scheme	% Change [a]	Impact Descriptor
1	11.4	11.4	0	Negligible
2	11.4	11.4	0	Negligible
3	11.0	11.0	0	Negligible
4	11.3	11.3	0	Negligible
5	11.1	11.1	0	Negligible
6	11.4	11.4	0	Negligible
7	11.5	11.5	0	Negligible
8	11.4	11.5	0	Negligible
9	11.1	11.2	0	Negligible
10	11.1	11.1	0	Negligible
11	11.1	11.1	0	Negligible
Objective	**25 [b]**		**-**	-

[a] % changes are relative to the objective and have been rounded to the nearest whole number.

[b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

7.77 The annual mean nitrogen dioxide concentrations are well below the objective at all receptors. The percentage changes in concentrations, relative to the air quality objective (when rounded), are predicted to be 0% or 1% at all receptors. Using the matrix in Table A11.2.1 (Appendix 7.2), these impacts are described as *negligible*.

7.78 Nitrogen dioxide concentrations are higher in the sensitivity test scenario, but remain well below the objective at all receptors. The percentage changes in concentrations are still all 0% or 1% and the resultant impacts are all *negligible*.

7.79 In terms of PM_{10} and $PM_{2.5}$, concentrations are again well below the objectives at all receptors. The percentage changes in concentrations, relative to the air quality objective (when rounded), are predicted to be 0% at all receptors and the resultant impacts are all *negligible*.

Impacts on the Development

7.80 Predicted air quality conditions for residents of the proposed development are set out in Table 7.13 (see Figure 7.1 for receptor locations). All of the values are well below the objectives. Air quality for future residents within the development will thus be acceptable.

Table 7.13: Predicted Concentrations of Nitrogen Dioxide (NO_2), PM_{10} and $PM_{2.5}$ in 2018 for New Receptors in the Development Site

Receptor	Annual Mean NO_2 (µg/m^3)		Annual Mean PM_{10} (µg/m^3) [a]	Annual Mean $PM_{2.5}$ (µg/m^3)
	'Official' Prediction [a]	*Worst-case Sensitivity Test* [b]		
A	9.9	*10.2*	16.3	10.8
B	12.9	*13.4*	17.4	11.3
C	13.0	*13.4*	17.4	11.3
D	11.9	*12.4*	17.1	11.2
E	11.0	*11.3*	16.9	11.1
F	11.7	*12.1*	17.1	11.1
Objective / Criterion	**40**		**32** [c]	**25** [d]

[a] In line with Defra's forecasts.

[b] Assuming higher emissions from modern diesel vehicles as described in Appendix 7.4.

[c] While the annual mean PM_{10} objective is 40 µg/m^3, 32 µg/m^3 is the annual mean concentration above which an exceedence of the 24-hour mean PM_{10} concentration is possible, as outlined in LAQM.TG16 (Ref 7.1). A value of 32 µg/m^3 is thus used as a proxy to determine the likelihood of exceedence of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Ref 7.16).

[d] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Significance of Operational Air Quality Impacts

7.81 The operational air quality impacts without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the

methodology set out in Appendix 7.2, and also takes into account the results of the worst-case sensitivity test for nitrogen dioxide. Future year concentrations are expected to lie between the two sets of results, but in order to provide a reasonable worst-case assessment, the judgement of significance focuses primarily on the results from the sensitivity test.

7.82 More specifically, the judgement that the air quality impacts will be 'not significant' without mitigation takes account of the assessment that:

- Concentrations of all pollutants will be well below the air quality objectives for all existing receptors and all of the impacts are predicted to be *negligible*; and
- Pollutant concentrations for future residents of the proposed development will be well below the objectives.

Mitigation Measures

Construction Impacts

7.83 Measures to mitigate dust emissions will be required during the construction phase of the development in order to minimise impacts upon nearby sensitive receptors.

7.84 The site has been identified as a Low to Medium Risk site, as set out in Table 7.9. Comprehensive guidance has been published by IAQM (Ref 7.17) detailing measures that should be employed, as appropriate, to reduce the impacts. This reflects best practice experience and has been used, together with the professional experience of the consultant who has undertaken the dust impact assessment, and its findings, to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in Appendix 7.5.

7.85 The mitigation measures should be written into a dust management plan (DMP). Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

Road Traffic Impacts

7.86 The assessment has demonstrated that there will be no exceedences of any of the objectives in the study area, including at the new properties within the Proposed Development, and that the scheme will have an insignificant impact on local air quality. It is thus not considered appropriate to propose any mitigation measures for this scheme.

Residual Effects

Construction Impacts

7.87 The IAQM guidance is clear that, with appropriate mitigation in place, the residual effect will normally be 'not significant'. The mitigation measures set out in Appendix 7.5 are based on the IAQM guidance. With these measures in place and effectively implemented the residual effects are judged to be insignificant.

7.88 The IAQM guidance recognises that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term dust annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will not be significant.

Road Traffic Impacts

7.89 The residual impacts will be the same as those identified in the Likely Significant Effects section of this chapter.

Cumulative Effects

7.90 The approach to the assessment of cumulative air quality effects is to allow for predicted traffic generation from a number of committed developments within the future baseline traffic flows used in the air quality assessment. This results in the assessment being based on worst-case potential future baseline conditions, which guarantees the maximum level of sensitivity to any changes in air quality resulting from traffic generated by the scheme (in accordance with the significance criteria for air quality set out in Appendix 7.2).

Summary

Construction Impacts

7.91 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emission. With these measures in place, it is expected that any residual effects will be 'not significant'.

Road Traffic Impacts

7.92 The air quality impacts associated with the operation of the proposed development have been assessed. Existing conditions within the study area show good air quality, with concentrations well below the air quality objectives.

7.93 The operational impacts of increased traffic emissions arising from the additional traffic on local roads, due to the development, have been assessed. Concentrations have been modelled for eleven worst-case receptors, representing existing

properties where impacts are expected to be greatest. In addition, the impacts of traffic from local roads on the air quality for future residents have been assessed at six worst-case locations within the new development itself. In the case of nitrogen dioxide, a sensitivity test has also been carried out which considers the potential under-performance of emissions control technology on modern diesel vehicles

7.94 It is concluded that concentrations of PM_{10} and $PM_{2.5}$ will remain well below the objectives at all existing receptors in 2018, whether the scheme is developed or not. This conclusion is consistent with the outcomes of the reviews and assessment reports prepared by AVDC and MKC, which show that exceedences of the PM_{10} objective are unlikely at any location. The scheme itself will have a negligible impact on local PM_{10} and $PM_{2.5}$ concentrations.

7.95 In the case of nitrogen dioxide, the annual mean concentrations will also remain below the objective at all existing receptors in 2018, whether the scheme is developed or not, and whether or not a worst-case assumption on NOx emissions from diesel vehicles is applied. Concentrations will increase by a maximum of 1% relative to the objective (when rounded) and the resultant impacts will all be negligible.

7.96 The impacts of local traffic emissions on the air quality for residents living in the proposed development have been shown to be acceptable at the worst-case locations assessed, with concentrations well below the air quality objectives.

7.97 The overall operational air quality impacts of the development are judged to be insignificant. This conclusion, which takes account of the uncertainties in future projections, in particular for nitrogen dioxide, is based on the concentrations being well below the objectives and impacts all being negligible.

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8. NOISE & VIBRATION (Section 12 of submitted Environmental Statement)

Introduction

8.1 This section assesses the noise and vibration impact of the proposed development as revised. It describes the methods used to assess the baseline conditions currently existing at the Application Site and within the surrounding areas, the potential direct and indirect noise and vibration impacts arising from construction activities, road traffic and noise associated with the employment uses of the development.

8.2 Any mitigation measures required to prevent, reduce or offset the impacts are outlined, and the residual impacts subsequently described.

Planning Policy Context

Local Planning Policy

8.3 This assessment takes into account Aylesbury Vale District Council Local Plan (AVDLP) Policies GP.8 (Ref 1) and GP.95 (Ref 2) and Milton Keynes Council (MKC) Policies D1 Impact of Development Proposals on Locality (Ref 8.3), T10 Traffic (Ref 4), and E9 Controlling the Risk of Pollution (Ref 5).

8.4 AVDLP Policy GP.8 states:

"Planning permission will not be granted where the proposed development would unreasonably harm any aspect of the amenity of nearby residents when considered against the benefits arising from the proposal. Where planning permission is granted, the Council will use conditions or planning obligations to ensure that any potential adverse impacts on neighbours are eliminated or appropriately controlled."

8.5 AVDLP Policy GP.95 states:

"In dealing with all planning proposals the Council will have regard to the protection of the amenities of existing occupiers. Development that exacerbates any adverse effects of existing uses will not be permitted."

8.6 MKC Policy D1 states:

"Planning permission will be refused for development that would be harmful for any of the following reasons:

(i) Additional traffic generation which would overload the existing road network or cause undue disturbance, noise or fumes;

(ii) Inadequate drainage, which would adversely affect surface water disposal, including flood control, or overload the existing foul drainage system;

(iii) An unacceptable visual intrusion or loss of privacy, sunlight and daylight

(iv) Unacceptable pollution by noise, smell, light or other emission to air, water or land;

(v) Physical damage to the site and neighbouring property including statutorily protected and other important built and natural features and wildlife habitats;

(vi) Inadequate access to, and vehicle movement within, the site."

8.7 MKC Policy T10 states:

"Planning permission will be refused for development if it would be likely to generate motor traffic:

(i) Exceeding the environmental or highway capacity of the local road network; or

(ii) Causing significant disturbance, noise, pollution or risk of accidents."

8.8 MKC Policy E9 states:

"Planning permission will be granted for industrial uses within employment areas if all of the following criteria are met:

(i) Ground water, surface water and soil are protected

(ii) Adequate controls are proposed to deal with air pollution and noise

(iii) Adequate controls are proposed to deal with vibration, smell, fumes, smoke, soot, ash, dust, grit, gases, heat, light and visual intrusion

(iv) The site and surrounding land are protected from contamination

(v) The proposed use is compatible with existing or potential surrounding uses"

Regional Planning Policy

8.9 There are no regional policies that relate to noise.

National Planning Policy

National Planning Policy Framework

8.10 The National Planning Policy Framework (NPPF) replaced Planning Policy Guidance Note 24 (PPG24) in March 2012. The guidance provided in the National Planning Policy Framework (NPPF) will form the basis for the assessment of the potential effects of noise upon the site. NPPF states in relation to noise affecting new developments 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 or land instability;*"

Planning Practice Guidance for Noise

8.11 The guidance provided in the Planning Practice Guidance for Noise (PPG) (March 2014) (Ref 6) accompanies the NPPF and will form the basis for the assessment of the potential effects of noise from the site upon nearby sensitive receptors. PPG states:

"*Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:*

- *Whether or not a significant adverse effect is occurring or likely to occur;*
- *Whether or not an adverse effect is occurring or likely to occur; and*
- *Whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation."

Noise Policy Statement for England

8.12 The Noise Policy Statement for England (NPSE) (2010) (Ref 7) states:

"The first aim of the Noise Policy Statement for England

*"Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development"***.**

The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development.

The second aim of the Noise Policy Statement for England

"Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

The second aim of the NPSE refers to the situation where the impact lies somewhere between Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed

Adverse Effect Level (SOAEL). It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.

The third aim of the Noise Policy Statement for England

"Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

This aim seeks, where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."

8.13 With regard to the noise generated by developments the NPSE does not make any reference to specific LOAELs or SOAELs. It is therefore considered that adherence to the guidance provided in the following British Standards and other documents would likely ensure that the above requirement of the NPSE is met:

- Environmental impact assessment guidance:
    - *Guidelines for Environmental Noise Impact Assessment* (Ref 8).
- Construction noise:
    - BS5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Noise.* Ref 9.
    - BS5228-2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Vibration*. Ref 10.
- Development related traffic noise:
    - *Technical Memorandum, Calculation of Road Traffic Noise*. Ref 11.
    - *Design Manual for Roads and Bridges*. Ref 8.
- Development related commercial/industrial noise:
    - BS4142:2014 *Methods for rating and assessing industrial and commercial sound*. Ref 13.
- Noise affecting a development site:

- British Standard 8233:2014 *Guidance on sound insulation and noise reduction for buildings*. Ref 14.

Assessment Scope

8.14 The scope of the assessment was as follows:

- Identification of the appropriate legislation, standards and guidance for the assessment of noise and vibration impacts.
- A review of the existing noise climate at the project site and at locally potentially sensitive properties.
- Qualitative assessment of construction noise and vibration impacts at local potentially sensitive receptors.
- Assessment of noise levels at a selection of receptors, which have the potential to be affected by an increase in noise level in future years as a result of the development, using CRTN and Design Manual for Roads and Bridges (DMRB) methodologies. The assessment uses the specified methodologies in order to predict noise level impacts specifically due to road traffic.
- Qualitative assessment of commercial/industrial noise impacts at local potentially sensitive receptors.
- Assessment of noise levels at the Application Site. The assessment uses the specified methodologies in order to predict noise level impacts specifically due to road and rail traffic.
- Provision of mitigation measures, as considered appropriate, in order to minimise any potential impacts arising from the development.

Relevant Standards for Assessment and Measurement

<u>Guidelines for Environmental Noise Impact Assessment</u>

8.15 This assessment will be conducted in accordance with The Guidelines for Environmental Noise Impact Assessment, produced by the Institute of Environmental Management and Assessment, and published in October 2014.

8.16 The guidelines address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. The guidelines provide specific support on how noise impact assessments fit within the Environmental Impact Assessment (EIA) process. They cover:

- How to scope a noise assessment.
- Issues to be considered when defining the baseline noise environment.
- Prediction of changes in noise levels as a result of implementing development proposals.
- Definition and evaluation of the significance of the effect of changes in noise levels.

8.17 The guidelines offer advice on how to establish the baseline noise level and suggest that "it is good practice to measure over short time periods even though the required assessment indictor is to be averaged over a longer period".

8.18 The guidelines also state that monitoring should be avoided when the wind speed exceeds 5ms-1, unusual temperature conditions, or when there is significant precipitation unless these are normal conditions for the area.

8.19 Cumulative effects are defined as:

"those that result from additive impacts caused by other past, present or reasonably foreseeable actions together with the plan, programme or project itself and synergistic effects (in combination) which arise from the reaction between impacts of a development plan, programme or project on different aspects of the environment."

BS5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise

8.20 Construction noise and vibration assessments are generally undertaken in accordance with BS5228-1:2009+A1:2014 Part 1: Noise and Part 2: Vibration. These standards refer to the need for the protection against noise and vibration of persons living and working in the vicinity of, and those working on, construction and open sites. It recommends procedures for noise and vibration control in respect of construction operations and aims to assist architects, contractors and site operatives, designers, developers, engineers, local authority environmental health officers and planners.

8.21 Noise and vibration can cause disturbance to processes and activities in neighbouring buildings and in certain extreme circumstances vibration can cause or contribute to building damage.

8.22 Whilst this assessment does not include a quantitative construction noise or vibration assessment reference will be made to this standard.

Calculation of Road Traffic Noise (CRTN)

8.23 The traffic noise calculations presented in this assessment will be undertaken in accordance with the former Department of Transport and Welsh Office memorandum Calculation of Road Traffic Noise (CRTN), published in 1988. This document sets out the UK standard methods and procedures to predict and measure road traffic noise. These procedures are necessary to enable entitlement under the Noise Insulation Regulations (1988) to be determined, but they also provide guidance appropriate to the calculation of traffic noise for more general applications, e.g. environmental appraisal of road schemes, highway design and land use planning.

8.24 In the UK, road traffic noise is predicted and measured in terms of a statistical measure, equivalent to the 90th percentile. Termed the LA10, this measure of noise is equivalent to the noise level exceeded for 10% of the measurement period. Most UK legislation that refers to road traffic noise uses this noise index over an 18 hour period, from 06:00 hours to 00:00 hours.

8.25 The source of traffic noise (the source line) is taken to be a line 0.5m above the carriageway level and 3.5m in from the nearside carriageway edge.

8.26 To be eligible for compensation under the Regulations the following three conditions must be met:

- Condition 1: Within 15 years of the new or altered highway being opened, noise from any highway must be greater than or equal to 68dB(A) $L_{A10,18\text{-}hour}$ (the noise level exceeded for 10% of the time in an eighteen hour period) at the façade.
- Condition 2: There must be at least a 1dB(A) increase in traffic noise level ($L_{A10,18,hour}$) within the 15-year period, compared to the noise level prior to construction of the new or altered highway.
- Condition 3: Post-construction, the $L_{A10,18,hour}$ noise level must increase by at least 1dB(A) within the 15-year period. The increase in noise level must be attributable the new or altered highway.

8.27 All three of the conditions listed above must be fulfilled for a residential property to be eligible for compensation and, once the scheme has been open to traffic for 12 months, claims can be submitted.

Design Manual for Roads and Bridges Volume 11 Section 3 Part 7

8.28 Volume 11, Section 3 Part 7 of DMRB provides guidance on the appropriate level of assessment to be used when assessing the noise and vibration impacts arising from projects that generate changes to road traffic, including new construction, improvements and maintenance. The document, which adheres to the calculation methodology detailed in the CRTN, looks at both temporary and permanent impacts and provides a methodology for assessing the magnitude of impacts.

8.29 A full DMRB assessment has not been completed as part of this assessment; rather a comparison of the baseline $L_{A10,18,hr}$ façade noise level in 2018 will be compared to the baseline plus development traffic $L_{A10,18,hr}$ façade noise level in 2026.

BS4142:2014 *Methods for rating and assessing industrial and commercial sound*

8.30 Industrial/commercial noise assessment is generally undertaken in accordance with BS4142:2014. This standard is intended to be used to assess the potential adverse impact of sound, of an industrial and/or commercial nature, at nearby sensitive receptor locations within the context of the existing sound environment.

8.31 Where the specific sound contains tonality, impulsivity and/or other sound characteristics penalties should be applied depending on the perceptibility. For tonality a correction of either 0, 2, 4 or 6dB should be added; for impulsivity a correction of either 0, 3, 6 or 9dB should be added and if the sound contains specific sound features which are neither tonal nor impulsive a penalty of 3dB should be added.

8.32 In addition, if the sound contains identifiable operational and non-operational periods, that are readily distinguishable against the existing sound environment, a further penalty of 3dB may be applied.

8.33 The assessment of impacts contained in BS4142:2014 is undertaken by comparing the sound rating level, i.e. the specific sound level of the source plus any penalties, to the measured representative background sound level immediately outside the sensitive receptor location. Consideration is then given to the context of the existing sound environment at the sensitive receptor location to assess the potential impact.

8.34 Once an initial estimate of the impact is determined, by subtracting the measured background sound level from the rating sound level, BS4142:2014 states that the following should be considered:

- Typically, the greater the difference, the greater the magnitude of the impact.
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. It is an indication that the specific sound source has a low impact when the rating level does not exceed the background sound level, depending on the context.

8.35 BS4142:2014 notes that:

"Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."

8.36 BS4142:2014 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

8.37 Whilst this assessment does not include a quantitative commercial/industrial noise or vibration assessment reference will be made to this standard.

BS8233:2014 Guidance on sound insulation and noise reduction for buildings noise assessment.

8.38 In order to assess the noise levels across the Application Site BS8233:2014 will be referred to. This standard is the provision of recommendations for the control of noise in and around buildings and will be used in this assessment to determine the impact of noise upon the proposed development. The standard suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate. The standard suggests suitable internal noise levels within different types of buildings, including residential dwellings, as shown in Table 8.1.

Table 8.1
Suitable Internal Noise Levels, dB

Activity	Location	07:00 to 23:00 $L_{Aeq,16hr}$	23:00 to 07:00 $L_{Aeq,8hr}$
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30

8.39 BS8233:2014 states that the recommended limits can be relaxed by up to 5dB "where development is considered necessary or desirable".

8.40 Whilst it may be considered desirable to achieve the BS8233:2014 recommended internal noise levels with windows open, it is stated that where the limit cannot be met with an open window *"there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level."*

8.41 It is therefore not essential that the recommended internal noise levels are achievable with open windows if suitable alternative means of ventilation can be provided.

8.42 With regards to external noise, Section 7.7.3.2 of BS8233:2014 states that:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB LAeq,T, with an upper guideline value of 55 dB LAeq,T which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the

convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited".

Assessment Methodology

8.43 Predictions are necessary when forecasting future impacts. Established good practice methods from the guidelines and standards listed above are used throughout this assessment to ensure that these predictions are as accurate as possible.

Construction Noise Assessment Methodology

8.44 There are currently no details of the construction activities likely to be taking place during construction of the development. This assessment has therefore taken a qualitative approach to the assessment of construction noise, recognising that whilst construction activities in close proximity to noise-sensitive receptors can result in very high noise levels these activities are temporary and intermittent in nature and disruption due to construction is a localised phenomenon.

Development Related Traffic Assessment Methodology

8.45 An assessment has been carried out using the Design Manual for Roads and Bridges Volume 11 Section 3 Part 7 methodology to determine the LA10,18hr façade noise level at a number of sensitive receptor locations. Data on traffic levels has been derived from the Milton Keynes Transport Model.

8.46 The calculations have been undertaken in accordance with the methodology detailed in CRTN which specifies a method for predicting future noise levels from traffic by using existing and forecast traffic level data to calculate future 18 hour L10. The traffic data required for the calculation is predicted 18 hour AAWT, percentage of HGV and speed of vehicles for the Do Minimum and Do Something scenarios.

Commercial/Industrial Impact Assessment Methodology

8.47 The potential exists for noise from the development to impact upon nearby sensitive receptors. The likely sources of noise within the development are:

- Possible fixed plant associated with the employment uses, local centre and school – heating, ventilation, air conditioning or refrigeration plant (HVAC).

8.48 Details of the likely occupants of the employment areas of the development are currently unknown and therefore details of the type, location and noise levels of any fixed plant are not currently available. It is also unknown whether the proposed secondary school will have any fixed plant associated with it.

8.49 For these reasons a qualitative rather than quantitative assessment of the potential impacts of operational noise has been undertaken.

8.50 It is not anticipated that there will be any significant sources of vibration within the development and therefore operational vibration has not been considered further within this report.

Noise Effects upon the Development Assessment Methodology

8.51 The assessment of the potential effects of noise upon the proposed development of the specified site for residential purposes is based on information provided within NPPF, PPG, NPSE and other appropriate guidance.

8.52 To determine noise from road and rail traffic at the site a noise model of the area has been developed using CadnaA®, a program used for the prediction and assessment of environmental noise.

Road Traffic

8.53 CadnaA® uses the principal methodology set out in the Calculation of Road Traffic Noise (1988), for determining the $L_{A10,T}$ noise level; the noise level that is exceeded for 10% of the time. To allow the BS8233:2014 assessment to be undertaken, the $L_{A10,18hr}$ noise levels require conversion to a $L_{Aeq,T}$.

8.54 For assessment purposes, the modelled $L_{A10,18hr}$ road traffic noise levels will be converted to a $L_{Aeq,T}$, the equivalent continuous sound level using the formulae presented in Table 8.2, as recommended in the '*Method for Converting the UK Road Traffic Noise Index $L_{A10,18hr}$ to the EU Noise Indices for Road Noise Mapping'* (2006). Ref 14.

Table 8.2
$L_{A10,18hr}$ conversion calculations

Time period	Non-motorway conversion	Motorway conversion
07:00 – 21:00	$L_{day} = 0.95 \times L_{A10,18hr} + 1.44$	$L_{day} = 0.98 \times L_{A10,18hr} + 0.09$
21:00 – 23:00	$L_{evening} = 0.97 \times L_{A10,18hr} - 2.87$	$L_{evening} = 0.89 \times L_{A10,18hr} + 5.08$
23:00 – 07:00	$L_{night} = 0.90 \times L_{A10,18hr} - 3.77$	$L_{night} = 0.87 \times L_{A10,18hr} + 4.24$
07:00 – 23:00	$L_{Aeq,16hr} = 10\log_{10}((12 \times (10^{Lday/10}) + 4 \times (10^{Levening/10})/16)$	

8.55 For this assessment, the non-motorway conversion calculations will be applied.

8.56 Traffic data for the baseline 2018 and the opening year of the development, 2026, has been supplied by the Client. The traffic data used in this assessment can be seen in Table 8.3.

Table 8.3
Traffic Data

Road	AAWT 2018	AAWT 2026	HGV %	(km/h)
Development Road	0	3476	5	50
Development Road	0	4700	5	50
1_Site access Whaddon Road	0	2373	5	50
2_Site Access	0	1487	5	50
3B_Access Road	0	2065	5	50
9C_ A421 Standing Way	27771	35322	5	94
4_A421 Standing Way Roundabout	27014	32990	5	50
4+5_Bottle Dump Roundabout	34348	44390	5	50
5_Whaddon Road	7334	11400	8	74
6_Whaddon Road	7334	10244	10	72
7+3_Development roundabout with Buckingham Road	9412	18611	5	50
3A_B4034 Buckingham Road	0	13070	1	67
3D_B4034 Buckingham Road	0	14796	1	67
8_A421	25815	32472	3	64
9A_H8_Standing Way	21523	29955	5	94
9D_H8_Standing Way	3801	5866	5	94

Railway Traffic

8.57 It is understood that the currently unused railway line at the southern boundary of the development is to be brought back into use and will carry passenger and freight traffic from 2017 onwards.

8.58 It is likely, therefore, that noise from rail traffic will impact upon proposed dwellings within the development at the southern boundary.

8.59 The exact numbers of rail movements proposed for the line are not currently known and therefore a reasonable worst case has been assumed with passenger

movements3 of 281 trains in the daytime and 5 at night. Freight movements4 are assumed at 45 trains in the daytime and up to 40 during the night.

8.60 Calculations have been performed using CadnaA noise modelling software which implements the Calculation of Railway Noise (CRN) methodology.

8.61 Guidance provided in BS 8233:2014 Guidance on sound insulation and noise reduction for buildings has been used in order to recommend levels of insulation required by the building façades of the proposed residential properties.

Significance Criteria

8.62 The Guidelines for Environmental Noise Impact Assessment address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. In accordance with the Guidelines the following must be determined:

- The noise impact.
- The noise effect.
- The significance of the effect.

Noise Impact

8.63 In accordance with the Guidelines the noise impact may be determined in the first instance by calculating the change in the noise level[5] and secondly by comparing the subsequent noise level with an absolute noise limit value[6].

Construction Impact

8.64 A quantitative assessment of construction activities will not be completed as the data required to complete this assessment has not been provided. However, for construction noise a qualitative reference will be made to the noise impact scale presented in the Design Manual for Roads and Bridges Volume 11 Section 3 Part 7 *Noise and Vibration* in Table 8.4. Whilst this table strictly relates to traffic noise, the noise bands may be applied to changes in the ambient noise level as a result of construction activities.

[3] Train Class C319 with a plus 16.1 correction to account for three carriages.
[4] Train Class Freightliner with a plus 12.3 correction to account for three carriages.
[5] Paragraphs 7.7 to 7.11 of the Guidance
[6] Paragraphs 7.54 to 7.66 of the Guidance

Table 8.4
Construction Noise - Change in Noise Level Noise Impact

Noise Impact	$L_{Aeq,T}$ dB Noise Change
None	0.0
Negligible	0.1 – 0.9
Minor	1.0 – 2.9
Moderate	3.0 – 4.9
Major	5.0 +

Development Related Traffic Impact

8.65 In this assessment the impact of the change in noise level from development related traffic will be determined with reference to the classification of magnitude of impacts used in short-term traffic noise assessments presented in the Design Manual for Roads and Bridges Volume 11 Section 3 Part 7 *Noise and Vibration*. The impact of the change in noise level is shown in Table 8.5.

Table 8.5
Operational Traffic and Construction Traffic Noise - Change in Noise Level Noise Impact

Noise Impact	$L_{A10,18hr}$ dB Noise Change
None	0.0
Negligible	0.1 – 0.9
Minor	1.0 – 2.9
Moderate	3.0 – 4.9
Major	5.0 +

8.66 In addition to the change in noise level the impact of the change in noise level from development related traffic will be assessed with reference to the absolute noise level encountered and how it compares to the prescribed limit value, which in this instance will be 68dB(A) $L_{A10,18\text{-hour}}$ as detailed in the Noise Insulation Regulations 1988. The impact scale presented in Table 8.6 will be adopted.

Table 8.6
Traffic Noise – Absolute Noise Level Noise Impact

Noise Impact	$L_{Aeq,T}$ dB Noise Change
None	No increase in the absolute noise level
Negligible	The existing absolute noise level increases but is below the guideline value
Minor	The existing absolute noise level increases but equals the guideline value
Moderate	The existing absolute noise level is above the guideline value and increases
Major	The existing absolute noise level increases from below the guideline value to a level that exceeds the guideline value

Commercial/Industrial Impact

8.67 A quantitative assessment of commercial/industrial activities will not be completed as the data required to complete this assessment has not been provided. However, a qualitative reference will be made to the noise impact scale in Table 8.7, which has been compiled with reference to BS4142:2014.

Table 8.7
Commercial/Industrial Noise – Change in Noise Level Noise Impact

Noise Impact	Difference Between the Rating Level and the Background Sound Level
None	-10.0
Negligible	-5.0
Minor	0.0
Moderate	+5.0
Major	+10.0

Noise Effects upon the Development Impact

8.68 With regards to the Noise impact upon the Application Site, as future residents would not be accustomed to the existing baseline noise environment at the site, only the absolute noise level will be referred to in the determination of the noise impact at the site. In this instance the absolute noise level will be assessed against the

daytime and night-time noise limits detailed in BS8233:2014. The impact scale presented in Table 8.8 will be adopted.

Table 8.8
Development - Absolute Noise Level Noise Impact

Noise Impact	$L_{Aeq,T}$ dB Noise Level
None	The existing absolute noise level is equal to or below the guideline value
Negligible	The existing absolute noise level is 0.1 – 0.9 above the guideline value
Minor	The existing absolute noise level is 1.0 – 2.9 above the guideline value
Moderate	The existing absolute noise level is 3.0 – 4.9 above the guideline value
Major	The existing absolute noise level is 5.0 + above the guideline value

Noise Effect

8.69 Generic noise effects are detailed in Table 7-7 of the Guidelines. Where an adverse impact is identified the Guidelines present the following generic relationship between noise impact[7] and noise effect:

- Negligible Impact Noise Effect: "*Noise impacts can be heard, but does not cause any change in behaviour or attitude, e.g. turning up volume on television; speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is perceived change in the quality of life*".
- Minor Impact Noise Effect: "*Noise impact can be heard and causes small changes in behaviour and/ or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Potential for non-awakening sleep disturbance. Affects the character of the area such that there is a perceived change in the quality of life*".
- Moderate Impact Noise Effect: "*Causes a material change in behaviour and/or attitude, e.g. voiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area*".
- Major Impact Noise Effect: "*Significant changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects e.g.*

[7] The magnitude descriptors have been changed in this Chapter to reflect those referred to in this assessment

regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory".

8.70 The significance of the noise effect will depend on the receptor type and its sensitivity to the noise impact. The sensitivity of the receiving environment is shown in Table 8.9.

Table 8.9
Sensitivity Criteria for Acoustic Receptors

Sensitivity	Definition
Very High	Residential properties (night-time) Schools and healthcare buildings (daytime)
High	Residential properties (daytime) SAC, SPA, SSSI (or similar areas of special interest)
Medium	Offices and other non-noise producing employment areas
Low	Industrial areas

The Significance of the Effect

8.71 The significance of the noise effect will only be determined in this chapter for the quantitative assessments completed, namely:

- Development related traffic assessment.
- Noise effect upon the development assessment.

8.72 The significance of the noise effect from development related traffic for existing residential receptors is shown in Table 8.10.

Table 8.10

Significance of Noise Effect From Development Related Traffic Upon Existing Residential Receptors

Increase in the $L_{Aeq,T}$ Noise Level	**No increase in the $L_{A10,18hr}$ noise level**	**The existing $L_{A10,18hr}$ noise level increases but is below the guideline value of 68dB(A)**	**The existing $L_{A10,18hr}$ noise level increases but equals the guideline value of 68dB(A)**	**The existing $L_{A10,18hr}$ noise level is above the guideline value of 68dB(A) and increases**	**The existing $L_{A10,18hr}$ noise level increases from below the guideline value of 68dB(A) to a level that exceeds the guideline value**
0.0	None	-	-	-	-
0.1 – 0.9	-	Negligible	Minor	Moderate	Major
1.0 – 2.9	-	Negligible	Minor	Moderate	Major
3.0 – 4.9	-	Minor	Moderate	Moderate	Major
5.0 +	-	Moderate	Moderate	Major	Major

8.73 The significance of the noise effect from the noise levels affecting future residents at the Application Site is shown in Table 8.11. The guideline values are as follows:

- Daytime external: 55dB(A) $L_{Aeq,T}$.
- Daytime internal: 40dB(A) $L_{Aeq,T}$.
- Night-time internal: 30dB(A) $L_{Aeq,T}$.

Table 8.11
Significance of Noise Effect for Development Residential Receptors

Noise Impact	$L_{Aeq,T}$ dB Noise Level
None	The existing absolute noise level is below the guideline value
Negligible	The existing absolute noise level is 0.1 – 0.9 above the guideline value
Minor	The existing absolute noise level is 1.0 – 2.9 above the guideline value
Moderate	The existing absolute noise level is 3.0 – 4.9 above the guideline value
Major	The existing absolute noise level is 5.0 + above the guideline value

8.74 For the qualitative construction and commercial/industrial assessments it will not be possible to determine the significance of the effect.

Baseline Noise Environment

Sensitive Receptors

8.75 For the purposes of this assessment, any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship that might be impacted in terms of noise or vibration by the proposed development can be said to be a sensitive receptor.

8.76 Locations were chosen to represent the receptors most likely to be impacted by the development.

Importance and Sensitivity of Affected Receptors

8.77 Taking into account the scale of the development and its situation, surrounded by an existing city environment in which noise levels are already at a high level, all receptors potentially affected by the development can be considered to be of local importance.

Measurement Locations

8.78 Based upon a desktop study of the potentially most affected properties eight No. noise measurement locations, within the site and close to the site, were selected to monitor existing noise levels. The monitoring locations are shown on Figure 8.1.

Figure 8.1
Monitoring Locations

Measurement Equipment and Conditions

8.79 On the monitoring dates (13th and 14th of March 2013) weather conditions were dry and calm with wind speeds below 5ms^{-1}.

8.80 Measurements were obtained using the following equipment:

- Norsonic Nor140 Type 1 sound level meter, Serial Number 1403010.
- Norsonic Type 1251 acoustic calibrator, Serial Number 1872.
- Norsonic Nor140 Type 1 sound level meter, Serial Number 1403009.
- Norsonic Type 1251 acoustic calibrator, Serial Number 31821.
- Cirrus CR 831B Serial Number, C17175FF.
- Cirrus CR 511E Serial Number, 036342.
- Cirrus CR171B Serial Number, G061698.
- Cirrus CR515, Serial Number 60608.

8.81 The sound level meters were appropriately calibrated before and after the measurements. At all locations the microphone was mounted on a tripod of height

1.2m and the ground condition at all locations could be classified as "soft ground". The instruments were configured with the time response set to fast. Measurements were obtained with 'A' weighting for $L_{Aeq,T}$ L_{Amax}, $L_{A90,T}$, and $L_{A10,T}$ at five minute intervals.

Existing Noise Sources and Sensitive Receptors

8.82 Ambient noise in the area is generally dominated by traffic on the surrounding roads (Standing Way, Buckingham Road and Whaddon Road).

8.83 Existing noise-sensitive receptors are predominantly the residential properties to the east of the proposed development off Wincanton Hill and Chepstow Drive which represent the eastern boundary of the proposed development, a property on Weasel Lane to the west and properties on Whaddon Road to the north-west.

8.84 These receptors will experience both operational and construction phase noise impacts from the development.

8.85 Details of the proposed nature of the development were reviewed to determine the appropriate timing and duration of noise surveys to assess existing ambient conditions. The following locations were chosen to undertake monitoring:

- Location 1 off Weasel Lane.
- Location 2 SW corner of site approximately 35m from Whaddon Road.
- Location 3 northern boundary with Standing Way.
- Location 4 near to residential properties on Hamilton Lane.
- Location 5 Weasel Lane near the junction with Buckingham Road.
- Location 6 at Leys Ground Farm off Whaddon Road.
- Location 7 at Blaydon Close.
- Location 8 at Hammond Park, Newton Longville.

8.86 Day and night-time noise measurements were undertaken at locations 1 – 4 and daytime only measurements were undertaken at locations 5 – 8.

8.87 The noise climate at each receptor is detailed below:

- Location 1 – Distant road traffic from Standing Way, occasional vehicles on Weasel Lane.
- Location 2 – Road traffic on Whaddon Road.
- Location 3 – Road traffic on Standing Way.
- Location 4 – Distant road traffic from Standing Way, occasional vehicles on Hamilton Lane.
- Location 5 – Road traffic on Buckingham Road, occasional vehicles on Weasel Lane, distant road traffic on Standing Way.

- Location 6 – Road traffic on Whaddon Road, distant road traffic on Standing Way.
- Location 7 – Occasional vehicle movements, dog walkers.
- Location 8 – Occasional dog walkers, vehicle movements, distant road traffic from Whaddon Road.

Existing Noise Levels

8.88 The results of the baseline noise surveys are summarised in Table 8.12 below:

Table 8.12 Results of Noise Monitoring, dB

Location	Period	$L_{Aeq,T}$	L_{A90}	L_{A10}	L_{AFmax}
Location 1	Daytime	54.3	50.8	55.2	80.7
	Night-time	49.7	42.6	50.3	63.5
Location 2	Daytime	60.5	44.7	53.1	74.3
	Night-time	46.1	38.1	45.5	67.5
Location 3	Daytime	58.8	54.4	60.1	77.2
	Night-time	54.2	45.1	54.5	68.5
Location 4	Daytime	49.1	45.3	49.9	66.3
	Night-time	45.3	38.9	45.5	61.4
Location 5	Daytime	63.6	57.3	66.5	75.2
Location 6	Daytime	67.5	59.1	71.5	80.7
Location 7	Daytime	48.0	40.1	49.3	61.4
Location 8	Daytime	47.6	39.6	47.4	66.0

Likely Significant Effects

Construction

Construction – On-Site

8.89 At this stage, the precise timetable and location of the construction plant and processes are not known. Due to the size of the development and the proximity of noise sensitive premises there exist a number of possible worst case scenarios of construction noise impact.

8.90 It is envisaged that the main construction activities likely to generate noise will comprise ground preparation, excavations for foundations, construction of new roads and buildings and the offloading of materials.

8.91 It is currently unknown whether piling will be required for the new development; however, given the predominantly residential nature of the development it is considered unlikely.

8.92 Details of the precise construction methodologies to be adopted, plant to be used, when (at what stage and at what times of the day), and where (at what stage of the construction process, location on site, time of day etc.) are not presently available. This information will allow predictions of potential construction noise impacts on local receptors to be made with some certainty. Therefore a qualitative approach has been considered within this assessment.

8.93 It is not likely that all construction processes would occur simultaneously and operate continuously. Also, different processes would occur at different areas of the construction site. However, the fact that the site extends right up to the gardens of the properties off Wincanton Hill and Chepstow Drive and surrounds the property on Weasel Lane means that the noise impact during construction may be Major (an increase in the ambient noise level of at least 5dB(A)) (see Table 8.4). As it has not been possible to undertake a quantitative assessment it is not possible to determine the significance of the noise effect. However, the impact would be of short to medium term duration only.

Construction – Off Site Vehicle Movements

8.94 The exact number of vehicle movements associated with the demolition and construction works i.e. deliveries, removal of waste, construction staff vehicles etc. cannot be determined precisely at this stage. However, Buckingham Road and Whaddon Road are likely to provide the main site entrances i.e. most likely to be used by the construction traffic. Currently these roads have an average annual daily traffic (AADT 24hr) flow of around 12500 and 7200 vehicles respectively. DMRB guidance suggests that a 25% increase in traffic levels is needed to produce a 1 dB increase in noise levels which equates to at least 1800 vehicle movements daily, a level which is considered unlikely to be generated by construction traffic.

8.95 Construction traffic is likely to increase the number of HGV movements along these roads and calculations show that to give a 3 dB increase in noise (i.e. a Moderate impact magnitude see Table 8.5) then HGV flows would need to increase by 100 vehicles per hour on Buckingham Road and 60 vehicles per hour on Whaddon Road which is considered unlikely given the timescales over which the development will be constructed. It is considered therefore that the worst case scale of impact upon local traffic levels and HGV percentages, and therefore noise levels, is Minor. As it has not been possible to undertake a quantitative assessment it is not possible to determine the significance of the noise effect. However, the impact would be of short to medium term duration only.

Construction - Vibration

8.96 No vibration impacts are anticipated since piling is unlikely to be required as part of the building foundation design. Localised ground improvement may be undertaken e.g. for road construction but these are considered unlikely to constitute a significant vibration source. Therefore the impact of construction vibration from the development is considered to be Negligible.

Operational Impacts

Development Related Traffic Noise

8.97 Based on the methodology outlined above the $L_{A10,18hr}$ façade noise level at a number of sensitive receptor locations has been determined for the baseline do minimum year 2018 and the future do something assessment year in 2026.

8.98 The $L_{A10,18hr}$ façade noise levels are compared in Table 8.13.

Table 8.13 Predicted Noise Levels from Vehicle Movements in and out of the development

Receptor	DM 2018, $L_{A10,18hr}$, dB	DS 2026, $L_{A10,18hr}$, dB	Change
Leys Grand Farm	70.8	72.7	+1.9
New Leys	62.0	62.4	+0.4
Dagnall House	66.0	65.9	-0.1
Manor Farm	63.4	64.9	+1.5

8.99 From Table 8.13 it can be seen that the changes in road traffic noise due to the proposed development will, at most, result in a change in the $L_{A10,18hr}$ façade noise level that represents a Minor impact (see Table 8.5).

8.100 The noise effects that may be associated with the impact are defined in this Chapter. The significance of the effect is at worst moderate at Leys Grand Farm (see Table 8.10).

Development Related Traffic Vibration

8.101 Once the development is operational, only a very small proportion of vehicles visiting the Site are likely to be HGVs. Therefore the potential for increased vibration levels is minimal and it is considered that the scale of impact of increased vibration levels is Negligible.

Commercial/Industrial Sources

8.102 If fixed plant is installed at the proposed schools (i.e. close to existing noise-sensitive receptors) without adequate mitigation or consideration of noise effects then the magnitude of impact at properties off Wincanton Hill and Chepstow Drive has the potential to be Major (a difference between the background sound level and the rating level of at least 10dB(A)) (see Table 8.7).

8.103 If fixed plant is installed at buildings within the proposed employment areas without adequate mitigation or consideration of noise effects then the magnitude of impact at existing properties off Wincanton Hill and Chepstow Drive and at proposed residential properties within the development close to the employment areas has the potential to be Major.

8.104 As it has not been possible to undertake a quantitative assessment it is not possible to determine the significance of the noise effect from commercial/industrial sources.

Noise effects upon the development

External Noise Levels

8.105 With the development masterplan for the site included within the noise model, the daytime external $L_{Aeq,16hr}$ noise environment at a height of 1.5m can be seen in Figure 8.2. The model includes both railway noise and road traffic noise.

Figure 8.2
External Daytime Noise Level, dB L_{Aeq}

8.106 It can be seen from Figure 8.2 that:

- The external ambient daytime noise level across the majority of the site is 55dB L_{Aeq} or below.
- At properties fronting the road network the external ambient daytime noise level exceeds 55dB $L_{Aeq.}$
- From a review of the noise model at properties fronting Standing Way the external ambient daytime noise level exceeds 60dB $L_{Aeq.}$

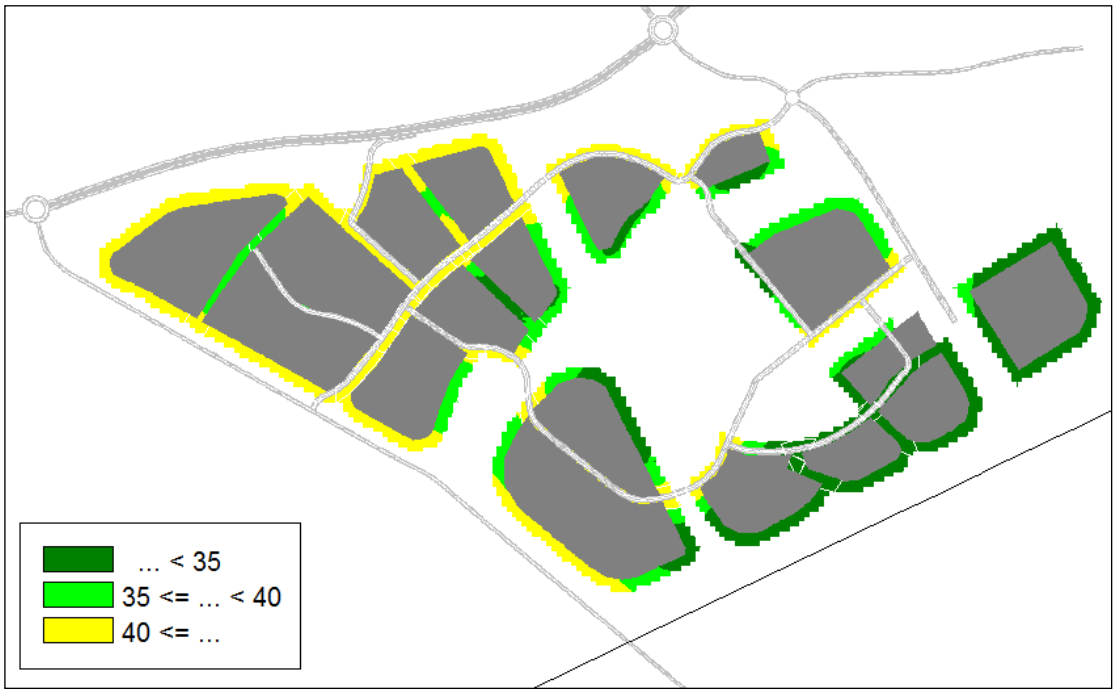
8.107 The impact of traffic noise in external amenity spaces is therefore considered to be at worst Major (Table 8.8) and the significance of the effect is Major (Table 8.11).

8.108 In order to reduce the noise level in those gardens fronting the road network it is recommended that the layout of the development should be designed such that the dwellings provide screening to their gardens and outdoor amenity areas.

Internal Noise Levels

8.109 The internal daytime noise level at each ground floor façade is shown on Figure 8.3. It is assumed that an open window will reduce external noise levels by 15dB(A).

Figure 8.3
Daytime Internal Noise Level, dB L_{Aeq}



8.110 It can be seen from Figure 8.3 that:

- For part of the site, the internal daytime noise level with an open window is less than 35dB L_{Aeq}. In these areas (shown in dark green) the BS8233:2014 limit for daytime resting will be met.
- At façades fronting the road network, the internal daytime noise level with an open window is more than 40dB L_{Aeq}, the limit for a dining room.
- From a review of the noise map at properties fronting Standing Way the internal ambient daytime noise level exceeds 45dB $L_{Aeq.}$

8.111 The impact of traffic noise in internal spaces is therefore considered to be at worst Major (Table 8.8) and the significance of the effect is Major (Table 8.11).

8.112 The internal night-time noise level at each property (at first floor) is shown on Figure 8.4. Again, it is assumed that an open window will reduce external noise levels by 15dB(A).

Figure 8.4
Night-time Internal Noise Level, dB L_{Aeq}

8.113 It can be seen from Figure 8.3 that:

- For part of the site, the internal night-time noise level with an open window is less than 30dB LAeq. In these areas (shown in dark green) the BS8233:2014 limit for night-time will be met.
- At other properties (shown yellow), the internal night-time noise level with an open window is more than 30dB LAeq.
- From a review of the noise map at properties fronting Standing Way the internall ambient daytime noise level exceeds 35dB $L_{Aeq.}$

8.114 The impact of traffic noise in internal spaces is therefore considered to be at worst Major (Table 8.8) and the significance of the effect is Major (Table 8.11).

Mitigation

Construction

8.115 Construction works are often subject to control by planning conditions. If complaints are received by the Local Authority regarding construction noise then notices under Part III of the Environmental Protection Act 1990 or Section 60 of the Control of Pollution Act 1974 can be served which can restrict construction works. The following measures will be used to control and minimise noise impacts from the construction activities for the project.

8.116 Given the absence of detailed information regarding construction methods and programmes, it is recommended that Best Practicable Means should be employed to minimise construction impacts and the following will be incorporated into the Construction Environment Management Plan (CEMP). These are the minimum standards that should be achieved during construction: Within the constraints of efficient site operations and the requirements of the relevant British Standards, the following will be adopted:

- Limit the use of particularly noisy plant, i.e. do not use particularly noisy plant early in the morning where avoidable.
- Limit the number of plant items in use at any one time.
- Plant maintenance operations should be undertaken as far away from noise-sensitive receptors as possible.
- Phasing the works to maximise the benefit from perimeter structures.
- Any compressors, generators etc. brought on to site should be silenced or sound reduced models fitted with acoustic enclosures.
- Reduce the speed of vehicle movements.
- All pneumatic tools should be fitted with silencers or mufflers.
- Ensure that operations are designed to be undertaken with any directional noise emissions pointing away from noise-sensitive receptors where practicable.
- When replacing older plant, ensure that the quietest plant available is considered wherever possible; any deliveries/waste removal vehicles should be programmed to arrive and depart during daytime hours only.
- Drop heights must be minimised when loading vehicles with rubble.
- Care should be taken when loading vehicles to minimise disturbance to local residents. Vehicles should be prohibited from waiting within the site with their engines running.

- All plant items should be properly maintained and operated according to the manufacturers' recommendations in such a manner as to avoid causing excessive noise. All plant should be sited so that the noise impact at nearby noise-sensitive properties is minimised.
- Local hoarding, screens or barriers should be erected as necessary to shield particularly noisy activities.
- Any problems concerning noise from construction works can sometimes be avoided by taking a considerate and neighbourly approach to relations with local residents.

8.117 Experience from other sites has shown that by implementing these measures, typical noise levels from construction works can be reduced by 5dB (A) or more.

8.118 With regards to training the contractor's site induction programme and site rules must include good working practice instructions for site staff/managers and contractors to help minimise noise and vibration whilst working on the site.

8.119 Good working practice guidance/instructions should include, but not be limited to, the following points:

- Avoid un-necessary revving of engines;
- Plant used intermittently should be shut-down between operational periods;
- Avoid reversing wherever possible;
- Drive carefully and within the site speed limit at all times; and
- Report any defective equipment/plant as soon as possible so that corrective maintenance can be taken.

8.120 With regards to maintenance weekly inspection of all plant shall be made to ensure that:

- Any plant found to be requiring interim maintenance should be identified by the operator and repairs undertaken by a qualified engineer as soon as possible.
- Regular and effective maintenance of plant can play an important part in keeping noise levels under control.
- Always ensure that doors fitted to acoustic enclosures around fixed plant remain closed, the fitting of self-closing mechanisms is advisable.

8.121 With regards to public relations it is essential to maintain good public relations with local residents in nearby noise-sensitive receptors. The following is advised:

- Get to know the neighbours, be concerned about them and try to understand their problems, encourage them to know the site personnel, listen as well as talk.
- Hold regular liaison meetings and provide information as freely as possible.
- Create a good impression by running a tidy and efficient site.

- Nominate a point of contact for issues relating to the site
- Support a liaison committee
- Give advance notice and explanation of activities that might cause complaint
- Keep systematic records of complaints and the remedial actions taken
- Follow up complaints with correspondence and action
- Ensure that site staff are environmentally aware and are trained to cope with issues
- Do not rely on the letter of the law where there are obvious problems but culpability cannot be easily proved; be prepared to be flexible
- Try to co-operate and avoid being adversarial.

8.122 If complaints are received the following details the actions which will be undertaken following a complaint being received, namely:

- A complaints response system shall be maintained by the construction contractor for the site enabling any complaints regarding noise to be reported and appropriate action taken.
- An investigation shall be instigated as soon as possible following receipt of the complaint to identify the cause of the complaint.
- Such an investigation may involve the identification and cessation of the activity or activities considered to be the cause of the complaint and/or the investigation of mitigation measures to reduce the noise emission levels from the activity or activities, for example the replacement of noisy plant with quieter alternatives and/or the use of temporary screening mounds.

8.123 Any deviation from agreed working practices shall be identified immediately and conformance to the working practice reinstated.

Operational

Development Related Traffic

8.124 Impacts from increased levels of road traffic can be minimised by the use of low-noise surfacing to the new grid road within the development.

Commercial/Industrial

8.125 Operational noise impacts can be significantly mitigated by attention to building materials, location of individual noise sources and use of screening and attenuation to control noise emissions.

8.126 A summary of the generic mitigation measures which will be adopted during the detailed design of the South West Milton Keynes development is detailed below.

8.127 In general, the following should be considered when detailed design is addressed:

- Careful siting of noise sources.
- Choice of HVAC and refrigeration plant.
- The provision of screening to delivery areas and HVAC plant.
- Choice of construction materials & sound insulation for the domestic buildings.
- Agreement of delivery hours with the local authority.
- Agreement with the local authority on opening hours of premises within the development.

8.128 Bearing in mind the above general considerations, the following are typical of the particular mitigation methods which will be applied to reduce the operational noise and vibration impacts on the sensitive receptors:

- All HVAC plant for the new employment uses, local centre and school will be sited at the facades of buildings that face away from any residential receptors, including new properties within the development itself. This will reduce the impact of this equipment on the environment to a low (negligible) level.
- Notwithstanding the point above, it may be advisable for the Local Authority to specify noise limits related to the background noise levels at the nearest sensitive receptor for fixed plant associated with the development.
- The operational noise due to vehicle movements in and out of site will be limited by keeping to a minimum any programmed service and delivery vehicle movements.

<u>The Development</u>

8.129 It can be seen from Figure 8.2 that at those properties towards the fringe of the proposed development, the daytime external noise environment exceeds 55dB. In these areas shown yellow there will be a Major significant effect and mitigation to reduce noise levels in external areas would be required. In order to mitigate the effect the layout of the development should be designed such that the dwellings provide screening to their gardens and outdoor amenity areas.

8.130 It can be seen from Figures 8.3 and 8.4 that at those properties towards the fringe of the proposed development, the daytime and night-time internal noise environment exceeds the guideline values recommended in BS8233:2014 with an open window. In these areas shown yellow there will be a Major significant effect and mitigation to reduce noise levels internally would be required. Mitigation in the form of appropriate glazing is recommended and it is anticipated that this would be determined in detail at the detailed design stage of the scheme.

Residual Effects

Construction Noise

8.131 Mitigation and enhancement measures are proposed, for the construction phase of the development. The impact, after mitigation, is considered to be Moderate to Negligible (Table 8.4).

Commercial/Industrial Noise

8.132 Mitigation and enhancement measures are proposed, for the construction phase of the development. The impact, after mitigation, is considered to be Moderate to Negligible (Table 8.7).

Effect upon the Development

External Noise

8.133 Mitigation measures are proposed for the Application site. The impact, after mitigation, is considered to be Moderate to Negligible.

Internal Noise

8.134 In order to achieve an internal ambient daytime noise level of 35dB LAeq or less on the ground floor and comply with BS8233:2014, it can be seen from Figure 8.3 that for a number of facades an open window will not be sufficient. Enhanced glazing is required. From a review of the noise model the highest glazing RTRA specification is required at properties fronting Standing Way. At these plots the glazing at first floor level would need a minimum RTRA specification of 31dB. With such glazing in place there will be no significant noise effect (Table 8.11).

8.135 In order to achieve an internal ambient night-time noise level of 30dB LAeq or less on the first floor and comply with BS8233:2014, it can be seen from Figure 8.4 that for a number of facades an open window will not be sufficient. Enhanced glazing is required. From a review of the noise model the highest glazing RTRA specification is required at properties fronting Standing Way. At these plots the glazing at first floor level would need a minimum RTRA specification of 30dB. With such glazing in place there will be no significant noise effect (Table 8.11).

8.136 In addition to installing appropriate glazing the development layout should be arranged so that, where practicable, habitable rooms, i.e. bedrooms, living rooms and dining rooms, do not face the main noise sources.

Cumulative Effects

Cumulative Impacts of the Proposed Scheme with other Schemes

8.137 The only likely cumulative effect of this scheme with other schemes would be in the generation of additional traffic on local roads. Pell Frischmann have confirmed that all currently known committed schemes are included within the traffic model and have hence been included within the traffic noise assessment.

8.138 Therefore, in relation to noise and vibration, there are not considered to be any further cumulative impacts of the proposed scheme with other schemes.

Summary

8.139 This assessment has included:

- Qualitative assessment of construction noise and vibration impacts at local potentially sensitive receptors.
- Assessment of noise levels at a selection of receptors, which have the potential to be affected by an increase in noise level in future years as a result of the development.
- Qualitative assessment of commercial/industrial noise impacts at local potentially sensitive receptors.
- Assessment of noise levels at the Application Site.

8.140 The assessment has concluded:

- The impact of construction noise may be Major. However, with mitigation in place the impact would reduce to a Moderate to Negligible Impact.
- The impact of commercial/industrial noise may be Major. However, with mitigation in place the impact would reduce to a Moderate to Negligible Impact.
- The impact of development related traffic may be Major with a moderate significance. However, with mitigation in place the significance of the impact may be reduced.
- The impact of noise in external areas of the Application Site may be major with a major significance. However, with mitigation in place the impact would reduce to Moderate or Negligible.
- The impact of noise in internal areas of the Application Site may be major with a major significance. However, with mitigation in place there would be no impact and no significant effect.

8.141 Table 8.14 summarises the significant environmental noise and vibration impacts of the South West Milton Keynes development as revised, both for the construction and the operational phases.

Table 8.14 – Significant Environmental Effects

Characterisation of the Impact	Period	Sensitivity of Receptors	Impact Magnitude	Potential Significance and Nature of Effect	Additional Mitigation	Residual Impact Magnitude	Residual Significance and Nature of Effect
Construction On Site	Daytime	High	Major	Not defined	See Chapter	Moderate to Negligible	Not defined
Construction Off Site Vehicles	Daytime	High	Minor	Not defined	N/A	N/A	N/A
Construction Vibration	Daytime	High	Negligible	Not defined	N/A	N/A	N/A
Development Related Traffic	Daytime/Night -Time	High/Very High	Minor	Moderate	Low noise road surface	Minor	Moderate to Minor
Development Related Traffic Vibration	Daytime/Night -Time	High/Very High	Negligible	Not defined	N/A	N/A	N/A
Commercial/Industrial Noise	Daytime/Night -Time	High/Very High	Major	Not defined	See Chapter	Moderate to Negligible	Not defined
Noise Effect upon the Development –	Daytime	High	Major	Major	Appropriate site design	Moderate to	Moderate to Negligible

External						Negligible	
Noise Effect upon the Development – Internal	Daytime/Night -Time	High/Very High	Major	Major	Specified glazing	None	None

References

Ref 8.1: Aylesbury Vale District Council Local Plan Policy GP.8.

Ref 8.2: Aylesbury Vale District Council Local Plan Policy GP.95.

Ref 8.3: Milton Keynes Council, Policy D1: Impact of Development Proposals.

Ref 8.4: Milton Keynes Council, Policy E9: Controlling the Risk of Pollution.

Ref 8.5: Planning Practice Guidance for Noise (NPPG), 2014.

Ref 8.6: Noise Policy Statement for England (NPSE), 2010.

Ref 8.7: Guidelines for Environmental Impact Assessment.

Ref 8.8: British Standard BS5228:2009+A1:2014 Noise and vibration control on construction and open sites – Noise.

Ref 8.9: British Standard BS5228:2009+A1:2014 Noise and vibration control on construction and open sites – Vibration.

Ref 8.10: Calculation of Road Traffic Noise (CRTN) – Department of Transport, 1988.

Ref 8.11: Design Manual for Roads and Bridges (DMRB), 2011.

Ref 8.12: BS4142:2014 Methods for rating and assessing industrial and commercial sound.

Ref 8.13: BS8233:2014 Guidance on sound insulation and noise reduction for buildings.

Ref 8.14: Method for Converting the UK Road Traffic Noise Index $L_{A10,18hr}$ to the EU Noise Indices for Road Noise Mapping' (2006).

9. SIGNIFICANT INTERACTIVE & CUMULATIVE EFFECTS

Introduction

9.1 The submitted ES (January 2015) contained Table 17.1 that summarised the likely significant effects of the Proposed Development. The relevant sections of that table relating to landscape & visual, traffic & transport, noise and vibration are updated by Table 9.1 below to reflect the assessment of the revisions to the Proposed Development.

Statement of Significance

9.2 Table 9.1 summarises the likely significant effects of the Proposed Development as revised in relation to the topics of landscape & visual, traffic & transport, noise and vibration.

Table 9.1: Likely Significant Effects

Topic	Stage of Development	Receptor	Duration of Effect	Mitigation Measure	Significance of Effect
Landscape	Construction & Operation	Bedfordshire and Cambridgeshire Claylands (NCA 88)	Permanent	Change and effects would be inconsequential and limited to a very small part of the NCA.	Negligible
		Newton Longville – Stoke Hammond Claylands LCA	Permanent	The majority of the site's landscape elements e.g. mature trees, hedgerows and rights of way are conserved and these would be strengthened by the proposed GI Framework	Minor adverse
		Whaddon Chase LCA	Permanent	Overall key characteristics and features across the wider LCA would not be fundamentally changed, and that the Proposed Development would not lead to any significant effects upon the LCA.	Negligible
		Horwood Claylands LCA	Permanent	Overall key characteristics and features across the wider LCA would not be fundamentally changed, and that the Proposed Development would not lead to any significant effects	Negligible

				upon the LCA.	
		Mursley-Soulbury Claylands LCA	Permanent	Overall key characteristics and features across the wider LCA would not be fundamentally changed, and that the Proposed Development would not lead to any significant effects upon the LCA.	Negligible
		Application Site and its immediate context	Permanent	The mitigation approach includes a GI Framework that covers around 62 ha of the site. The majority of the site's landscape elements e.g. mature trees, hedgerows and rights of way are conserved. The GI includes a variety of new landscape habitats such as broadleaved woodland and natural greenspace that will provide environmental and recreational benefits.	Moderate adverse
		Bletchley viewpoints 1, 11-12	Permanent	The Proposed Development seeks to minimise the impact on these receptors by locating the proposed built elements of the scheme some distance back from existing properties. The layout of uses proposed in the along the eastern edge of the site includes a corridor of greenspace that would be planted with new hedges and trees, the playing fields of the proposed Secondary School, and open space and allotments. This is considered to be an appropriate design solution in terms of the interface between the established settlement edge and the new	Moderate adverse

				development and would minimise the impact upon these receptors.	
		Newton Longville viewpoints 2 and 3	Permanent	The Proposed Development and the GI Framework minimises the impact of the Proposed Development on these receptors by adopting a series of east-west corridors of greenspace and tree cover on the south facing slopes of the site, and establishing a substantial swathe of greenspace, habitat creation and planting on the site's more visible higher slopes in the vicinity of Weasel Lane. This landscape approach will 'break-up' the built components and planting will help to 'soften' the built form.	Moderate adverse
		Bletchley Leys Farm and The Leys viewpoint 4	Permanent	The GI includes areas of greenspace and new planting around these properties, with new built development as defined on the Parameter Plans set back some distance from these receptors	Moderate adverse
		Chase Farm viewpoint 5	Permanent	The GI Framework includes areas of greenspace and new woodland planting on the western edge of the development that would effectively contain and filter views of the built form in the longer term.	Negligible
		Lower Salden Farm and Springfield Farm viewpoints 6 and 7	Permanent	The GI Framework includes areas of greenspace and new woodland planting on the western edge of the development that would effectively contain and filter views of the built form in the longer term.	Negligible

		Milton Keynes Tattenhoe Park viewpoint 8	Permanent	The GI Framework includes areas of greenspace and new woodland planting on the western edge of the development that would effectively contain and filter views of the built form in the longer term.	Minor adverse/Negligible
		Milton Keynes Boundary Walk viewpoints 10-11 and 18	Permanent	The Proposed Development locates the route within a wide and largely contiguous grassland corridor that will include the reinforcement of the existing hedgerow and planting of new trees, shrubs and hedgerows to create a pleasant -albeit different walking experience.	Moderate adverse
		Rights of way users Weasel Lane viewpoints 12-15	Permanent	The Proposed Development locates the route within a wide and largely contiguous grassland corridor that will include the reinforcement of the existing hedgerow and planting of new trees, shrubs and hedgerows to create a pleasant -albeit different walking experience.	Moderate adverse
		Rights of way users Midshires Way, Swan's Way viewpoints 16 & 17	Permanent	The GI Framework would minimise the impact of the Proposed Development on these receptors by creating an extensive corridor of greenspace on the western perimeter of the site. This will include the planting of new woodland, trees, shrubs and hedgerows that would filter and 'soften' views of the built form.	Minor adverse-negligible
		Rights of way users public bridleway Mursley-Newton Longville, viewpoints 19 & 20	Permanent	The Proposed Development and the GI Framework would minimise the impact of the Proposed	Minor adverse

				Development on these receptors by locating built development away from the higher slopes of the site and by adopting a series of east-west corridors of greenspace and tree cover to 'break-up' the built components and to 'soften' the built form.	
		Rights of way users public footpath Mursley-Newton Longville viewpoint 21	Permanent	The Proposed Development and the GI Framework would minimise the impact of the Proposed Development on these receptors by locating built development away from the higher slopes of the site (in the vicinity of Weasel Lane) and by adopting a series of east-west corridors of greenspace and tree cover to 'break-up' the built components and to 'soften' the built form.	Minor adverse
		Highway users A421 (H8 Standing Way) & Buckingham Road	Permanent	Views of the site are heavily restricted by largely contiguous established tree cover along the A421, albeit there are some occasional fleeting views of the northern part site through the vegetation, and more generally from one or two locations on the Buckingham Road.	Minor adverse
		Highway users Whaddon Road viewpoints 24-26	Permanent	To minimise the impact on these receptors the built development would be some distance back from the road corridor beyond a deep (c40-60m) corridor of greenspace and planting. The GI would strengthen the existing roadside hedgerow with new planting whilst the corridor would provide the	Moderate adverse

				opportunity for the planting of new woodland, trees, hedges and woodland	
		Highway users Shenley Road viewpoint 27	Permanent	Views of the site for highway users are difficult to clearly discern because of intervening elements within the landscape and any views of the Proposed Development are likely to be fleeting and filtered by existing vegetation.	Negligible
		Highways users Bletchley Road viewpoint 28	Permanent	Once established, the GI framework of new trees, hedges and pockets of woodland would filter view and 'soften' the views of the built form and this would lessen the effects on these receptors.	Moderate minor adverse
Traffic Movement & Access	Construction	Increased levels of traffic generated by construction vehicles	Temporary	Construction Phase Traffic Management Plan implemented to minimise construction traffic impacts.	Negligible
	Operation	Traffic levels on A421 (between Whaddon Crossroads and Bottle Dump Roundabouts)	Permanent	Travel Demand Management Strategy, Framework Travel Plan and Public Transport Strategy implemented. Physical improvements at Bottle Dump Roundabout.	Negligible
		Traffic levels on Whaddon Road through Newton Longville	Permanent	Travel Demand Management Strategy, Framework Travel Plan and Public Transport Strategy implemented.	Negligible
		Traffic levels on A421 Standing Way (between Bottle Dump and Tattenhoe Roundabouts)	Permanent	Travel Demand Management Strategy, Framework Travel Plan and Public Transport Strategy implemented. Physical improvements at Bottle Dump Roundabout.	Negligible
		Traffic levels on Buckingham Road	Permanent	Travel Demand Management	Minor adverse

				Strategy, Framework Travel Plan and Public Transport Strategy implemented.	
Air Quality	Construction	Dust impacts during construction on existing and future residents	Temporary	Construction Environmental Management Plan and Dust Management Plan implemented.	Negligible
	Operation	Increased emissions from additional traffic on existing and future residents	Permanent	Concentrations of PM_{10} and $PM_{2.5}$ and nitrogen dioxide will remain below objectives at all existing receptors in 2026. No mitigation.	Negligible
Noise and Vibration	Construction	Construction on site noise	Temporary	Construction Environmental Management Plan implemented. Noise monitoring conducted to ensure noise control techniques are implemented.	Moderate adverse/Negligible
		Construction off site vehicle noise	Temporary	Construction Environmental Management Plan implemented.	Minor adverse
		Construction vibration	Temporary	Construction Environmental Management Plan implemented.	Negligible
	Operation	Development related traffic noise	Permanent	Addressed in design and layout, with dwellings separated from main noise sources and noise mitigation measures implemented.	Moderate/Minor adverse
		Development related traffic vibration	Permanent	No mitigation.	Negligible
		Commercial/Industrial noise	Permanent	Addressed in design and layout, with dwellings separated from main noise sources and noise mitigation measures implemented.	Moderate adverse/Negligible
		Noise effect upon the development – external	Permanent	Addressed in design and layout, with dwellings separated from main noise sources and noise mitigation measures implemented.	Moderate adverse/Negligible
		Noise effect upon the development – internal	Permanent	Suitable glazing design.	None

Cumulative Effects

9.3 Cumulative effects are impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the Proposed Development. The traffic modelling has included all known committed developments within and on the edge of Milton Keynes and as such the cumulative effect of traffic from these developments on air quality and noise matters has been assessed. As a result of the comprehensive mitigation package agreed in principle with BCC and MKC and outlined in the Transport Assessment (August 2016) the residual cumulative impact of the proposed development (i.e. following the implementation of the agreed mitigation measures) in terms of traffic & transport is considered to be minimal and not significant in EIA terms.

9.4 Cumulative landscape and visual effects of the revisions to the Proposed Development have been considered in the Landscape & Visual Impact Assessment (July 2016). It is concluded that the cumulative effects of the Proposed Development and Tattenhoe Park would not result in any significant long term effects on landscape character and visual amenity. It is similarly judged that the cumulative effects of the Proposed Development and the Newton Leys development would not result in any significant long term effects on landscape character and visual amenity.

9.5 There would be cumulative effects on existing residents from the impacts on landscape, air quality and noise. It is the cumulative effects on residents from changes arising from construction and road traffic noise during the construction phase and from changes to the landscape during the operational phase which would remain significant. The cumulative noise effects on residents would be temporary and the effects would be reduced by mitigation measures comprising a Construction Environmental Management Plan and noise control techniques. The cumulative landscape effects on residents would be partially mitigated through a Landscape Strategy, comprising additional woodland, trees and hedgerows, and over time the significant adverse effects would reduce as the landscape enhancement measures become established. While residents would be exposed to construction, noise and landscape impacts all at once, it is not the case that those impacts combined would increase the significance of their effect. The identified mitigation measures e.g. the Construction Environmental Management Plan and Landscape Strategy would be implemented to address and reduce the significant environmental effects.

Interactive Effects

9.6 Interactive effects arise where the effects of development on one environmental topic bring about changes in another topic. The interactive effects identified for the Proposed Development relate to water and are set out in Table 17.3. of the

submitted ES (January 2015). The revisions to the Proposed Development do not impact on these effects.

Summary

9.7 The Addendum ES has identified a number of Moderate Adverse and Moderate/Minor Adverse effects arising from the assessment of the revisions to the Proposed Development. Moderate Adverse effects are significant in EIA terms.

10. Conclusions

10.1 The assessment of the revisions to the Proposed Development set out in the Addendum ES has identified a number of Moderate Adverse and Moderate/Minor Adverse effects both during the construction and the operational phases of the development. As noted above Moderate adverse effects are significant in EIA terms.

10.2 Mitigation measures are proposed to address or reduce these significant effects during the construction phase and on completion, e.g. a Construction Management Plan and a Framework Travel Plan; and it is expected that these would be secured by way of planning conditions.

10.3 However, the significant landscape and visual effects on the application site, nearby receptors and users of the public rights of way network would remain, although over time these effects would reduce as the landscape enhancement measures become established.

APPENDIX to Section 7. AIR QUALITY

7.1 Construction Dust Assessment Procedure

7.1.2 The criteria developed by IAQM (Ref 7.17) divide the activities on construction sites into four types to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Track out.

7.1.3 The assessment procedure includes the four steps summarised below:

STEP 1: Screen the Need for a Detailed Assessment

7.1.4 An assessment is required where there is a human receptor within 350 m of the boundary of the site 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), or where there is an ecological receptor within 50 m of the boundary of the site 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).

7.1.5 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. No mitigation measures beyond those required by legislation will be required.

STEP 2: Assess the Risk of Dust Impacts

7.1.6 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 (Step 2A); and
- The sensitivity of the area to dust effects (Step 2B).

7.1.7 These two factors are combined in Step 2C, which is to determine the risk of dust impacts with no mitigation applied. The risk categories assigned to the site may be different for each of the four potential sources of dust (demolition, earthworks, construction and trackout).

Step 2A – Define the Potential Dust Emission Magnitude

7.1.8 Dust emission magnitude is defined as either ‘Small’, ‘Medium’, or ‘Large’. The IAQM explains that this classification should be based on professional judgement, but provides the examples in

Table A7. Error! No text of specified style in document.**.1**.

Table A7. Error! No text of specified style in document.**.1: Examples of How the Dust Emission Magnitude Class May be Defined**

Class	Examples
Demolition	
Large	Total building volume >50,000 m^3, potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities >20 m above ground level
Medium	Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty construction material, demolition activities 10-20 m above ground level
Small	Total building volume <20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months
Earthworks	
Large	Total site area >10,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry to due small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes
Medium	Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m – 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes
Small	Total site area <2,500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <10,000 tonnes, earthworks during wetter months
Construction	
Large	Total building volume >100,000 m^3, piling, on site concrete batching; sandblasting
Medium	Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), piling, on site concrete batching
Small	Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout [a]	

Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m
Medium	10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m
Small	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

[a] These numbers are for vehicles that leave the site after moving over unpaved ground.

Step 2B – Define the Sensitivity of the Area

7.2 The sensitivity of the area is defined taking account of 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 to reduce the risk of wind-blown dust.

7.1.9 The first requirement is to determine the specific sensitivities of local receptors. The IAQM recommends that this should be based on professional judgment, taking account of the principles in Table A7.Error! No text of specified style in document.**.2**. These receptor sensitivities are then used in the matrices set out in Table A7.Error! No text of specified style in document.**.3**, Table A7.Error! No text of specified style in document.**.4**, and Table A7.Error! No text of specified style in document.**.5** to determine the sensitivity of the area. Finally, the sensitivity of the area is considered in relation to any other site-specific factors, such as the presence of natural shelters etc., and any required adjustments to the defined sensitivities are made.

Step 2C – Define the Risk of Impacts

7.1.10 The dust emission magnitude determined at Step 2A is combined with the sensitivity of the area determined at Step 2B to determine the *risk* of impacts with no mitigation applied. The IAQM provides the matrix in Table A7.Error! No text of specified style in document.**.6** as a method of assigning the level of risk for each activity.

STEP 3: Determine Site-specific Mitigation Requirements

7.1.11 The IAQM provides a suite of recommended and desirable mitigation measures which are organised according to whether the outcome of Step 2 indicates a low, medium, or high risk. The list provided by the IAQM has been used as the basis for the requirements set out in Appendix 7.5.

STEP 4: Determine Significant Effects

7.1.12 The IAQM does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally not be significant.

7.1.13 The IAQM guidance recognises that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term dust annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will not be significant.

Table A7. Error! No text of specified style in document.**.2: Principles to be Used When Defining Receptor Sensitivities**

Class	Principles	Examples
Sensitivities of People to Dust Soiling Effects		
High	users can reasonably expect enjoyment of a high level of amenity; or the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected a to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land	dwellings, museum and other culturally important collections, medium and long term car parks and car showrooms
Medium	users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or the appearance, aesthetics or value of their property could be diminished by soiling; or the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land	parks and places of work
Low	the enjoyment of amenity would not reasonably be expected; or there is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land	playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads

Class	Principles	Examples
Sensitivities of People to the Health Effects of PM_{10}		
High	locations where members of the public may be exposed for eight hours or more in a day	residential properties, hospitals, schools and residential care homes
Medium	locations where the people exposed are workers, and where individuals may be exposed for eight hours or more in a day.	may include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}
Low	locations where human exposure is transient	public footpaths, playing fields, parks and shopping streets
Sensitivities of Receptors to Ecological Effects		
High	locations with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particularly dust sensitive species	Special Areas of Conservation with dust sensitive features
Medium	locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or locations with a national designation where the features may be affected by dust deposition	Sites of Special Scientific Interest with dust sensitive features
Low	locations with a local designation where the features may be affected by dust deposition	Local Nature Reserves with dust sensitive features

Table A7. Error! No text of specified style in document.**.3: Sensitivity of the Area to Effects on People and Property from Dust Soiling**[8]

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

[8] For demolition, earthworks and construction, distances are taken either from the dust source or from the boundary of the site. For trackout, distances are measured from the sides of roads used by construction traffic. Without mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

Table A7. Error! No text of specified style in document.**.4: Sensitivity of the Area to Human Health Effects 8**

Receptor Sensitivity	Annual Mean PM_{10}	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m^3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m^3	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m^3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg/m^3	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32 µg/m^3	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table A7. Error! No text of specified style in document.**.5: Sensitivity of the Area to Ecological Effects 8**

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

Low	Low	Low

Table A7. Error! No text of specified style in document.**.6: Defining the Risk of Dust Impacts**

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

7.2 EPUK & IAQM Planning for Air Quality Guidance

7.2.1 The guidance issued by EPUK and IAQM (Ref 7.16) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

"Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:

1 *The severity of the impacts on air quality;*

2 *The air quality in the area surrounding the proposed development;*

3 *The likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*

4 *The positive benefits provided through other material considerations".*

Recommended Best Practice

7.2.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

"The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions".

7.2.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- Include 10 or more dwellings;
- Where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- Provide more than 1,000 m^2 of commercial floor space;
- Are carried out on land of 1 ha or more.

7.2.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;

- Wherever possible, new developments should not create a new "street canyon", as this inhibits pollution dispersion;
- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000 m^2 of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNOx/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
    - Spark ignition engine: 250 mgNOx/Nm^3;
    - Compression ignition engine: 400 mgNOx/Nm^3;
    - Gas turbine: 50 mgNOx/Nm^3.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNOx/Nm^3 and 25 mgPM/Nm^3.

7.2.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

"It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the "damage cost approach" used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential".

7.2.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

"There may be a requirement to carry out an air quality assessment for the impacts of the local area's emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:

- *The background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- *The presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- *The presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular nitrogen dioxide), that would cause unacceptably high exposure for users of the new development; and*
- *The presence of a source of odour and/or dust that may affect amenity for future occupants of the development".*

Impacts of the Development on the Local Area

7.2.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the follow apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use;
- More than 1,000 m^2 of floor space for all other uses or a site area greater than 1 ha.

7.2.8 Coupled with any of the following:

- The development has more than 10 parking spaces;
- The development will have a centralised energy facility or other centralised combustion process.

7.2.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, the criteria for which are set out below. The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria is likely to be more appropriate.

- The development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- The development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- The development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- The development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights, or roundabouts;
- The development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- The development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor;
- The development will have one or more substantial combustion processes where the combustion unit is:
  - Any centralised plant using bio fuel;
  - Any combustion plant with single or combined thermal input >300 kW; or

- A standby emergency generator associated with a centralised energy centre (if likely to be tested/used >18 hours a year).

- The development will have a combustion unit of any size where emissions are at a height that may give rise to impacts through insufficient dispersion, e.g. through nearby buildings.

7.2.10 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area.

7.2.11 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this chapter.

Impact Descriptors and Assessment of Significance

7.2.12 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach developed by EPUK and IAQM (Ref 7.18) has therefore been used. This approach involves a two stage process:

- A qualitative or quantitative description of the impacts on local air quality arising from the development; and
- A judgement on the overall significance of the effects of any impacts.

Impact Descriptors

7.2.13 Impact description involves expressing the magnitude of incremental change as a proportion of a relevant assessment level and then examining this change in the context of the new total concentration and its relationship with the assessment criterion. tion is positive or negative.

Table A7.2.2 sets out the method for determining the impact descriptor for annual mean concentrations at individual receptors, having been adapted from the table presented in the guidance document. For the assessment criterion the term Air Quality Assessment Level or AQAL has been adopted, as it covers all pollutants, i.e. those with and without formal standards. Typically, as is the case for this assessment, the AQAL will be the air quality objective value. Note that impacts may

be adverse or beneficial, depending on whether the change in concentration is positive or negative.

Table A7.2.2: Air Quality Impact Descriptors for Individual Receptors for All Pollutants [a]

Long-Term Average Concentration At Receptor In Assessment Year [b]	Change in concentration relative to AQAL [c]				
	0%	1%	2-5%	6-10%	>10%
75% or less of AQAL	Negligible	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Negligible	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Negligible	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Negligible	Moderate	Substantial	Substantial	Substantial

[a] Values are rounded to the nearest whole number.

[b] This is the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme' concentration where there is an increase.

[c] AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.

Assessment of Significance

7.2.14 The IAQM guidance is that the assessment of significance should be based on professional judgement, with the overall air quality impact of the scheme described as either 'significant' or 'not significant'. In drawing this conclusion, the following factors should be taken into account:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts;
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- The potential for cumulative impacts and, in such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality

management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and

- The judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

7.2.15 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant.

7.3 Modelling Methodology

Model inputs

7.3.1 Predictions have been carried out using the ADMS-Roads dispersion model (v4.0). The model requires the user to provide various input data, including emissions from each section of road, and the road characteristics (including road width). Vehicle emissions have been calculated based on vehicle flow, fleet composition and speed data using the Emission Factor Toolkit (Version 6.0.2) published by Defra (Ref 7.20).

7.3.2 The model has been run using 2015 meteorological data from the monitoring station located at Bedford, which is considered suitable for this area.

7.3.3 AADT flows and %HGV data have been provided by Mouchel. Traffic speeds were primarily based on data provided by Mouchel, but were reduced close to junctions. The traffic data used in this assessment are summarised in Table A7.Error! No text of specified style in document.**.3**.

Table A7. Error! No text of specified style in document.**.3: Summary of Traffic Data used in the Assessment**

Road Link	2015		2018 Without Scheme		2018 With Scheme	
	AADT	% HDV	AADT	% HDV	AADT	% HDV
A421 Buckingham Road	23,732	2.6	25,411	2.6	27,277	2.6
Whaddon Road North of Site Access	6,743	8.0	7,219	8.0	9,926	8.0
Whaddon Road South of Site Access	6,743	9.6	7,219	9.6	8,770	9.6
A421 Standish Way West	24,834	10.0	26,591	10.0	27,552	10.0

Road Link	2015		2018 Without Scheme		2018 With Scheme	
	AADT	% HDV	AADT	% HDV	AADT	% HDV
A421 Standish Way East	19,787	10.0	21,186	10.0	25,627	10.0
Snelshall Street	3,495	5.0	3,741	5.0	5,104	5.0
Buckingham Road West of New Roundabout	8,651	0.5	9,265	0.5	11,172	0.5
Buckingham Road East of New Roundabout	8,651	0.5	9,265	0.5	11,172	0.5
Southwest Site Access Road from New Roundabout	-	-	-	-	3,476	5.0
Southeast Site Access Road from New Roundabout	-	-	-	-	2,065	5.0
Site Access Road from Standish Way	-	-	-	-	1,487	5.0
Site Access Road from Whaddon Road	-	-	-	-	2,373	5.0

7.3.4 Diurnal flow profiles for the traffic have been derived from the national diurnal profiles published by DfT (Ref 7.30). Figures A7.4.1 and A7.4.2 show the road networks included within the models and define the study area.

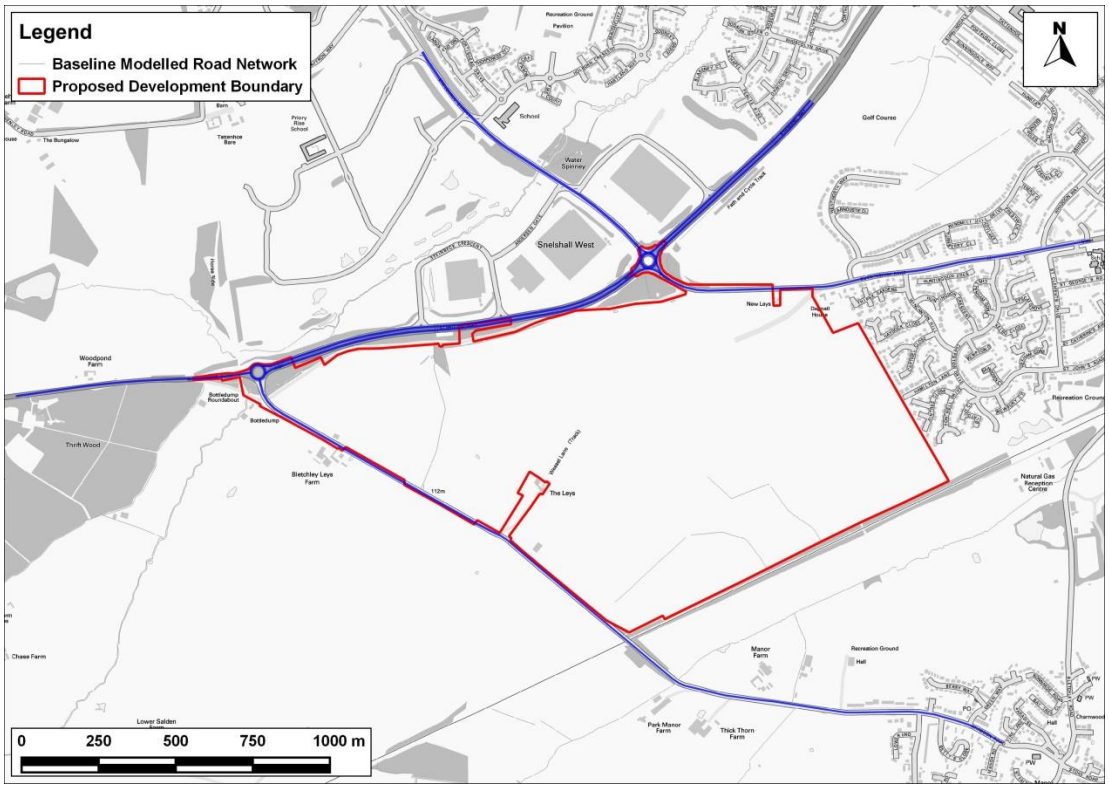


Figure A7. Error! No text of specified style in document..**1: Baseline Modelled Road Network**

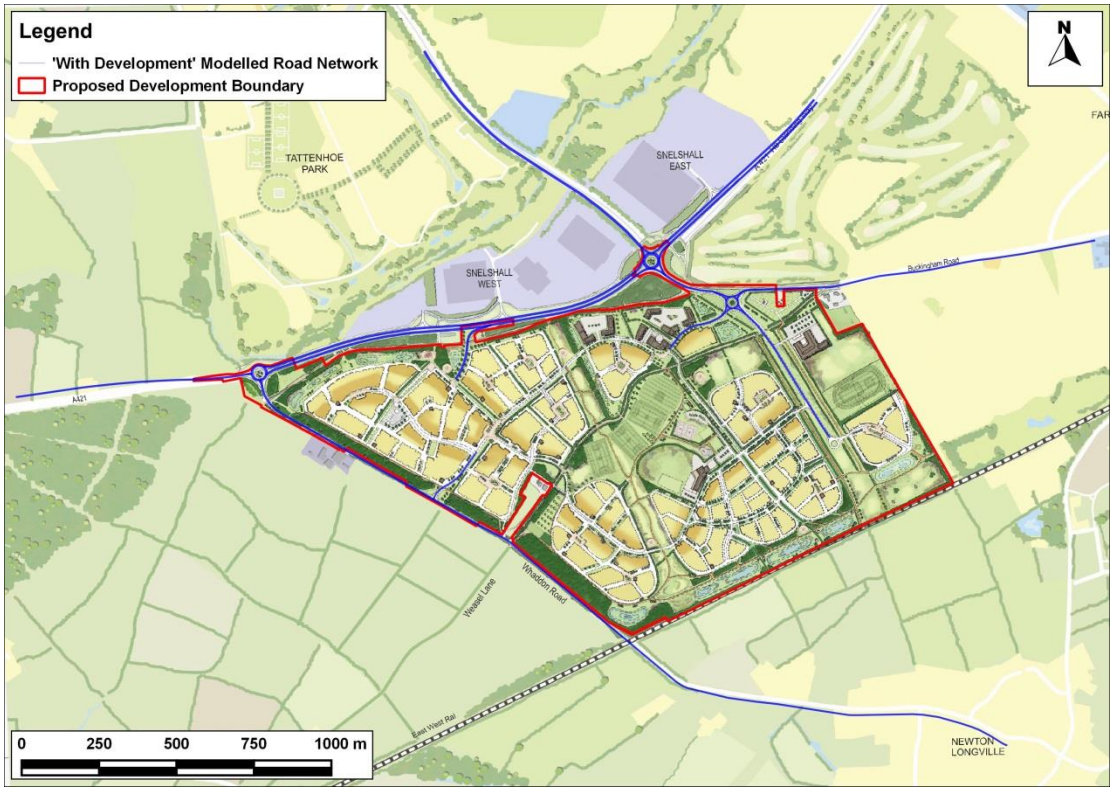


Figure A7. Error! No text of specified style in document..**2: 'With Development' Modelled Road Network**

Sensitivity Test for Nitrogen Oxides and Nitrogen Dioxide

7.3.5 As explained in the main air quality chapter, a detailed analysis has been carried out which showed that, where previous standards had limited on-road success in reducing nitrogen oxides emissions from diesel vehicles, the 'Euro VI' and 'Euro 6' standards are delivering real on-road improvements (Ref 7.24). Furthermore, these improvements are expected to increase as the Euro 6 standard is fully implemented. Despite this, the detailed analysis suggested that, in addition to modelling using the EFT, a sensitivity test using elevated nitrogen oxides emissions from certain diesel vehicles should be carried out (Ref 7.24). A worst-case sensitivity test has thus been carried out by applying the adjustments set out in Table A7.Error! No text of specified

style in document..**4** to the emission factors used within the EFT[9], using the CURED tool (Ref 7.23). The justifications for these adjustments are given in Ref 7.24. Results are thus presented for two scenarios: first the 'official prediction', which uses the EFT with no adjustment, and second the 'worst-case sensitivity test', which applies the adjustments set out in Table A7.Error! No text of specified style in document..**4**. The results from this sensitivity test are likely to over-predict emissions from vehicles in the future and thus provide a reasonable worst-case upper-bound to the assessment.

Table A7. Error! No text of specified style in document..**4: Summary of Adjustments Made to Emission Factor Toolkit**

Vehicle Type		Adjustment Applied to Emission Factors
All Petrol Vehicles		No adjustment
Light Duty Diesel Vehicles	**Euro 5 and earlier**	No adjustment
	Euro 6	Increased by 60%
Heavy Duty Diesel Vehicles	**Euro III and earlier**	No adjustment
	Euro IV and V	Set to equal Euro III values
	Euro VI	Set to equal 20% of Euro III emissions [a]

[a] Taking account of the speed-emission curves for different Euro classes as explained in (Ref 7.24).

Background Concentrations

7.3.6 The background pollutant concentrations across the study area have been defined using the national pollution maps published by Defra (Ref 7.20), based on EFT Version 6.0.2. These cover the whole country on a 1x1 km grid and are published for each year from 2011 until 2030. The background maps for 2015 have been calibrated against concurrent measurements from national monitoring sites. The calibration factor calculated has also been applied to future year backgrounds. This has resulted in slightly higher predicted concentrations for the future assessment year than that derived from the Defra maps (Ref 7.31).

Background NO_2 Concentrations for Sensitivity Test

7.3.7 The road-traffic components of nitrogen dioxide in the background maps have been uplifted in order to derive future year background nitrogen dioxide concentrations for use in the sensitivity test. Details of the approach are provided in the report referenced as Ref 7.31).

Model Verification

[9] All adjustments were applied to the COPERT functions. Fleet compositions etc. were applied following the same methodology as used within the EFT.

7.3.8 In order to ensure that ADMS-Roads accurately predicts local concentrations, it is normal to verify the model against local measurements. However, the verification factor calculated for the original air quality assessment was less than 1, thus no adjustment was applied. Experience of undertaking other assessments undertaken in Milton Keynes suggests that this is regularly the case in the area. As a result, no verification has been undertaken for the model outputs for this updated assessment, and the results presented are unadjusted.

Model Post-processing

7.3.9 The model predicts road-NOx concentrations at each receptor location. These concentrations have, along with the background NO_2, been processed through the NOx from NO_2 calculator version 4.1 available on the Defra LAQM Support website (Ref 7.20). The traffic mix within the calculator was set to "All other urban UK traffic". The calculator predicts the component of NO_2 based on the road-NOx and the background NO_2.

11.4 Construction Mitigation

11.4.1 The following is a set of measures that should be incorporated into the specification for the works:

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before and during work on site;
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environmental manager/engineer or the site manager; and
- Display the head or regional office contact information.

Dust Management Plan

- Develop and implement a Dust Management Plan (DMP) approved by the Local Authority which documents the mitigation measures to be applied, and the procedures for their implementation and management.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked;
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book; and

Monitoring

- Undertake daily on-site and off-site inspections where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the Local Authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the site boundary, with cleaning to be provided if necessary;
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the Local Authority when asked;
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions; and

Preparing and Maintaining the Site

- Plan the site layout so that machinery and dust-causing activities are located away from receptors, as far as is possible;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Avoid site runoff of water or mud;
- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- Cover, seed, or fence stockpiles to prevent wind whipping.

Operating Vehicle/Machinery and Sustainable Travel

- Ensure all vehicles switch off their engines when stationary – no idling vehicles;
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery-powered equipment where practicable;
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate);
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials; and
- Implement a Travel Plan that supports and encourages sustainable staff travel (public transport, cycling, walking, and car-sharing).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes, conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and
- Ensure 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.

Waste Management

- Avoid bonfires and burning of waste materials.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover from small areas during work, not all at once.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces), if possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site log book;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems or mobile water bowsers, and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates should be located at least 10 m from receptors, where possible.