

South West Milton Keynes

Environmental Statement

Main Report

JANUARY 2015

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GLOSSARY

Within this Environmental Statement the following terms are defined as follows:

Above Ordnance Datum	Ordnance Datum is the vertical datum used by ordnance survey as the basis for deriving altitudes on maps. Topography may be described using the level in comparison or 'above' ordnance datum.
ADMS-Roads pollution Model	A tool for investigating air pollution problems due to small networks of roads that may be in combination with industrial sites, for instance small towns or rural road networks.
Agricultural Land Classification	Grades of agricultural land. The Application Site contains 16Ha of Grade 3a and 122Ha of Grade 3b.
Air Quality Management Area	A defined area by virtue of Section 82(3) of the Environment Act 1995, where it appears that the air quality objectives prescribed under the UK Air Quality Strategy will not be achieved. In these areas, a Local Authority must designate Air Quality Management Areas, within which an Action Plan can be proposed to secure improvements in air quality so that prescribed air quality objectives can be achieved.
Ambient	Background levels.
Applicant	The South West Milton Keynes Consortium
Application Site	A mixed-use sustainable urban extension on 144.77 Ha of land to the south west of Milton Keynes, and described in Section 2.9 of ES Volume 1 – Main Report and is shown on Drawing No. SWMK03-079-C.
B1	<p>B1 (Business) building use is use for all or any of the following purposes:</p> <p>(a) as an office other than a use within class A2 (financial and professional services),</p> <p>(b) for research and development of products or processes, or</p> <p>(c) for any industrial process, being a use which can be carried out in any residential area without detriment to the amenity of that area by reason of noise, vibration, smell, fumes, smoke, soot, ash, dust or grit.</p>
B2	B2 (General Industry) building use is for the carrying on of an industrial process other than one falling within class B1 above or within classes B3 to B7

B8	B8 (Distribution and Storage) building use is for storage or as a distribution centre.
Baseline	Environmental conditions at specific periods of time, present on, or near a site, against which future changes may be measured or predicted.
Biodiversity	Abbreviated form of 'biological diversity'.
Completed Development	Within the ES this phase refers to the Proposed Development when fully built and operational.
Conceptual Site Model	A Conceptual Site Model (CSM) represents the characteristics of the site in diagrammatic or written form that shows the possible relationships between contaminants, pathways and receptors. The development of the CSM supports the identification and assessment of pollution linkages. Development of the CSM forms part of the preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained throughout the risk assessment process.
Conservation Area	An area of special environmental or historical importance that is protected from changes by law.
Construction	Within the ES this phrase refers to all construction works associated with the Proposed Development. It is anticipated that construction of the Proposed Development would commence in 2016/17, subject to the grant of planning permission, and that the Proposed Development would be completed by 2023/24.
Contamination	Contamination is the addition, or the result of addition, or presence of a material or materials to, or in, another substance to such a degree as to render it unfit for its intended purposes.
dB(A)	The unit of noise measurement (measured on a logarithmic scale), which expresses the loudness in terms of decibel (dB) scale and the frequency factor (A).
Dust	Fine particles of solid materials capable of being re-suspended in air and settling only slowly under the influence of gravity where it may cause nuisance.
Effect	A physical or measurable change to the environment attributable to the project.
EIA Regulations	The Town and Country Planning (Environmental Impact Assessment) Regulations 2011.
Environmental Statement (ES)	Report that presents the findings of the Environmental Impact Assessment.

Emission	A material that is expelled or released to the environment. Usually applied to gaseous or odorous discharges to the atmosphere.
Environmental Impact Assessment (EIA)	A systematic means of assessing a development project's likely significant environmental effects.
Floodplain	Land adjacent to a watercourse over which water flows, or would flow but for defences in place, in times of flood.
Flood Risk Assessment (FRA)	A desk based study which considers the contributing factors and predicts / quantifies the risk of flooding and also identifies a water level in the event of flooding.
Flood Zone	<p>There are four classifications for flood zones as defined in the Technical Guidance to the NPPF:</p> <ul style="list-style-type: none"> • Zone 1: Low probability (less than 1 in 1000 annual probability of river or sea flooding in any year); • Zone 2: Medium probability (between 1 in 100 and 1 in 1000 annual probability of river flooding or between 1 in 200 and 1 in 1000 annual probability of sea flooding in any year); • Zone 3a: High probability (1 in 100 or greater annual probability of river flooding in any year or 1 in 200 or greater annual probability of sea flooding in any given year); and • Zone 3b: High probability (functional flood plain. Essentially the 1 in 20 or greater annual probability of flooding in any given year).
Frequency (Sound)	The rate of repetition of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the Hertz (Hz), which is identical to cycles per second. A thousand hertz is often denoted kHz e.g. 2 kHz = 2000 Hz. Human hearing ranges approximately from 20 Hz to 20 kHz. For design purposes, the octave bands between 63 Hz to 8 kHz are generally used. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For more detailed analysis, each octave band may be split into three one-third octave bands or in some cases, narrow frequency bands.
Habitat	The environment in which populations or individual species live or grow.
LA ₁₀	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence LA10 is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum

	level'.
LA_{90}	The ambient noise level in the absence of the source, which is exceeded for 90% of the time.
LA_{eq}	<p>The Equivalent Continuous A-weighted Sound Pressure Level. The sound pressure level of a steady sound that, over the same time as the measurement period, contains the same total acoustic</p> <p>energy as the sound field being measured. This takes into account the level and duration of noise events and is considered the indicator of the Ambient Noise Level.</p>
$LA_{eq, T}$	The continuous equivalent sound level over period T. It is a widely used noise parameter that calculates a constant level of noise with the same energy content as the varying acoustic noise signal being measured. The letter "A" denotes that the Aweighting has been included and "eq" indicates that an equivalent level has been calculated. Hence, LA_{eq} is the Aweighted equivalent continuous noise level. A-weighting is a filter incorporated into a sound level meter which, when measuring noise, replicates the sensitivity of human hearing.
LAF_{max}	The maximum noise level.
Landscape Character	The distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement. It creates the particular sense of place of different areas of the landscape.
Landscape Effects	Change in the elements, characteristics, character and qualities of the landscape as a result of development.
Landscape Sensitivity	The extent to which a landscape can accept change of a particular type and scale without unacceptable adverse effects on its character.
Listed Building	<p>Buildings placed on statutory lists of buildings of 'special architectural or historic interest' compiled by the Secretary of State for Culture, Media and Sport under the Planning (Listed Buildings and Conservation Areas) Act 1990, on advice from English Heritage. There are three classes of listed building:</p> <ul style="list-style-type: none"> • Grade I buildings are considered to be of exceptional interest and are sometimes internationally important; • Grade II* buildings are particularly important and of more than special interest;

	<ul style="list-style-type: none"> • Grade II Listed Building are considered to be of national importance and special interest.
Main River	Main Rivers are watercourses designated as such on Main River maps (held by the Environment Agency) and are generally the larger arterial watercourses. Main Rivers are also indicated with a red line as part of the Flood Zones held by the Local Planning Authority.
Mitigation Measures	Actions proposed to moderate adverse effects arising from the whole or specific elements of a development.
Noise	<p>Noise is defined as unwanted sound. The range of audible sound is from 0 dB to 140 dB. The frequency response of the ear is usually taken to be about 18 Hertz (Hz) (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting that is most widely used and that correlates best with subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements. For variable noise sources such as traffic, a difference of 3 dB(A) is just distinguishable. In addition, a doubling of a noise source would increase the overall noise by 3 dB(A). For example, if one item of machinery results in noise levels of 30 dB(A) at 10 m, then two identical items of machinery adjacent to one another would result in noise levels of 33 dB(A) at 10 m. The 'loudness' of a noise is a purely subjective parameter but it is generally accepted that an increase/decrease of 10 dB(A) corresponds to a doubling/halving in perceived loudness.</p>
Non Technical Summary	A report which briefly describes the main points discussed in the Environmental Statement in a clear manner, without the use of technical jargon and phraseology.
Phase 1 Habitat Survey	An ecological survey technique that provides a standardised system to record vegetation and wildlife habitats. It enables a basic assessment of habitat type and its potential importance for nature conservation. Each habitat type or feature is identified and presented on a map.
PM _{2.5}	Particulate matter with a mean aerodynamic diameter of less than 2.5µm.
PM ₁₀	Particulate matter with a mean aerodynamic diameter of less than 10µm.

Public Right of Way	Public rights of way are public highways that are legally protected in the same way as roads.
Proposed Development	The proposed development as described in Section 2.9 of ES Volume 1 – Main Report.
Receptor	A component of the natural, created or built environment such as human being, water, air, a building, or a plant that has the potential to be affected by the Proposed Development.
Residual Effects	Those effects of a development that cannot be mitigated following implementation of mitigation proposals.
Ridge and Furrow	Ridge and Furrow is an archaeological pattern of ridges and troughs created by a system of ploughing used in Europe during the Middle Ages, typical of the open field system.
Scheduled Monument	A nationally important archaeological site or historic building, given protection against unauthorised change.
Scoping	An exercise undertaken to determine the topics to be addressed within the Environmental Statement.
Section 106 Agreement	Section 106 (S106) of the Town and Country Planning Act 1990 allows a local planning authority (LPA) to enter into a legally binding agreement or planning obligation with a landowner in association with the granting of planning permission. The obligation is termed a Section 106 Agreement.
Sustainable Drainage System (SUDS)	Sustainable management practices designed to control the rate and quality of surface water runoff into receiving waters, for example the use of swales and wetlands as buffers, as opposed to conventional drainage practices.
Topography	The natural or artificial features, level and surface form of the ground surface.
Transport Assessment	A quantitative assessment of transport effects of construction and operational phases of the proposed development.
Visual Effect	Change in the appearance of the landscape from available viewpoints as a result of development.

ABBREVIATIONS

AADT	Average Annual Daily Traffic
AAI	Area of Archaeological Importance
AAWT	Average Annual Weekly Traffic
ADMS	Atmospheric Dispersion Modelling System
ALC	Agricultural Land Classification
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
AMR	Annual Monitoring Report
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
AURN	Automatic Urban and Rural Network
AVDC	Aylesbury Vale District Council
AW	Anglian Water
BAP	Biodiversity Action Plan
BBG	Buckinghamshire Badger Group
BCC	Buckinghamshire County Council
BGS	British Geological Survey
BMERC	Buckinghamshire and Milton Keynes Environmental Records Centre
BMV	Best and Most Versatile Agricultural Land
BNL	Basic Noise Levels
BNS	Biological Notification Site
BoCC	Birds of Conservation Concern
BPA	British Pipeline Agency
BPEO	Best Practicable Environmental Option
BRE	Building Research Establishment
BS	British Standard
BT	British Telecommunications
CD&E	Construction, Demolition and Excavation Waste
CEMP	Construction Environmental Management Plan
C&I	Commercial and Industrial Waste
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CLEA	Contaminated Land Exposure Assessment
CNWL	Central and North West London NHS Foundation Trust
CRN	Calculation of Railway Noise
CROW	Countryside & Rights of Way Act 2000
CRTN	Calculation of Road Traffic Noise
CSM	Conceptual Site Model
CWS	County Wildlife Site
dB	Decibel
DCLG	Department for Communities and Local Government
DEFRA	Department for Environment, Food and Rural Affairs
DETR	Department of the Environment, Transport and the Regions
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EC	European Commission
EcIA	Ecological Impact Assessment
EEC	European Economic Community
EIA	Environmental Impact Assessment

EHO	Environmental Health Officer
EPA	Environmental Protection Act 1990
EPI	Environmental Performance Indicators
EPS	European Protected Species
EPUK	Environmental Protection UK
EQS	Environmental Quality Standards
ES	Environmental Statement
ETF	Emissions Factors Toolkit
FRA	Flood Risk Assessment
FRCA	Farming and Rural Conservation Agency
FTP	Framework Travel Plan
GAC	Generic Assessment Criteria
GCN	Great Crested Newt
GEA	Gross External Area
GFA	Gross Floor Area
GI	Green Infrastructure
GIAA	Green Infrastructure Action Areas
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GP	General Practitioner
HCA	Homes and Communities Agency
Ha	Hectares
HEGS	Hedgerow Evaluation and Grading System
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
HSE	Health and Safety Executive
HVAC	Heating, Ventilation and Air Conditioning
HWRC	Household Waste Recycling Centre
IAQM	Institute of Air Quality Management
IEMA	Institute of Environmental Assessment and Management
IOA	Institute of Acoustics
Km	Kilometre
Kv	Kilovolts
LAQM	Local Air Quality Management
LCT	Landscape Character Type
LEA	Local Education Authority
LEAP	Local Equipped Area of Play
LET	Landscape Effects Table
LOAEL	Lowest Observed Adverse Effect Level
l/s	Litres per second
LTP	Local Transport Plan
LWS	Local Wildlife Site
m	Metres
mm	Millimetres
MAFF	Ministry of Agriculture, Forestry and Fisheries
MAGIC	Multi Agency Geographic Information for the Countryside
MKC	Milton Keynes Council
MKCHS	Milton Keynes Community Health Services
MKTM	Milton Keynes Traffic Model
MUGA	Multi Use Games Area
NBBG	North Buckinghamshire Bat Group
NCA	Natural Character Area
NEAP	Neighbourhood Equipped Area of Play
NEC	Noise Exposure Category
NERC	Natural Environment & Rural Communities Act 2006
NHS	National Health Service

NOMIS	Official Labour Market Statistics
NPSE	Noise Policy Statement for England
NTS	Non Technical Summary
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
ODPM	Office of the Deputy Prime Minister
ONS	Office for National Statistics
OS	Ordnance Survey
PCT	Primary Care Trust
PM ₁₀ /PM _{2.5}	Fine particulate matter
PROW	Public Right of Way
S106	Section 106 Agreement
SAC	Special Area of Conservation
SAM	Scheduled Ancient Monument
SDA	Strategic Development Area
SFRA	Strategic Flood Risk Assessment
SINC	Site of Importance for Nature Conservation
SGN	Southern Gas Networks
SOAEL	Significant Observed Adverse Effects Level
SPA	Special Protection Area
SPD	Supplementary Planning Document
sqm	Square metres
SSSI	Site of Special Scientific Interest
SUDS	Sustainable Drainage System
SWMK	South West Milton Keynes
SWMP	Site Waste Management Plan
TA	Transport Assessment
TP	Travel Plans
WCA	Wildlife & Countryside Act 1981
WFD	Waste Framework Directive
WPD	Western Power Distribution
WRAP	Waste and Resources Action Programme
ZTV	Zone of Theoretical Visibility
µg/m ³	Micrograms per cubic metre

SOUTH WEST MILTON KEYNES

ENVIRONMENTAL STATEMENT

VOLUME 1 – MAIN REPORT

SOUTH WEST MILTON KEYNES CONSORTIUM

1. INTRODUCTION

- 1.1 This Environmental Statement (ES) has been prepared on behalf of the South West Milton Keynes Consortium (SWMK Consortium). The ES has been submitted to support an outline planning application for a mixed use development (hereafter referred to as the “Proposed Development”) at South West Milton Keynes (SWMK). The SWMK Consortium – also referred to as the “Applicant” - comprises Hallam Land Management, William Davis Ltd, Taylor Wimpey, Connolly Homes and Bellcross Homes. The SWMK Consortium control land to the south west of Milton Keynes, south of the A421 and north of the line of the proposed Oxford to Cambridge railway line (hereafter referred to as the “Application Site”). The location and extent of the Application Site is shown on Drawing No. SWMK03-079-C and is also provided in **Appendix 1.1**
- 1.2 The Proposed Development site is wholly located within the administrative boundary of Aylesbury Vale District Council (AVDC), but the principal access points to the A421 will be within the administrative boundary of Milton Keynes Council (MKC). The planning application has been submitted to both AVDC and MKC, so that each planning authority can determine the elements of the Proposed Development that fall within their respective administrative areas.
- 1.3 It is anticipated that construction of the Proposed Development will commence in 2016/17, subject to the grant of planning permission, and that the Proposed Development will be completed by 2023/24. The key dates which have been used to assess the environmental impacts of the Proposed Development in this ES, are as follows:
- Planning Application submitted – 2014/15
 - Outline planning permission granted (one year from submission) – 2015/16
 - Reserved Matters approval (one year from outline permission) – 2016/17
 - Start Date – 2016/17
 - Infrastructure delivery (two years from outline permission) - 2017/18
 - Housing delivery (seven years from reserved matters) – 2017/18 to 2023/24
 - Completion – 2023/24.

Environmental Impact Assessment

- 1.4 The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (hereafter referred to as the “EIA Regulations”) set out the regulations on assessing the effects of certain projects on the environment. The Proposed Development falls within Category 10b (Urban Development Projects) of Schedule 2 of the EIA Regulations. The Proposed Development is Environmental Impact Assessment (EIA) Development because of the scale and nature of the environmental effects. It is likely to have significant environmental effects on agricultural land, landscape, ecology and transport, and on the existing farm businesses and residents of the nearest residential properties.
- 1.5 ID: 4-002-20140306 of the National Planning Practice Guidance (NPPG) provides a summary of the aim of the EIA process, which is to ensure that when decision-makers decide whether to grant planning permission for a project, they do so in the full knowledge of the likely

significant effects of that project on the environment. The likely significant environmental effects of the Proposed Development are identified and assessed in the ES for both the construction and operational phases. Where relevant, mitigation measures are proposed to prevent, reduce and offset significant adverse effects on the environment arising from the Proposed Development and these are described in respect of each environmental topic. The ES provides sufficient information to enable the decision makers (AVDC and MKC) to decide whether planning permission should be granted for the Proposed Development.

Development Parameters

- 1.6 It is neither feasible nor realistic for all aspects of a large scale development to be designed in detail at an early stage. The EIA Regulations require that an ES for an outline planning application provides a description of development that is sufficient to enable the likely significant effects to be identified. Therefore, Development Parameters have been identified in this ES in order to fix those aspects of the Proposed Development which are capable of giving rise to significant environmental effects. The Development Parameters have been established and assessed so that appropriate planning conditions can be defined to provide limits and controls for future reserved matters applications. The Development Parameters to be defined by planning conditions include:

- the location and types of land use;
- the maximum quantum of floorspace for the proposed uses;
- the maximum heights of development;
- landscaping and open space; and
- highway access and pedestrian and cycle linkages.

ES Structure

- 1.7 Regulation 2(1) of the EIA Regulations requires an ES to include at least the information set out in Part 1 Schedule 4. Table 1.1 below identifies the required information for the Proposed Development and where it can be found in the ES.

Table 1.1: ES Information

Required Information	Location within ES
1. A description of the development comprising information on the site, design and size of the development.	Chapter 2 (Application Site & Project Description)
2. A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.	All Technical Chapters (5 to 17)
3. The data required to identify and assess the main effects which the development is likely to have on the environment.	All Technical Chapters (5 to 17)
4. An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for the choice made, taking into account the environmental effects.	Chapter 3 (Policy Context & Alternatives)
5. A non-technical summary of the information provided under paragraphs 1 to 4 of this Part.	Non-Technical Summary

1.8 The ES comprises three separate volumes, which are as follows:

- Volume 1 - Main Report: providing the full text of the ES in 18 Chapters;
- Volume 2 – Technical Appendices: comprising the technical and supporting documents referred to in the relevant chapters of the ES; and
- Volume 3 – Non-Technical Summary: providing a concise summary of the Proposed Development, its likely significant environmental effects and the measures proposed to reduce, offset or avoid these effects.

Other Documents

1.9 In addition to the ES, the planning application is supported by a number of other documents, which are as follows:

- Application Forms/Ownership Certificates
- Planning Statement
- Design & Access Statement
- Sustainability Statement
- Flood Risk Assessment
- Retail Assessment
- Employment Assessment
- Statement of Community Involvement
- Arboricultural Assessment
- Transport Assessment & Travel Plans
- Energy Strategy
- S106 Heads of Terms
- Draft Construction Environmental Management Plan

ES Availability and Comments

1.10 The ES and the Technical Appendices can be purchased at a cost of £150 for printed copies, and £15 for a CD. All documents are available from:

Mark Hyde
Januarys
York House
7 Dukes Court
54-62 Newmarket Road
Cambridge CB5 8DZ

Telephone: 01223 326 825
E-mail: mjh@januarys.co.uk

1.11 The ES will also be available to view in the Planning Departments at AVDC and MKC, and on the planning applications database within the Councils' websites. All comments on the planning application should be sent to:

Head of Development Management
Planning Division
Aylesbury Vale District Council
The Gateway
Gatehouse Road
Aylesbury
HP19 8FF

Director of Planning & Transport
Department of Planning Services
Milton Keynes Council
PO Box 125
Civic Offices
1 Saxon Gate East
Milton Keynes
MK9 3ZL

2. APPLICATION SITE & PROJECT DESCRIPTION

Site Context

- 2.1 The Application Site straddles the boundary between the rural hinterland of Aylesbury Vale and the urban areas of Milton Keynes. To the north is the industrial area of Snelshall West and to the east is the established residential area of Far Bletchley. To the west and south of the Site is farmland and open countryside. The village of Newton Longville is located to the south of the Site.
- 2.2 The Application Site is located adjacent to Milton Keynes, which is a main centre in the region providing significant employment opportunities and containing a broad range of services and facilities. The Proposed Development includes walking, cycling and public transport infrastructure and facilities, which would connect to the existing networks in the surrounding area.
- 2.3 The surrounding area possesses an undulating land form characterised by a ridge running across the central length of the Site from east to west. The predominant topographic features are shallow ridges and valleys sloping away from this focal ridge line, which run broadly on a south west alignment.
- 2.4 The Site is well connected on a local, sub-regional and regional scale. The A421 immediately north of the Site enables connections to the established Milton Keynes grid road network also linking to the A5 and M1 which provide connections to the wider city and region respectively.

Application Site

- 2.5 The Application Site covers an area of 144.77 Ha and is located immediately to the west of Far Bletchley, at the south western edge of Milton Keynes. The boundaries of the Site are formed by the A421 (H8 Standing Way) and Buckingham Road (A4034) to the north, the disused former Oxford to Bletchley rail line to the south (due to be reopened as part of the East West Rail project), Whaddon Road to the west, and the existing residential area of Far Bletchley to the east. Weasel Lane – an existing bridleway and cycle route – cuts through the Site from Whaddon Road to Buckingham Road. There are other public rights of way across the Site, including the Milton Keynes Boundary Walk.
- 2.6 The Site currently comprises agricultural land. There are hedgerows and trees at some of the field boundaries. There are existing buildings on the Site, which are associated with the farm businesses and are in agricultural use.
- 2.7 An oil pipeline crosses the middle of the Site in a north south direction and a 10m wide exclusion zone for the pipeline is incorporated into the layout of the Proposed Development. There are high voltage overhead power lines crossing the north western part of the Site; the power lines will be placed underground as part of the Proposed Development. An intermediate pressure gas main passes through the eastern part of the Site in a north south direction; the gas main will fall within land set aside for the grid road reserve.

Sensitive Receptors

- 2.8 The likely significant effects on the potential receptors of the Proposed Development, both during construction and operation, have been considered in the various ES technical studies. The potential sensitive receptors are identified in Table 2.1 below.

Table 2.1 Potential Sensitive Receptors

Category	Sensitive Receptor/Land Use
Land Use	<p>Properties within the Application Site and in neighbouring residential areas including:</p> <ul style="list-style-type: none"> Residents at Chase Farm, Lower Salden Farm, The Leys Farmhouse, and Bletchley Leys Farmhouse; and Residents on edge of Bletchley, Far Bletchley, and Newton Longville.
Cultural Heritage	<ul style="list-style-type: none"> Newton Longville Conservation Area; Listed Buildings; Areas of Archaeological Interest including late prehistoric/Roman settlements within the Application Site; and, Areas of ridge and furrow.
Agricultural Land	<ul style="list-style-type: none"> Agricultural land quality comprising Grade 3a and sub-Grade 3b; and, Three existing farm businesses (two full-time and one part-time).
Ecology	<ul style="list-style-type: none"> Milton Keynes Wildlife Corridor Wetland and Woodland within the Application Site Railway Sidings east of Salden Wood/83F08 Semi-natural woodland Mature trees Hedgerows Great Crested Newts Bats Reptiles Breeding and Overwintering Birds Badgers
Landscape & Visual	<ul style="list-style-type: none"> Newton Longville Conservation Area; Landscape Character Areas of Newton Longville – Stoke Hammond Claylands, Whaddon Chase, and Horwood Claylands; Users of footpaths on Midshires and Swan's Way, Weasal Lane, Milton Keynes Boundary Walk, and at Cowpasture Farm and around Newton Longville; Residents at Chase Farm, Lower Salden Farm, The Leys Farmhouse, and Bletchley Leys Farmhouse; and Residents on edge of Bletchley, Far Bletchley, and Newton Longville.
Transport, Movement and Access	Vehicles, pedestrians and cyclists using the local

	<p>highway network, including at:</p> <ul style="list-style-type: none"> • A421 (Standing Way); • Whaddon Road; • Weasel Lane; • Milton Keynes Boundary Walk; and, • Other Rights of Way.
Water	<p>Existing watercourses at the Application Site and in the vicinity:</p> <ul style="list-style-type: none"> • Tattenhoe Brook; • Tributary of River Ouzel; and, • Field drains.

- 2.9 The effects of the Proposed Development on the identified sensitive receptors are assessed in the relevant chapters of this ES (Chapters 5 to 18) and the ES technical studies. For example, the significant effects on the sensitive ecological receptors are assessed in Chapter 7: Ecology and the various habitat and protected species surveys contained in Appendices 7.1 to 7.6.

Project Description

- 2.10 The description of the development for the purpose of the planning application is as follows:

Outline planning application with all matters reserved except for access for a mixed-use sustainable urban extension on 144.77 Ha of land to the south west of Milton Keynes, to provide for the following:

- up to 1,855 mixed tenure dwellings (C3) on 54.16 Ha of land;
- an employment area (B1) on 2.07 Ha of land;
- a neighbourhood centre on 0.67 Ha of land accommodating retail (A1/A2/A3/A4/A5), community (D1/D2) and residential (C3) uses;
- provision of a primary school on 3.0 Ha of land;
- provision of a secondary school on 5.2 Ha of land;
- allotment space on 1.22 Ha of land;
- ground remodelling;
- 55.75 Ha of multi-functional green open space including: parkland, sports and recreational facilities with pavilion/changing facilities; play areas, wildlife areas, a range of strategic open spaces including a community orchard and new landscaping;
- a Sustainable Drainage Scheme including 5.05 Ha of land for surface water attenuation measures;
- associated infrastructure including new junctions to the A421, Whaddon Road and Buckingham Road, primary streets, residential streets, pedestrian footpaths and cycle routes, foul water pumping stations and statutory undertakers equipment;
- a Grid Road Reserve of 7.24 Ha;
- highway improvements on 5.56 Ha;
- public transport infrastructure, car and cycle parking for all uses; and
- undergrounding of 132Kv overhead power lines.

Development Parameters

2.11 The Development Parameters are defined on the Parameter Plans, as follows:

- Site Location Plan (Drawing No. SWMK03-079-C)
- Development Framework Plan (Drawing No. SWMK03-073-H)
- Parameter Plan (Drawing No. SWMK03-074-G)

2.12 We identify below the matters that form part of the Development Parameters.

Overall Development Concept

2.13 The Proposed Development would form part of Milton Keynes. It would in effect be an urban extension, which has been designed to be a standalone new neighbourhood following the place-shaping principles identified in Policy CS6 of the Milton Keynes Core Strategy. The area for each land use is set out in Table 2.2 below.

Table 2.2 Land Uses

Land Use	Ha
Allotments	1.22
Employment	2.07
Green Open Space	55.75
Grid Road Reserve	7.24
Infrastructure	4.87
Local Centre	0.67
Primary School	3.00
Secondary School	5.20
Water Attenuation	5.05
Residential	54.16
Sub-Total	139.21
Highway Improvements	5.56
Total	144.77

Residential Development

2.14 Up to 1,855 mixed tenure dwellings, including a range of affordable housing types to be provided on site. Up to 30% of the overall housing target will be affordable, which would equate to up to 557 affordable dwellings. The proportion of affordable housing to be provided within the overall development would be specified in the S106 Agreement. The residential development would be located on the southern part of the Site and in the north western quadrant.

Neighbourhood Centre

2.15 A neighbourhood centre is provided, comprising retail and community uses with residential uses on the upper floors. It would be provided in a mixed-use area in the north eastern part of the Site.

Schools

- 2.16 5.20 Ha of land is provided for a four form of entry Secondary School. The secondary school is located on the eastern boundary of the Site, providing good access to and from existing and proposed residential areas and also good connections to the highway network and walking, cycling and public transport networks. 3 Ha of land is provided for a three form of entry Primary School with pre-school provision. The primary school is located towards the centre of the Site, making it readily accessible to all residents of the Proposed Development.

Employment

- 2.17 Class B1 employment uses are provided on 2.07 Ha of land in the north eastern part of the Site, opposite Snelshall West employment area, in a visible location and providing good access to the A421 and the wider strategic highway network.

Density Parameters

- 2.18 The Proposed Development includes a variety of residential densities, as shown on the Residential Density Plan (Drawing No. SWMK03-082-C). The average density is 35 dwellings per hectare (dph), which is a typical for other Milton Keynes expansion areas. Lower densities are proposed at the more sensitive boundaries, and higher densities close to the primary routes and at the neighbourhood centre. The distribution of densities across the Site is as follows:

- 20-25 dph – southern and eastern edges in more visually sensitive locations
- 25-35 dph – within locations not visible from public vantage points
- 35-40 dph – edge of site adjacent to primary routes
- 40-45 dph – close to employment and neighbourhood centre

Height Parameters

- 2.19 The height of buildings within the Proposed Development is shown on the Parameter Plan (Drawing No. SWMK03-074-G). The plan shows the maximum building heights within the Proposed Development, taking into account topography and AOD. The proposed building heights for the different uses are as follows:

- Residential: – 2 to 3 storeys up to 11m, with three storeys along primary routes and at key entrances or intersections in order to provide landmark or gateway buildings.
- Employment Area: – up to 12m, which is similar to other employment sites opposite and adjacent to A421 and these uses need visibility.
- Neighbourhood Centre – up to 13m, with retail and community uses at ground floor and residential above.
- Primary School – up to 10m and 2 storeys for efficient use of site.
- Secondary School – up to 12m.

Access

- 2.20 The Proposed Development includes improvements to the existing highway network, comprising the following: new highways access points to Whaddon Road, Buckingham Road, and a left in/left out junction onto the A421; junction improvements to Tattenhoe Roundabout and Bottle Dump Roundabout close to Central Milton Keynes and on the A421 (including revised access arrangements to the Pearce Recycling site); traffic calming in adjacent villages such as Newton Longville to discourage rat-running and high-speed traffic; and, a grid road reserve for the A4146 and A421 link road. At this stage the primary access points and the primary and secondary routes through the site are identified, although in due course a local streets and neighbourhood network will also be identified. Weasel Lane – an existing bridleway and cycle route – cuts through the Site from Whaddon Road to Buckingham Road. There are other public rights of way across the Site, including the Milton Keynes Boundary Walk. These rights of way will be retained and incorporated into the Proposed Development. Sustrans Route 51 crosses the Application Site. The Proposed Development includes walking, cycling and public transport infrastructure and facilities, which would connect to the existing networks in the surrounding area thus providing residents with the opportunity to travel by non-car modes of transport.

Open Space and Green Infrastructure

- 2.21 The Proposed Development includes open space and recreation facilities within the site, including a local park and district park, formal sports pitches, tennis courts and a Multi-Use Games Area (MUGA), a skateboard park, children's play areas comprising two Neighbourhood Equipped Area of Play (NEAP) and eight Local Equipped Area of Play (LEAP), and allotments. These facilities are located where they are easily accessible to residents within the Proposed Development and also from neighbouring areas.

Sustainability – Energy Use and Water Conservation

- 2.22 The Proposed Development has the characteristics of sustainable development in the following matters: energy efficiency and carbon reduction; sustainable transport; water resource management; information and communications technology; business and employment; healthy community; social well-being and governance; landscape and biodiversity; materials, waste and recycling; and, housing.

Drainage

- 2.23 The majority of the Site lies within Flood Zone 1 and therefore is at low risk of flooding. The north western corner of the Site is within Flood Zone 3 and as such is at high risk of flooding. However the Environment Agency has no records of flooding at the site. All buildings will be located within Flood Zone 1. The Proposed Development will include sustainable drainage systems comprising green roofs, rainwater harvesting and permeable paving, and attenuation basins will be included to attenuate surface water run-off to green field rates. The Proposed Development incorporates drainage infrastructure, foul water pumping stations and statutory undertakers' equipment.

Waste Management

- 2.24 The Proposed Development would generate construction, household, commercial, and organic waste. The appointed contractor will prepare a voluntary Site Waste Management Plan (SWMP). A separate Construction & Environmental Management Plan will be prepared to deal with dust, noise, health and safety during the construction phase. The SWMP will include measures to minimise the amount of waste generated and disposed of during the site clearance and construction phase of the Proposed Development. The Proposed Development will include both internal and external waste and recycling storage facilities, and exterior storage space will be provided for home composting and community composting facilities may also be an option. The Proposed Development will include Bring Sites within publicly accessible areas such as supermarkets and public car parks to provide additional recycling opportunities.

3. POLICY CONTEXT & ALTERNATIVES

Introduction

- 3.1 Schedule 4 of the EIA Regulations requires an ES to provide:

“...an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects.”

- 3.2 The planning background to development in the SWMK Area – including the Application Site - provides the context for this planning application. The SWMK Area refers to the broad area on the south western edge of the urban area of Milton Keynes, between the A421 to the north and the disused former Oxford to Bletchley rail line to the south. The identification of a potential urban extension area to the south west of Milton Keynes emerged from a series of studies over the last twenty two years. As set out below, the SWMK Area has been considered at a strategic level through the former Milton Keynes South Midlands Sub Regional Strategy, the South East Plan, the Vale of Aylesbury Proposed Submission Core Strategy and the Consultation Draft Salden Chase Masterplan & Delivery SPD processes. In all cases, the SWMK Area has been assessed as a suitable and sustainable location for development. The Application Site has been comprehensively considered for mixed use development at a strategic level, and it has been compared with realistic alternatives during that process.
- 3.3 Alternative layouts have been considered, which are explained in the Design & Access Statement, and the design of the Proposed Development has evolved from on-site constraints and as a result of feedback from consultation.

Strategic Background

- 3.4 We highlight below some of the relevant background contained in technical studies to inform development plan documents, which identified land in the SWMK Area (including the Application Site) as a suitable and sustainable location for development.

Technical Studies

- 3.5 Three studies were commissioned from Llewellyn Davies (1992, 1996 & 1998) by a consortium of public sector bodies comprising Buckinghamshire, Bedfordshire and Northamptonshire County Councils, Milton Keynes Borough Council, Aylesbury Vale, Mid Bedfordshire and South Northamptonshire District Councils, the then Commission for New Towns and the Government Office for the South East. The studies consistently identified the SWMK Area as a ‘development area without major problems’. Llewellyn Davis concluded that no overriding constraints stood in the way of the site and that the juxtaposition of road and rail created opportunities for public transport options, constituting significant advantages in the site’s favour.
- 3.6 A study was commissioned from David Lock Associates (1999) by Milton Keynes Chamber of Commerce that addressed the potential for development in and around the City. The report recommended that the City’s future growth should be concentrated on the A421 axis,

reinforced by east-west rail. The report concluded that an east-west axis of growth complemented the existing development form and created opportunities for public transport enhancement.

- 3.7 In July 2001 Roger Tym & Partners were commissioned by the Government and Regional Assemblies and Regional Development Agencies for the South East, East of England and East Midlands to study the growth potential of the Milton Keynes & South Midlands area. The study report was published in September 2002 and recommended a preferred spatial strategy for Milton Keynes with the SWMK Area being identified as a site with potential for development by 2016.
- 3.8 Subsequently a further study was commissioned from Roger Tym & Partners. The Milton Keynes Growth Area Study, published in 2003, was prepared to inform the Examination in Public of the Draft Milton Keynes & South Midlands Sub-Regional Strategy. The final study report identified the SWMK area as one of only three locations to meet development requirements to 2016. The Growth Area Assessment identified and assessed a range of locations on the edge of Milton Keynes to meet long term growth. We consider the potential alternative locations in more detail below.
- 3.9 The Faber Maunsell (2003) Milton Keynes Public Transport Long Term Vision further reinforced the importance of an east-west growth corridor embracing the A421, together with development of SWMK, involving public transport and the provision of a park and ride interchange.
- 3.10 In 2006 GVA Grimley was commissioned by the Milton Keynes Partnership to assess options for the growth of Milton Keynes, which would inform the South East Plan. The Growth Strategy for Milton Keynes: Options for Growth Evaluation assessed a range of potential growth scenarios, and identified land to the south west of Milton Keynes as a future growth area.
- 3.11 In 2006 Colin Buchanan was asked by Buckinghamshire County Council and AVDC to review the expansion proposals put forward by the Milton Keynes Partnership in the draft Milton Keynes 2031 Strategy. Colin Buchanan's Milton Keynes Long Term Growth Strategy Review (2007) suggested alternative strategies for the growth of Milton Keynes, including an allocation for 2,700 dwellings in the SWMK Area. The study noted that there is capacity in landscape terms to absorb development in this location.

Regional/Sub-Regional Development Plans

- 3.12 The Milton Keynes and South Midlands Sub-Regional Strategy published in 2005 identified land to the south west, between the A421 and the railway line to Oxford as a growth location. The Spatial Diagram of the Sub-Regional Strategy is contained in **Appendix 3.1**.
- 3.13 The Draft South East Plan was submitted to Government in March 2006 and an Examination in Public was held between November 2006 and March 2007, and was adopted in May 2009. Policy MKAV1 includes a requirement for an urban extension to the south-west of Milton Keynes. **Appendix 3.2** contains an extract from the adopted Milton Keynes and Aylesbury

Vale Strategy from the South East Plan, including Diagram MKAV1 which specifically identified a Strategic Development Area at SWMK – the SWMK SDA Area.

Draft Aylesbury Vale Core Strategy

- 3.14 The Submission Draft Aylesbury Vale Core Strategy, published for consultation in June 2009, sought to deliver strategic growth to the south west of Milton Keynes. Draft Policy CS4 (North East Aylesbury Vale SDA) supported the allocation of 5,390 dwellings plus infrastructure to the south of the A421 and north of the railway line to the west of Far Bletchley and to the north of Newton Longville. **Appendix 3.3** contains the draft AVDC Core Strategy policy (Policy CS4) and supporting text for North East Aylesbury Vale SDA i.e. the former SWMK SDA Area.

Draft SPD for the Masterplanning & Delivery North East Aylesbury Vale SDA

- 3.15 In January 2010 Aylesbury Vale District Council prepared a Draft SPD for the Masterplanning & Delivery North East Aylesbury Vale SDA which sought to deliver Policy CS4 of the Draft Core Strategy. The NE Aylesbury Vale SPD considered three potential areas for the SDA, one of which was the former SWMK SDA Area. AVDC prepared a Core Strategy Evidence Paper North East Aylesbury Vale Strategic Development Area (SDA) (March 2009) to consider the merits of the three potential areas. Section 7: Conclusions from the Evidence Paper, compared the three sites against place-shaping principles and the SA objectives. The former SWMK SDA Area was referred to as Site B, and was selected as the preferred location for the SDA at SWMK, based on its sustainability credentials. **Appendix 3.4** contains the Location Plan for NE Aylesbury Vale SDA from the Masterplan & Delivery SPD.
- 3.16 It is clear that strategic development to the south west of Milton Keynes was accepted through technical studies and previous development plan documents as the most suitable and preferred site for an urban extension in this location. We set out below the outcome of the site selection processes for the Milton Keynes South Midlands Sub-Regional Strategy and the Draft Masterplanning & Delivery North East Aylesbury Vale SDA SPD. The site selection processes undertaken for these documents demonstrate that alternative locations for an urban extension to Milton Keynes have been considered and assessed.

Consideration of Alternative Sites

- 3.17 Alternative locations for an urban extension to the south west of Milton Keynes have been considered and assessed in two documents: Milton Keynes Growth Area Study - Roger Tym & Partners (May 2003); and, Draft SPD for the Masterplanning & Delivery North East Aylesbury Vale SDA (January 2010). The outcome of those assessments demonstrates that the Application Site has emerged as the most suitable location for the Proposed Development.

Milton Keynes Growth Area Study - Roger Tym & Partners (May 2003)

- 3.18 The Milton Keynes Growth Area Study was prepared to inform the Examination in Public of the Draft Milton Keynes & South Midlands Sub-Regional Strategy. The Study considered and assessed a wide range of options for urban extensions on the periphery of Milton Keynes.

The assessment process was undertaken in three stages: Stage 1 assessed broad locations for growth; Stage 2 examined a long list of land parcels; and, Stage 3 assessed the preferred scenario. The assessment process is set out in Chapters 5 and 6 of the Study, which are contained in **Appendix 3.5**.

- 3.19 Figure MK2: Stage 1 Testing of Long Term Growth Options identifies the 7 potential strategic development locations. The Application Site falls within Area 1: South West of Bletchley. The conclusions of the Stage 1 assessment for Area 1 were:

“Good potential close to railway line and on Bletchley side of Newton Longville. Limited potential for expansion to south east of Whaddon subject to further appraisal. Requires local analysis and testing outside present scope – assume small scale growth for present study purposes.”

- 3.20 Area 1 was carried forward to Stage 2. At Stage 2 the suitable strategic locations were divided into land parcels. Those land parcels are shown on Figure MK3: Stage 2 Testing of Long Term Growth Options. Figure MK3 shows 10 potential land parcels to the south west of Milton Keynes: MK2 (a, b and c), MK3 (a and b), MK4, MK5 (a and b), MK6 and MK7. The Application Site falls within Parcels MK3a and MK4. The land parcels were assessed against a series of criteria which were summarised in Paragraph 5.12 of the Study as:

- *Environmental impact – landscape, natural habitats, cultural heritage and community identity.*
- *Planning Issues – land contamination, natural resources (minerals, agricultural land and water), land stability, flooding, proximity to sources of noise, and woodland protection.*
- *Access – to public transport, services and facilities, employment sites and the highway network.*
- *Infrastructure – waste water treatment, electricity and water.*
- *Ease of implementation.*

- 3.21 Paragraph 5.17 of the Study sets out the conclusions of the assessment process for the sites to the south west of Milton Keynes. It states:

“Seven sites have been examined in the South West of Milton Keynes, running in an arc from the A421 near Tattenhoe Park, via Newton Longville to the West Coast Mainline near Newton Leys. All of the sites lie within Aylesbury Vale District. Sites MK3a, 3b and 4 are located between the A421 and the unused rail line to Oxford. Like the sites around Whaddon, this area was also part of Whaddon Chase but the remaining areas of Ancient Woodland have been excluded from the potential development areas. Outside these woodlands there are no major environmental or natural resource constraints on any of these three sites and they are both well located in terms of access to existing roads, the proposed southern bypass and the East-West rail corridor. Development of Newton Leys for employment uses would also strengthen the potential of the area.”

- 3.22 The Study recommended that Parcels MK3a and MK4 should be identified as development areas for the period to 2016. Figure MK4: Preferred Spatial Strategy shows the location of the additional development areas, including land at SWMK and the Application Site.

Draft SPD for the Masterplanning & Delivery North East Aylesbury Vale SDA

- 3.23 Aylesbury Vale District Council prepared a Draft SPD for the Masterplanning & Delivery North East Aylesbury Vale SDA which sought to deliver Policy CS4 of the Draft Core Strategy. The NE Aylesbury SPD considered three potential areas for the SDA, one of which was the former SWMK SDA Area. In March 2009 AVDC prepared a Core Strategy Evidence Paper North East Aylesbury Vale Strategic Development Area (SDA) to consider the merits of potential areas to accommodate an urban extension to the south west of Milton Keynes. Section 4 (Alternative Proposals for Meeting the SEP Requirement) of the Evidence Paper identifies the potential sites to accommodate that development. Section 4 is contained in **Appendix 3.6**. Figure 4.2 in the Evidence Paper shows the three areas which were subject to detailed evaluation. The Application Site falls within the eastern part of Site B: Salden Chase. The other potential sites assessed were Site A: North of the A421 and Site C: West of Newton Leys.
- 3.24 Section 7 (Conclusions from the Evidence Paper), compared the three sites against the place-shaping principles and the outcome of the SA results. Section 7 is contained in **Appendix 3.6**. Site B was selected as the preferred location for the strategic development area at SWMK, based on its sustainability credentials. The outcome of the assessment of potential sites is summarised in Paragraphs 7.2 and 7.3 of the Evidence Paper, which state:

“It is considered that the evaluation confirms the initial high-level assessment against the draft place-shaping principles set out in Section 5 of this paper, and further evaluation against other potential constraints criteria support the conclusion that Site B – Salden Chase – is the most appropriate location for the North-East Aylesbury Vale SDA. A Land Suitability Assessment undertaken for MK2031 identified it as the least constrained area, and it particularly has potential to make an important contribution to the Milton Keynes linear park system and the achievement of the North-East Aylesbury Vale SDA transport strategy.

A Sustainability Appraisal (SA) of the three sites has also been undertaken. This evaluates the three sites (Site A, Site B and Site C) against the 17 SA objectives; these include delivery of housing, impact on climate change, mitigation of flooding and provision of business and employment. The SA scores the sites against the objectives ranging from a major negative impact to a minor negative impact. As can be seen in the below summary table Site B scores the best overall with the least number of major negative impacts and the highest number of positive impacts (both major and minor).”

Consideration of Alternative Site Layouts

- 3.25 The process to establish the design and layout of the Proposed Development is described in detail in Section 4 of the Design & Access Statement. The design and layout evolved from an

iterative design process alongside an appraisal of the physical characteristics of the site, site constraints and an extensive series of workshops and consultations.

- 3.26 The site analysis demonstrates that the Proposed Development area has clearly defined boundaries. The boundary of the Site is formed by the A421 and Buckingham Road to the north, the disused former Oxford to Bletchley rail line to the south, Whaddon Road to the west, and the existing residential area of Far Bletchley to the east. A defensible boundary would be required to the west where the Site fronts open countryside, which has been addressed by strategic landscaping on the western boundary. The significant ridge line across the Site provides opportunities to create views into and out of the site. The Site has a varied topography, and the undulating land form creates three discrete land parcels with different characteristics. The land form also influences the drainage strategy for the Site and the location of surface water attenuation within the Proposed Development. There are existing public rights of way and a bridleway/cycle route through the Site, and there is an established road network in the surrounding area, and the Proposed Development must connect to these existing links. The Site contains existing landscape, ecological habitats, and archaeological features which would be retained within the Proposed Development. The areas of archaeological interest - four areas of late prehistoric/Roman settlement - will be preserved in the open space or school playing fields within the Proposed Development. The Site contains a variety of utilities infrastructure. Exclusion zones are required for the oil pipeline and intermediate pressure gas main, and these areas are kept free of development within green infrastructure and highway corridors. The high voltage overhead power lines which cross the Site can be placed underground as part of the Proposed Development. The proximity of the rail line at the southern boundary requires a buffer to be retained and careful design in order to avoid any adverse noise or visual impacts. The existing features of the Site have influenced the design and layout of the Proposed Development.
- 3.27 In addition to the existing physical characteristics and the various constraints and opportunities that the site presents, the development concept has also been influenced by the intrinsic functional character and structure of Milton Keynes. The Proposed Development would form part of Milton Keynes. It would in effect be an urban extension which includes some of the characteristic features of the City, such as self-contained residential neighbourhoods surrounded by substantial areas of open space and strategic landscaping, and it would connect to the existing grid road network. It has been designed to be a standalone new neighbourhood which follows the place-shaping principles identified in Policy CS6 of the Milton Keynes Core Strategy. This approach was discussed with both AVDC and MK during design process.
- 3.28 The final illustrative masterplan for the site is the result of a series of pre-application discussions and workshops which have considered alternative designs and layouts for the Proposed Development. In summary, four versions of the illustrative masterplan have been prepared; a first draft in June 2012 (see **Appendix 3.8**), revised drafts in April 2013 (see **Appendix 3.9**) and September 2013 (see **Appendix 3.10**), and the final version in September 2014 (see **Appendix 3.11**). The main amendments that have occurred during the illustrative masterplan process have been the relocation of the employment area, neighbourhood

centre, and primary school, the addition of a secondary school, and the location and extent of the green infrastructure and open space areas. The amendments were made as a result of consultation feedback from the pre-application discussions and the outcome of the workshops.

4. ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

Introduction

- 4.1 This chapter explains the EIA methodology and describes the ES structure and content. It provides details of the process of identifying and assessing the likely significant environmental effects of the Proposed Development.
- 4.2 The content and conclusions of the ES are based on an assessment of the Development Parameters identified in Chapter 2, the baseline surveys and a series of technical studies. Any cumulative and interactive effects have also been taken into account as part of this assessment process, as noted below in Paragraph 4.21 to 4.32 and in the Technical Chapters (5 to 17).

General Approach

- 4.3 The ES has been prepared in accordance with the EIA Regulations which implement European Council Directive No. 85/337/EEC as amended by European Council Directive No. 97/11/EC. The practice guidance on EIA, which has been followed for this ES, includes the following documents:
- National Planning Practice Guidance (NPPG) (published 6th March 2014); and,
 - Guidelines for Environmental Impact Assessment, Institute of Environmental Management and Assessment (IEMA) 2004.
- 4.4 ID: 4-003-20140306 of the NPPG provides a summary of the stages of preparing an EIA, including the screening and scoping stages and preparing the ES.
- 4.5 The Government has indicated that it intends to review the requirements for EIA and issue new regulations in the near future. It is likely that the existing requirements will be simplified and reduced rather than new requirements added. If required an addendum will be prepared to this ES to take into account any new regulations.

Scoping

- 4.6 The purpose of requesting a Scoping Opinion is to obtain a formal opinion from the Local Planning Authority on what should be included in the ES. It is an important tool for identifying the likely significant effects of a proposed development through its design, construction and completed phases and ensures that appropriate mitigation options are considered, where necessary.
- 4.7 In January 2013 a formal EIA Scoping Opinion request was submitted to AVDC – the letter and supporting documents are provided in **Appendix 4.1**. This included a Scoping Report prepared on behalf of the Applicant which set out initial thoughts on the proposed content of the ES.

4.8 The Scoping Report concluded that the topics that require consideration as part of the assessment process are as follows:

- Archaeology and Cultural Heritage;
- Agricultural Land;
- Ecology (flora and fauna);
- Landscape Character and Visual Resources;
- Hydrology and Drainage;
- Traffic, Movement and Access;
- Air Quality;
- Noise;
- Socio-Economic Issues;
- Services and Utilities; and
- Interactive and Cumulative Impacts.

4.9 AVDC consulted MKC, Buckinghamshire County Council and other statutory advisors on the Scoping Report. Consultation responses to the Scoping Report were provided on the following matters: waste, noise and vibration, odour, green infrastructure, historic environment, rights of way, flood risk, contaminated land and transport. With the exception of green infrastructure, waste and contaminated land all of these matters had already been identified for assessment in the Scoping Report. Green infrastructure provision is not considered to be a matter for assessment within an ES. On 16th September 2013, AVDC adopted a scoping opinion which confirmed that the matters identified in the Scoping Report were those that should be covered in the ES – see letter in **Appendix 4.2**. The SWMK Consortium subsequently decided to address waste and contaminated land matters in addition to the topics mentioned above; and relevant chapters have been included within this ES. Chapter 15 deals with waste and contaminated land is addressed in Chapter 16: Soil and Ground Conditions.

Assessment Methodology

4.10 The EIA Regulations require that that an ES should identify, describe and assess the likely significant effects of a development on the environment. Therefore, this ES identifies, describes and assesses the likely significant effects of the Proposed Development during both the construction phase and once completed.

4.11 ID: 4-040-20140306 of the NPPG provides a summary of the aspects of the environment that need to be considered in an ES. It states:

“The list of aspects of the environment which might be significantly affected by a project is set out in Schedule 4 [EIA Regulations], and includes population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the factors. Consideration should also be given to the likely significant effects resulting from the use of natural resources, the emission of pollutants, the creation of nuisances and

the elimination of waste. In addition to the direct effects of a development, the Environmental Statement should also cover indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects where these are significant. These are comprehensive lists, and a particular project may give rise to significant effects, and require full and detailed assessment, in only one or two respects.”

- 4.12 The environmental effects have been evaluated against definitive standards and legislation where available. Where it has not been possible to quantify effects, qualitative assessments have been carried out, based on available knowledge and professional judgement. Where uncertainty exists, this has been noted in the relevant assessment chapter.

Determining Significance

- 4.13 The significance of effects reflects the relationship between two factors:
- The actual change taking place to the environment i.e. the magnitude or severity of an impact; and
 - The sensitivity, importance or value of the affected resource or receptor.
- 4.14 The magnitude of an effect is often quantifiable in terms of, for example, extent of land take, or predicted change in noise levels. The sensitivity, importance or value of the resource or receptor is normally derived from:
- Legislative controls;
 - Designated status within the land use planning system;
 - The number of individual receptors such as residents;
 - An empirical assessment on the basis of characteristics such as rarity or condition; and/or
 - The ability of the receptor to absorb change.
- 4.15 Significance will generally be classified as major, moderate or minor (although each discipline uses slightly different terminology). The three levels of significance are:
- Major – an effect which in isolation could have a material influence on the decision making process;
 - Moderate – an effect which on its own could have moderate influence on decision making, particularly when combined with other similar effects; or
 - Minor – an effect which on its own is likely to have a minor influence only on decision making but when combined with other effects could have a more material influence.
- 4.16 Effects of ‘major’ or ‘moderate’ significance are considered to equate to significant effects in the context of the EIA Regulations.
- 4.17 The effects are also described as:
- Adverse – detrimental or negative effects to an environmental resource or receptor; or

- Beneficial – advantageous or positive effect to an environmental resource or receptor.

- 4.18 Each of the technical chapters or accompanying technical appendices provides the criteria, including sources and justifications, for quantifying the different levels of effect. Where possible, this has been based upon quantitative and accepted criteria, together with the use of value judgements and expert interpretations to establish the extent to which an effect is likely to be environmentally significant.
- 4.19 For the Proposed Development, the short to medium term effects would be those associated with the site clearance and construction phase, and comprise potential effects on the following: agricultural land, farm buildings, ecology, landscape, transport, air quality, noise, utilities, waste, soil and ground conditions, and socio-economic. The medium to long term effects would be those associated with the operational phase, and comprise potential effects on the following: ecology, landscape, transport, air quality, waste and socio-economic matters. As set out in this ES some of the effects are positive.

Baseline Conditions

- 4.20 The ES includes a description of the ‘baseline’ environmental conditions against which the likely significant environmental effects of the Proposed Development have been assessed. The ‘baseline’ conditions are those that exist at or shortly before the submission of the planning application i.e. July 2014.

Cumulative and Interactive Effects

Cumulative Effects

- 4.21 A requirement of the EIA Regulations is to assess cumulative effects. Section 11.3 of the 2003 IEMA Guidelines for Environmental Impact Assessment provides guidance on cumulative impacts. Paragraph 11.3.1 of the Guidelines quotes the United States Council on Environmental Quality definition of cumulative effects, which is as follows:

“the impacts on the environment which result from incremental impacts of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time”.

- 4.22 In summary, the cumulative effects arising from other planned and committed developments, which collectively with the Proposed Development, would lead to significant effects are as follows:
- Landscape: Developments at Tattenhoe Park and Newton Leys.
 - Noise: Additional traffic on local roads from known committed developments.
 - Air Quality: Predicted traffic generation from 45 allocated sites and land parcels which are proposed within Milton Keynes Council’s housing trajectory up to 2026.

- Residents of nearest residential properties: Cumulative effects arising from changes to landscape, air quality and noise during construction and operation.

Interactive Effects

- 4.23 Interactive effects arise where the effects of development on one environmental topic bring about changes in another topic. These interactive effects are reviewed in each of the technical chapters of this ES. The interactive effects identified for the Proposed Development relate to water e.g. surface water run-off, hydrocarbon pollution of groundwater and controlled water.

Structure of Technical Chapter

- 4.24 Through the EIA process, the likely significant environmental effects of the Proposed Development are assessed. Each key environmental topic has been assigned a separate chapter in the ES (Chapter 5 to 16), and within each of these chapters the information that will inform the EIA process has been set out in the following way:

- Introduction – a brief summary of what is considered in the chapter.
- Planning Policy Context – a review of national and development plan policies that are relevant to the environmental topic;
- Assessment Methodology – an outline of the methods used to undertake the technical studies with reference to legislation, published standards, guidelines, best practice and any relevant significance criteria;
- Baseline Conditions – a description of the environmental conditions against which the likely significant environmental effects of the Proposed Development have been assessed;
- Likely Significant Effects – the identification and assessment of the likely significant environmental effects of the Proposed Development during the construction and operational phases;
- Mitigation Measures – the development of mitigation measures to avoid, offset or reduce the significant adverse effects of a project during the design, construction or operational phases;
- Residual Effects – the identification of the remaining effects of the Proposed Development, after the implementation of available mitigation measures, and an assessment of the significance of those residual effects;
- Cumulative Effects – the identification of effects which arise from the combination of effects from the Proposed Development and from other planned or committed schemes in the vicinity;
- Interactive Effects – the identification of effects which arise from changes in one environmental receptor on another environmental receptor; and
- Summary – a summary of the key finding of the ES chapter.

Assumptions and Limitations

- 4.25 The assumptions that have been made when preparing this ES are as follows:

- All of the principal existing land uses adjoining the Application Site remain;

- Construction will commence in 2016/17 (subject to gaining planning permission) and will be completed in by 2023/24;
- The Proposed Development will be constructed in accordance with the Development Parameters;
- Conditions will be attached to the planning permission that will control disturbance during the construction works;
- Necessary off-site services infrastructure for the Proposed Development will be provided by statutory undertakers; and
- The planning permission, when granted, will contain conditions that will be sufficient to limit the Proposed Development to that which has been assessed.

5. ARCHAEOLOGY & CULTURAL HERITAGE

Introduction

5.1 This chapter evaluates the impacts of the Proposed Development on the historic environment. The historic environment includes a wide range of features resulting from human intervention in the landscape, varying in scope from buried archaeological remains up to late 20th century industrial structures. It can be divided into the following two categories:

- i) Archaeology
 - Scheduled Ancient Monuments (SMs).
 - Archaeological finds and sites.
 - Historic Battlefields, Shipwrecks and World Heritage Sites are not considered within this chapter because there are no such designations within the study area.
- ii) Built Heritage
 - Listed Buildings (Grades I, II*, and II).
 - Registered Parks and Gardens (Grades I, II* and II).
 - Conservation Areas.

5.2 The key objectives of the historic environment assessment are to:

- Assess the potential impact of construction of the Project on known and potential archaeological heritage assets and to evaluate the significance of the impact;
- Assess the impacts of the operation of the Project on designated heritage assets including consideration of their settings;
- Identify measures for avoiding or mitigating potential impacts; and detail any residual impacts that cannot be mitigated.

Planning Policy Context

Local Context

5.3 The Local Plan framework is provided by the Aylesbury Vale District Local Plan (January 2004) which has the following saved heritage policies:

“Policy GP.53

In conservation areas the council will seek to preserve or enhance the special characteristics that led to the designation of the area.

Proposals for development will not be permitted if they cause harm to the character or appearance of conservation areas, their settings or any associated views of or from the conservation area.

Proposals for development or redevelopment must respect the historic layout, scale and form of buildings, street patterns, open spaces and natural features in the conservation area that contribute to its character and appearance.”

Proposals for alterations, extensions and changes of use must respect and complement the character, materials and design details of the structure and site concerned and its neighbours

Policy GP.59

In dealing with development proposals affecting a site of archaeological importance the Council will protect, enhance and preserve the historic interest and its setting.

Where research suggests that historic remains may be present on a development site planning applications should be supported by details of an archaeological field evaluation. In such cases the council will expect proposals to preserve the historic interest without substantial change.

Where permission is granted for development involving sites containing archaeological remains the council will impose conditions or seek planning obligations to secure the excavation and recording of the remains and publication of the results.”

5.4 Milton Keynes Core Strategy (2013) policy CS19 covers the historic environment:

Policy CS19 - The Historic and Natural Environment

Developments will protect and enhance the significance of the Borough’s Heritage Assets, including important elements of the 20th Century New Town architecture. Development proposals must consider the character, appearance and setting of sites, buildings, structures, areas, parks and gardens and landscapes that are of historic, architectural, cultural, biodiversity or archaeological significance.

5.5 Relevant saved historic environment policies in the Milton Keynes Local Plan 2001-2011 (December 2005) are:

Policy HE1 - Protection of Archaeological Sites

Planning permission will be refused for development proposals that would have an adverse impact upon a Scheduled Ancient Monument or its setting, or unscheduled site of local, regional or national importance or their settings.

Where development is proposed affecting an unscheduled site of known archaeological interest then archaeological investigations will need to be carried out to establish a mitigation and/or excavation strategy prior to development being permitted.

Where development is permitted, consent will be subject to a legal agreement and/or conditions, to ensure that:

- (i) *Archaeological remains are preserved in situ; or*
- (ii) *In appropriate circumstances, provision is made for the evaluation, excavation and recording of below and above ground archaeological remains prior to and during development, followed by post excavation research and publication of the results of the investigation.*

Policy HE5 - Development Affecting The Setting Of A Listed Building

Planning permission will be refused for any form of development that would adversely affect the setting of a listed building or group of listed buildings. This setting may extend well beyond their immediate building curtilage(s) and may include an extensive street scene or a wider urban design context, especially when the application site is located within a designated conservation area.

Applications may need to be advertised under sections 67 or 73 of the Planning (Listed Buildings and Conservation Areas) Act 1990 and may, in appropriate cases, require the concurrent submission of details relating to the siting, access, design, external appearance and landscaping of the proposed development

Policy HE6 - Conservation Areas

Development proposals within or affecting the setting of a Conservation Area should preserve or enhance the character and appearance of the area. The criteria used to assess such proposals are set out in English Heritage Guidance on the Management of Conservation Areas (1995); and interpreted in Character Statements for specific Conservation Areas.

Full planning applications will be required for all proposals in Conservation Areas, including detailed plans and elevations showing the new development in its setting. Conservation consent for demolition will be refused for buildings or features that make a positive contribution to the character and appearance of a Conservation Area, unless the proposed redevelopment would enhance the character of the area.

National Context

- 5.6 Legislation relating to archaeology and scheduled ancient monuments is contained in the Ancient Monuments and Archaeological Areas Act 1979. Legislation regarding buildings of special architectural or historic interest is contained in the Planning (Listed Buildings and Conservation Areas) Act 1990. Section 72 of the 1990 Act provides protection for the character and appearance of conservation areas.
- 5.7 Section 12 of the National Planning Policy Framework (NPPF), entitled *Conserving and enhancing the historic environment* provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets. Overall, the objectives of Section 12 of the NPPF can be summarised as seeking the:

- Delivery of sustainable development;
- Understanding the wider social, cultural, economic and environmental benefits brought by the conservation of the historic environment;
- Conservation of England's heritage assets in a manner appropriate to their significance; and
- Recognition of the contribution that heritage assets make to our knowledge and understanding of the past.

- 5.8 Section 12 of the NPPF recognises that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term.
- 5.9 Paragraph 128 states that in determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail supplied by an applicant should be proportionate to the importance of the asset and should be no more than sufficient to understand the potential impact of the proposal upon the significance of that asset.
- 5.10 *Heritage Assets* are defined in Annex 2 as: A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage assets include designated heritage assets and assets identified by the local planning authority (including local listing).
- 5.11 *Archaeological Interest* is defined as: A heritage asset which holds or potentially could hold evidence of past human activity worthy of expert investigation at some point. Heritage assets with archaeological interest are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them.
- 5.12 *Designated Heritage Assets* comprise: World Heritage Sites, Scheduled Monuments, Listed Buildings, Protected Wreck Sites, Registered Park and Gardens, Registered Battlefields and Conservation Areas.
- 5.13 *Significance* is defined as: The value of a heritage asset to this and future generations because of its heritage interest. This interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.
- 5.14 *Setting* is defined as: The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.
- 5.15 The NPPF is supported by the National Planning Policy Guidance (NPPG) which is an on-line resource that was published in March 2014. In relation to the historic environment, paragraph 18a-001-20140306 states that:

Protecting and enhancing the historic environment is an important component of the National Planning Policy Framework's drive to achieve sustainable development (as defined in Paragraphs 6-10). The appropriate conservation of heritage assets forms one of the 'Core Planning Principles'.

- 5.16 Paragraph 18a-002-20140306 makes a clear statement that any decisions relating to listed buildings and their settings and conservation areas must address the statutory considerations of the Planning (Listed Buildings and Conservation Areas) Act 1990 as well as satisfying the relevant policies within the National Planning Policy Framework and the Local Plan.

- 5.17 Whether a proposed development results in substantial harm or less than substantial harm is a key test in NPPF paragraphs 132-134. However, substantial harm is not defined in the NPPF. Paragraph 18a-017-20140306 of the NPPG provides additional guidance on substantial harm. It states:

What matters in assessing if a proposal causes substantial harm is the impact on the significance of the heritage asset. As the National Planning Policy Framework makes clear, significance derives not only from a heritage asset's physical presence, but also from its setting. Whether a proposal causes substantial harm will be a judgment for the decision taker, having regard to the circumstances of the case and the policy in the National Planning Policy Framework. In general terms, substantial harm is a high test, so it may not arise in many cases. For example, in determining whether works to a listed building constitute substantial harm, an important consideration would be whether the adverse impact seriously affects a key element of its special architectural or historic interest. It is the degree of harm to the asset's significance rather than the scale of the development that is to be assessed.

The harm may arise from works to the asset or from development within its setting. While the impact of total destruction is obvious, partial destruction is likely to have a considerable impact but, depending on the circumstances, it may still be less than substantial harm or conceivably not harmful at all, for example, when removing later inappropriate additions to historic buildings which harm their significance. Similarly, works that are moderate or minor in scale are likely to cause less than substantial harm or no harm at all. However, even minor works have the potential to cause substantial harm.

- 5.18 Paragraph 134 of the NPPF outlines that where a proposed development results in less than substantial harm to the significance of a heritage asset, the harm arising should be weighed against the public benefits accruing from the proposed development. Paragraph 18a-020-20140306 of the NPPG outlines what is meant by public benefits:

Public benefits may follow from many developments and could be anything that delivers economic, social or environmental progress as described in the National Planning Policy Framework (Paragraph 7). Public benefits should flow from the proposed development. They should be of a nature or scale to be of benefit to the public at large and should not just be a

private benefit. However, benefits do not always have to be visible or accessible to the public in order to be genuine public benefits.

- 5.19 The NPPG restates in paragraph 18a-040-20140306 that where an initial assessment indicates that proposed development site includes or has potential to include non-designated heritage assets with archaeological interest, applicants should be required to submit an appropriate desk-based assessment and, where necessary, a field evaluation. The paragraph goes on to state that:

“...it is estimated following an initial assessment of archaeological interest only a small proportion – around 3 per cent – of all planning applications justify a requirement for detailed assessment.”

- 5.20 In short, Government policy provides a framework which:

- Protects nationally important designated heritage assets
- Protects the settings of such designations
- In appropriate circumstances seeks adequate information (from desk based assessment and field evaluation where necessary) to enable informed decisions
- Provides for the excavation and investigation of heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact from the development, and to make this evidence publicly accessible

- 5.21 In considering any planning application for development, the planning authority will be mindful of the framework set by Government policy, in this instance the NPPF, by current Development Plan Policy and by other material considerations.

Assessment Methodology

- 5.22 The assessment involved the following key tasks:

- A 1km search radius was carried out from the Proposed Development site boundary for non-designated and designated archaeological remains.
- Production of an archaeological desk-based assessment in accordance with the Institute for Archaeologists Standards and Guidance for Archaeological Desk-based Assessments (2012). Sources reviewed included: Buckinghamshire Historic Environment Record (HER); National Monuments Record, historic cartographic and documentary sources at the Buckingham Record Office and the British Library, and unpublished material from recent nearby archaeological investigations (**Appendix 5.1**);
- Archaeological geophysical survey (**Appendix 5.2**);
- Archaeological evaluation trenching (**Appendix 5.3**);

- A 1km search radius of search from the Proposed Development boundary for all listed buildings (grade I, grade II* and grade II).
- A 1km of radius search the Proposed Development boundary for all conservation areas.
- A 500m of radius search the Proposed Development boundary for all Registered Parks and Gardens (Grades I, II* and II).
- World Heritage Sites, registered battlefields and protected wrecks were not included as there such designated heritage assets within the search area.

Significance Criteria

5.23 Criteria for assessing the magnitude of predicted change are given in Table 5.1.

Table 5.1: Criteria for assessing magnitude of change on historic environment receptors

Magnitude	Impact
Major	<p>Total or substantial loss of the significance of a heritage asset.</p> <p>Substantial harm to a heritage asset's setting such that the significance of the asset would be totally lost or substantially reduced (e.g. the significance of a designated heritage asset would be reduced to such a degree that its designation would be questionable; the significance of an undesignated heritage asset would be reduced to such a degree that its categorisation as a heritage asset would be questionable).</p>
Moderate	<p>Partial loss or alteration of the significance of a heritage asset.</p> <p>Considerable harm to a heritage asset's setting, such that the asset's significance would be materially affected/considerably devalued, but not totally or substantially lost.</p>
Minor	<p>Slight loss of the significance of a heritage asset. This can include the removal of fabric that forms part of the heritage asset, but that is not integral to its significance (e.g. the demolition of later extensions/additions of little intrinsic value).</p> <p>Some harm to the heritage asset's setting, but not to the degree that it would materially compromise the significance of the heritage asset.</p> <p>Level of harm perceivable, but insubstantial relative to the overall interest of the heritage asset.</p>
Negligible	<p>A very slight change to a heritage asset. This can include a change to a part of a heritage asset that does not materially contribute to its significance.</p> <p>Very minor change to a heritage asset's setting such that there is a slight impact not materially affecting the heritage asset's significance.</p>
No impact	No change to a heritage asset or its setting.

- 5.24 The sensitivity of the heritage asset will depend on factors such as the condition of the asset and its perceived heritage value and significance. The sensitivity of the heritage asset receptor is defined by its significance in terms of national, regional or local statutory or non-statutory protection and grading of the asset. Table 5.2 sets out the criteria for assessing sensitivity.

Table 5.2: Criteria for assessing sensitivity of receptors

Sensitivity	Criteria
Very High	World Heritage Sites
High	Scheduled Monuments & Areas of Archaeological Importance Archaeological sites of schedulable quality & significance Listed buildings (all grades) Registered Historic Parks and Gardens (all grades) Historic Battlefields
Medium	Local Authority designated sites e.g. Conservation Areas and their settings Undesignated sites of demonstrable regional importance
Low	Sites with significance to local interest groups. Sites of which the significance is limited by poor preservation and poor survival of contextual associations.

- 5.25 The sensitivity of the receiving environment, together with the magnitude of change, defines the significance of the impact (Table 5.3). Impacts of ‘major’ or ‘moderate’ significance are considered to equate to significant impacts highlighted in the context of the EIA Regulations.

Table 5.3: Criteria for assessing significance of impact

SENSITIVITY	Very High	Major	Major	Moderate	Minor
	High	Major	Moderate	Minor	Negligible
	Medium	Moderate	Minor	Negligible	Negligible
	Low	Minor	Negligible	Negligible	Negligible
		Major	Moderate	Minor	Negligible
MAGNITUDE OF CHANGE					

Baseline Conditions

- 5.26 At the time the archaeological desk based assessment of the site was undertaken, the Buckinghamshire Historic Environment Record contained little evidence to suggest that the site contained significant archaeological remains (**Appendix 5.1**). However, this absence of data was in contrast to the findings of archaeological investigations to the north of the A421 in Milton Keynes. Therefore, this lack of evidence was considered to be more of a product of the lack of systematic survey within the site rather than a genuine absence of archaeological remains. In order to better assess the archaeological potential of the site, a geophysical survey was undertaken comprising a mag sus survey of the entire site followed by detailed

magnetometer survey of a 20% sample of the site. The results of the geophysical survey are presented in **Appendix 5.2**.

- 5.27 Following completion of the geophysical survey, consultations with Buckinghamshire County Council were undertaken regarding the need and scope of archaeological evaluation trenching. The scope of works agreed comprised 2% of each area of the geophysical survey that identified actual or potential anomalies of archaeological origin as well as a buffer around each one to establish whether edge of the remains identified in the geophysical survey was real. Trenches were also excavated along the line of the A421 as this follows the line of a Roman road and also alongside Weasel lane. The evaluation was undertaken in accordance with a Written Scheme of Investigation that had been approved by Buckinghamshire County Council. Regular meetings were held on site with Buckinghamshire County Council during the evaluation fieldwork. The results of the evaluation trenching are presented in **Appendix 5.3**.
- 5.28 The location of Buckinghamshire and Milton Keynes Historic Environment Records (HER) sites referred to are shown on Figure 3 (in **Appendix 5.1**). The numbering is based on the numbering of the geophysical survey areas. The numbering of the sites and finds identified in the desk based assessment is labelled in the Key as “SMR Sites and Finds” (23- 38).

Designated Heritage Assets

- 5.29 There are no scheduled ancient monuments within the site.
- 5.30 The nearest scheduled monument is a fishpond in Water Spinney c. 400m to the north of the site in Tattenhoe (SAM no 19018, Site 23). This monument comprises a substantial earthen dam which now forms the northern boundary of Water Spinney, standing up to 1.5m high and extending north-west to south-east for some 100m. The pond is probably contemporary with the remains of the deserted medieval village of Tattenhoe which formerly occupied much of the area to the north-west of the SAM.
- 5.31 The scheduled remains of Tattenhoe deserted medieval village, moated site and fishponds lie c. 1km to the north of the Proposed Development site (SAM 19009).
- 5.32 There are no listed buildings within the Site. There are a number of listed buildings within Newton Longville Conservation Area which will be considered as part of the conservation assessment rather than as individual buildings.
- 5.33 There are no conservation areas within or immediately adjacent to the Proposed Development site. The nearest conservation area is Newton Longville which is c. 850m to the south of the Site at its nearest point.

Early Prehistoric

- 5.34 There are no recorded early prehistoric remains within the Proposed Development site. Neither the geophysical survey nor the evaluation trenching of the site revealed any pre-Iron Age features. Bronze Age/Iron Age pottery sherds were found in trench 34 which is located within Area 4 of the geophysical survey and trenching programme (**Appendix 5.2 & 5.3**).
- 5.35 Evidence for early prehistoric remains in the study area is limited to Mesolithic worked flints c. 700m to the north (Site 24) and c. 1.5km to the southwest (Site 25). A single Neolithic stone axe has been recorded c. 750m to the north west (Site 26).

Iron Age/Roman

- 5.36 Archaeological investigations at Tattenhoe Park to the north of SWMK have revealed the remains of a middle to late Iron Age open settlement (Site 27). This settlement comprised at least 21 roundhouses, an area of copper working and possibly grain storage. The settlement was partially enclosed in the late Iron Age.
- 5.37 The geophysical survey revealed a number of settlement/enclosure complexes that, although at the time were undated, they were considered to be of Iron Age and/or Roman in date (Areas 12, 13, 18 and 22 in the geophysical survey report **Appendix 5.2**). These were all targeted during the evaluation trenching. The numbering system used in the trenching programme was different from the geophysical survey (which had considered a much larger area than the Proposed Development site). Area 1 equates to Area 22 of the geophysical survey, Area 2 equates to Area 18 of the geophysical survey, Area 3 equates to Area 13 of the geophysical survey and Area 4 equates to Area 12 of the geophysical survey.
- 5.38 The cropmark of a rectangular enclosure along with a possible ring ditch is recorded on the Buckinghamshire HER toward the north eastern corner of the Proposed Development site (Area 2). The geophysical survey confirmed the presence of two rectangular enclosures with possible internal divisions and features at this location. The evaluation trenching confirmed that these two enclosures survive as below ground features and are of late prehistoric/possibly Roman in date. These remains are considered to be locally important and therefore are of low sensitivity.
- 5.39 Geophysical survey recorded a circular enclosure attached to two linear features radiating to the north and the south adjacent to a 'D' shaped enclosure with an entrance facing north east in Area 3. The evaluation established that there are two enclosures present of middle Iron Age and later prehistoric date as well as a middle Iron Age linear ditch. These remains are considered to be locally important and therefore are of low sensitivity.
- 5.40 The geophysical survey recorded a relatively large series of rectangular and irregular enclosures with internal divisions and features was recorded by the geophysical survey in the central part of the site (Area 4) which were interpreted as being prehistoric/Roman settlement. The evaluation trenching revealed a series of enclosures, ditches and other features spanning the Late Iron Age/Roman transitional period into the 4th century AD,

thereby confirming the presence of a late Iron Age/Roman settlement. These remains are more coherent and better preserved than the nearby findings of the evaluation and therefore are considered to be of regional significance and therefore are of moderate sensitivity.

- 5.41 The geophysical survey failed to reveal any coherent remains that could be interpreted as potentially prehistoric in date in the northern half of the site. This could be due to this part of the site being on a north facing slope and therefore less attractive for settlement than the south facing slope on which the sites described above are located. Therefore, while it is possible that there are further as yet unrecorded remains in the northern part of the site, the potential for this is considered to be limited.
- 5.42 A pit containing Roman pottery and a 1st century coin was recorded during an excavation of an Anglo-Saxon cemetery ahead of the construction of the A421, toward the north western corner of the site (Site 35). Whether this was a single isolated feature or was part of a larger Roman site is not known. However, the geophysical mag sus scan survey of the site failed to reveal any probable hotspots adjacent to these features; therefore, it is considered unlikely that this pit was part of a larger settlement that extends further south into the development site.
- 5.43 The geophysical survey failed to reveal any coherent remains that could be interpreted as potentially Roman in date in the northern half of the site. This could be due to this part of the site being on a north facing slope and therefore less attractive to settlement than the south facing slope on which the sites described above are located. Therefore, while it is possible that there are further as yet unrecorded remains in the northern part of the site, the potential for this is considered to be limited.
- 5.44 The results of the evaluation fall into a pattern recorded in the wider area which appears to have been a relatively densely occupied landscape in Roman times. Roman remains recorded in the wider study area include the route of a Roman road leading from the small town of *Magiovinium* (to the east) to Alchester (to the west) which the A421 (i.e. just within the northern boundary of the study area) follows.
- 5.45 A small Roman settlement/farmstead was recently recorded at Snellshall East, immediately to the north of the A421/ Buckingham Road roundabout (Site 28). This had been heavily truncated by ploughing and so was not fully understood but was interpreted as a settlement and its field system.
- 5.46 A 1st – 3rd century industrial site comprising a smelting hearth/kiln used for iron smelting, up to two timber framed buildings, pits, ditches, along with associated pottery, a coin and an inhumation burial, was recorded during the bulldozing of a former gravel pit and rubbish dump c. 700m to the south (Site 29). A probable settlement has also been recorded c. 600m to the north (Site 30) comprising a spread of pottery, tile, tegula, and a quern stone. The site has not been subject to intrusive archaeological investigation and therefore, the exact nature and extent of this site has not been fully established.

- 5.47 A number of isolated Roman finds have been recorded in the vicinity of the study site such as pottery to the west (Site 31) and a 4th century coin to the south (Site 32). Roman pottery sherds have been recorded c. 400m to the north east (Site 33) and c. 200m to the north (Site 34).
- 5.48 Geophysical survey of an area to the south east of the development site has identified a small Roman settlement comprising of ditched enclosures, pits and a possible hearth/kiln, all associated with a spread of Roman pottery and tile.
- 5.49 Sherds of Roman pottery and a piece of tile had been recorded c. 1km the south east of the site beside the railway. A geophysical survey of the area has confirmed this interpretation as a series of rectangular enclosures suggestive of settlement which, due to the presence of the Roman pottery sherds, is considered likely to be Roman in date.

Saxon - Early Medieval

- 5.50 The study site is located away from the historic centres of the nearby villages which may have had Saxon origins. However, a metal detecting survey and an excavation ahead of the construction of the A421 at Bottle Dump Corner, just within the north eastern corner of the site, recorded the remains of an Anglo-Saxon cemetery (Site 35). Five adult inhumations burials, all aligned north-south were recorded along with grave goods comprising two spearheads, an iron knife, an unidentified copper object, an iron pin and, glass and amethyst beads. The grave goods were generally of 6th – 7th century date and therefore, the burials were pagan. The cemetery lies alongside the route of the Roman road and therefore it is possible that it has a direct association with the road which would probably have still been in use in the 6th – 7th century. The geophysical survey and the evaluation trenching revealed no anomalies or features that could be interpreted as the cemetery extending southwards into the site.
- 5.51 The only other records of Saxon/early Medieval finds in the vicinity of the study site is a single Edward the Elder penny (899-925 AD) (Site 34) and an early Medieval stud (Site 36).
- 5.52 The geophysical survey and trenching failed to reveal any remains that could be interpreted as potentially Saxon in date within the site.

Medieval

- 5.53 The study area was originally to the south east of Whaddon Chase which originated as a hunting chase possibly soon after the Norman Conquest and from c. 1242 became a hunting forest. The Chase persisted until it was enclosed in the early 19th century; however, it is clear that it was subject to partial and piecemeal enclosure prior to this. The north western corner of the site beside Thrift Wood lay within Whaddon Chase lay within Whaddon Case but the rest of the site lay to the south east of the chase throughout the medieval and post medieval periods and would have lain within the open fields of Bletchley and Newton Longville.

- 5.54 Examination of aerial photographs of the Site reveal the ploughed remains of large areas of ridge and furrow within the site. Ridge and furrow was recorded in all detailed geophysical survey areas.
- 5.55 The non-scheduled earthwork of a moated site lies c.1km to the south west of the study site (Site 37). The site is presumed to be of Medieval date. It was formerly within a wood called Lodge Coppice and therefore, it may have contained the keeper's lodge.
- 5.56 Due to the lack of recorded medieval finds and located within 500m radius indicate that SWMK has low potential for medieval remains other than remains of an agricultural nature which are of local and therefore low sensitivity.

Post-Medieval

- 5.57 The first map which shows the Site at a reasonable and relatively accurate scale, is a plan of the demesne of Salden dated 1599. The detail shown of the development Site is limited. However, at this time Weasel Lane is depicted. The majority of the Site lies within an area labelled as 'Part of Bletchley' and 'Part of Bletchley Fields' but has no detail depicted. At this time, Bletchley and Newton Longville would have possessed their medieval open fields system as would have been evidenced by the extensive remains if this ridge and furrow had been not largely been ploughed out.
- 5.58 Jeffery's Map of Buckinghamshire (1770) (Figure 6 in **Appendix 5.1**) and Bryant's Map of Buckinghamshire (1825) (Figure 7 in **Appendix 5.1**) both depict the Site as being in open countryside with the north western corner being within a large block of woodland.
- 5.59 The area was enclosed between 1813 and 1841 and the existing field boundaries reflect the enclosure layout albeit with many field boundaries removed. The 1885 OS map depicts the Site essentially the same as it is today (Figure 8 in **Appendix 5.1**), since which time there has been a steady loss of field boundaries especially to the south of Weasel Lane (Figures 9 and 10 in **Appendix 5.1**).
- 5.60 The Site lies within an area defined in the Buckinghamshire & Milton Keynes Historic Landscape Characterisation Report (2006) as 19th century parliamentary enclosure. Parliamentary enclosure is the dominant historic landscape character of Aylesbury Vale and is considered as being of medium sensitivity and has a medium capacity to absorb change. As stated above, there has been significant hedgerow reduction within the Site to the south of Weasel Lane which has resulted in essentially 20th century prairie fields of little historic value.

Listed Buildings

- 5.61 There are no listed buildings within the Site. The nearest listed building is Lower Salden Farmhouse (Grade II) located within a farm complex c. 1.5kms to the south west of the Site. It is a mid to late 18th century property constructed of red and vitreous brick. The property

has 19th century casements at first floor and small dormers in the roof. At ground floor, alteration is evident in so far as new upvc windows have been added at some time in the past. There is also a c.20th century extension to the east and a c.19th century lean-to to the rear (north-west). The development Site lies beyond the setting of the farmhouse. A number of listed buildings are within Newton Longville Conservation Area and will be considered below as part of the conservation area rather than individually.

Conservation Areas

- 5.62 Newton Longville Conservation Area was designated in 1991 and comprises a small area centred on the Whaddon Road, Bletchley Road, Drayton Road and Stoke Road junction and incorporates buildings such as St Faith's Church, Newton Longville Manor House and historic development around Church End and the village green. The conservation area forms the historic core of the much larger essentially modern village. The modern expansion of Newton Longville has removed what would have been the former rural character of the village. There are number of listed buildings within the conservation area and also to the west at Westbrook End.

Likely Significant Effects

Designations

- 5.63 There are no scheduled ancient monuments, listed buildings, conservation areas, registered parks and gardens, battlefield sites or World Heritage Sites within the development Site. Therefore, there will be no direct impacts on designated historic assets.
- 5.64 The Proposed Development lies beyond the setting of Lower Salden Farmhouse (Grade II) which lies 1.5km to the south west of the site. The Proposed Development will have no effect on the setting or significance of the house.
- 5.65 The Newton Longville Conservation Area is entirely surrounded by late 20th century development and therefore, except from the western edge of the conservation area along Whaddon Road. The Proposed Development will be visible in long distance views from Whaddon Road form within the Conservation Area. The Proposed Development will not be visible from elsewhere within the Conservation Area. Therefore, there will be minor magnitude of change within the periphery of the setting of the Conservation Area which will not result in any change to the significance of the Conservation Area itself.

Non-Designated Archaeological Remains

- 5.66 The presence of the four areas of late prehistoric/Roman settlement identified during the geophysical survey and evaluation trenching have been taken into account during the design stage of the Proposed Development. The intention has been to where possible avoid or at the least limited the impact upon these remains. Taking each area in turn, the impacts will be as follows:

Area 1

The remains at this location comprise a number of enclosures indicative of a small settlement which is considered to be of local significance. The area has been allocated as open space with a LEAP located to the north of the enclosures and a SUDS basin to the north east. The open space will not require significant ground works to complete and consequently, there will be a negligible impact upon these remains.

Area 2

The remains at this location comprise two enclosures indicative of a small settlement or field system which is considered to be of local significance. The area has been allocated as open space. The northern tip of the northern enclosure lies just outside the red line area. The open space will not require significant ground works to complete and consequently, there will be a negligible impact upon these remains.

Area 3

The remains at this location comprise two enclosures indicative of a small settlement or field system which is considered to be of local significance. The area has been allocated as open space. The open space will not require significant ground works to complete and consequently, there will be a negligible impact upon these remains.

Area 4

The remains at this location comprise a number of enclosures, pits and ditches of a late Iron Age/Roman which is considered to be of local significance. This area has been allocated as open space with a NEAP and LEAP. The western edge of the site lies within playing fields of the proposed primary school. The open space and the playing fields will not require significant ground works to complete and consequently, there will be a negligible impact upon these remains.

- 5.67 It is possible that there may be as yet unrecorded archaeological remains within the application site beyond the area that were evaluated. It is considered unlikely that there are any remains of national or regional importance that have not been detected by the geophysical survey and trenching that would require preservation in-situ.
- 5.68 All hedgerows within the Site are being retained and therefore there will be a negligible effect on the parliamentary enclosure field system.
- 5.69 Weasel Lane is the oldest surviving feature of the historic landscape within the Site and is considered to be of regional significance and therefore is considered to be of medium sensitivity. The retention of Weasel Lane in a largely unaltered form has been one of the principal objectives of the design of the development framework plan. Weasel Lane will be retained unaltered except for where internal roads cross the lane in three places. Therefore, the Proposed Development will have a minor impact on this important feature of the historic landscape.

5.70 The Proposed Development will be largely screened from Newton Longville Conservation Area by the 20th century built area of the village. Long distance views toward the south eastern end of the development will be possible from the Whaddon Road from within part of the Conservation. The topography of the site will block any views of the development beyond Weasel Lane. Therefore, the Proposed Development will have a slight impact on views from the western edge of the conservation area. Therefore, the impact of the Proposed Development on the conservation area will be minor.

5.71 The same applies to the listed buildings to the west of the Conservation Area at Westbrook End. The Proposed Development will be only partially visible from these buildings and such the 1km views will also be screened by existing vegetation. Therefore, the impact will be minor.

Mitigation Measures

5.72 A watching brief will be undertaken on the construction of the Proposed Development in areas close to the four areas of archaeological potential. The purpose of this is to record any peripheral archaeological features that may be associated with the four possible settlement areas.

Residual Effects

5.73 The residual impact of the development will be that any the four areas of late prehistoric/Roman settlements and enclosures will be preserved in situ for the local community and future generations.

Cumulative Effects

5.74 There will be no cumulative effects arising in relation to the historic environment.

Summary

5.75 The potential impacts of the Proposed Development have been considered utilising existing information contained in the Buckinghamshire and Milton Keynes Historic Environment Records, Newton Longville Conservation Area Review, the Buckinghamshire & Milton Keynes Historic Landscape Characterisation Report, www.magic.co.uk. A geophysical survey and archaeological evaluation has also been undertaken, the scope of which was agreed with Buckinghamshire County Council.

5.76 This has enabled the potential direct and indirect impacts of the Proposed Development on designated and non-designated historic assets to be assessed. The geophysical survey and evaluation trenching has identified a four areas of late prehistoric/Roman settlement within the development Site. It is considered that the evaluation programme already undertaken has identified all significant archaeological remains within the Site.

- 5.77 The Proposed Development has been designed so as to enable all four settlement areas to be preserved within open space and school playing fields. Consequently, the Proposed Development will have a negligible impact on non-designated archaeological heritage assets.
- 5.78 Furthermore, an archaeological watching brief will be implemented on the areas of the Proposed Development closest to the four areas of prehistoric/Roman settlement remains so as to enable any peripheral remains that may be associated with these settlements to be recorded.
- 5.79 The Proposed Development will have no direct or indirect impacts on listed buildings.
- 5.80 The Proposed Development will have only a minor impact on views from the western edge of Newton Longville conservation area and a small number of listed buildings on the western edge of the modern built area of Newton Longville.
- 5.81 The historic landscape of the Site is essentially that of 19th century parliamentary enclosure which has subsequently suffered from significant hedgerow loss. This is the dominant historic landscape character of Aylesbury Vale and therefore when viewed in the wider district context, the Proposed Development will have a negligible impact upon this landscape type.
- 5.82 In the light of the above, the Proposed Development will have a minor impact upon the historic environment. These impacts will be mitigated as outlined above as a condition of planning permission.

6. AGRICULTURAL LAND

Introduction

- 6.1 This chapter assesses the potential significant effects of the Proposed Development upon agriculture. It follows the guidance set out in the National Planning Policy Framework (2012). This assessment initially considers the quality of the agricultural farm land lost due to the development and secondly, although no longer a policy requirement, the assessment considers the impacts of the proposal on farm businesses.
- 6.2 The Proposed Development area extends to approximately 144 hectares of predominately agricultural land which at the current time is primarily in arable use with a small area of grassland on the northern and the western boundaries. The Site is occupied by a number of separate farm businesses. These businesses occupy the land on a variety of different tenures, including owner-occupiers and short-term, non-secure arrangements.

Planning Policy Context

- 6.3 National Policy Guidance governing the non-agricultural development of agricultural land is set out in National Planning Policy Framework (2012) (The Framework) and in the National Planning Practice Guidance (NPPG) document (March 2014). Paragraph 112 of the Framework notes that local planning authorities:

“should take into account the economic and other benefits of the best and most versatile agricultural land. Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality”.

- 6.4 The best and most versatile agricultural land (BMV) is defined in Annex 2 of The Framework as land of Grades 1, 2 and 3a in the Ministry of Agriculture, Forestry and Fisheries (MAFF) Agricultural Land Classification (ALC). The NPPG goes on to explain that this land is *“the land which is most flexible, productive and effective in response to inputs and which can best deliver food and non-food crops for future generations.”* The NPPG does not provide any further guidance on the non-agricultural development of agricultural land.
- 6.5 Local Planning Policy is contained within the Aylesbury Vale District Local Plan (January 2004) (AVDP), the Milton Keynes Local Plan 2001-2011 (December 2005) (MKLP) and the Milton Keynes Core Strategy (July 2013). However there are no relevant saved policies in either the AVDP or the MKLP and there is no reference to Agricultural Land Quality in the Milton Keynes Core Strategy.

Assessment Methodology

Scope of the Assessment

- 6.6 The assessment has considered the two key agricultural circumstances. These are the effects of the Proposed Development on agricultural land quality and farm businesses.

Method of Baseline Data Collection

6.7 Baseline data has been collected by:

- i) Collection of all known Agricultural Land Classification (ALC survey) information, published and unpublished;
- ii) Review of relevant soils, geology, climate and topographic data;
- iii) Review of aerial photography and OS maps; and
- iv) Site Visit and telephone interviews with the farming occupiers whose main farm businesses are all located away from the site.

Identification of Sensitive Receptors

6.8 The relevant receptors have been identified as agricultural land quality (a receptor of potentially national importance) and the affected farm businesses (being a transient receptor, i.e. it can change over time in order to react to external influences, and this is of local importance).

Assessment Criteria

- 6.9 The assessment of potential effects as a result of the Proposed Development has taken into account both the construction and operational phases of the Proposed Development. The significance level attributed to each effect has been assessed based on the magnitude of change and the sensitivity of the affected receptor / receiving environment to change.
- 6.10 There are no standard guidance / assessment criteria for assessing the effects on agricultural receptors. The criteria set out in the Tables below are based upon professional judgement and discussions with other agricultural consultants and officers from the Department for the Environment, Food and Rural Affairs.

Significance of Effects

6.11 The magnitude of impact of the Proposed Development has been assessed against the criteria set out in Table 6.1 below.

Table 6.1 Impact Magnitude Definitions

Impact Magnitude	Definition	
	Impact on Soils	Impact on Local Agriculture
Major Negative	The proposed development would directly lead to the loss of over 50 hectares of “best and most versatile agricultural land” (Grades 1 / 2 / 3a).	The impact of the development would render a full-time agricultural business non-viable.
Moderate Negative	The proposed development would directly lead to the loss of between 20 and 50 hectares of “best and most versatile agricultural land” (Grades 1 / 2 / 3a).	The impact of the development would require significant changes in the day-to-day management of a full-time agricultural business.
Slight Negative	The proposed development would directly lead to the loss of less than 20 hectares of “best and most versatile agricultural land” (Grades 1 / 2 / 3a) or would directly lead to the loss of any quantity of non “best and most versatile agricultural land” (Grades 3b / 4 / 5).	Land take would require only minor changes in the day-to-day management / structure of a full-time agricultural business or land take would have significant effects on a part-time business.
Negligible	No direct impact upon agricultural land.	Land take would require only negligible changes to an agricultural business.

- 6.12 The methodology for determining the sensitivity of the receptors is set out in Table 6.2 below. There are two identified receptors, one of national importance, the loss of which is determined as being of high sensitivity, while the second receptor is of local importance and is defined as being of low sensitivity.

Table 6.2 Methodology for Determining Sensitivity

Sensitivity	Receptors
High	Land Resources are matters of potentially national importance. There are no defined criteria against which to set thresholds. National planning policy towards the development and protection of agricultural land is contained in paragraph 112 of The Framework. The effect on land resources is a combination of the quantum and quality of agricultural land affected, relative to both the national resource and the relative availability of land of that quality locally. Land resources should therefore be classified as being of high environmental value (sensitivity).
Low	Farm businesses are of potentially local importance. The way that farms are operated will vary over time according to ownership, local and international economic factors. Farm businesses are tolerant of some change without detriment to their character.

Table 6.3 Impact Sensitivity

Magnitude	Sensitivity		
	High	Moderate	Low
Major	Major Adverse / Beneficial	Major – Moderate Adverse / Beneficial	Moderate-Minor Adverse / Beneficial
Moderate	Major-Moderate Adverse / Beneficial	Moderate-Minor Adverse / Beneficial	Minor Adverse / Beneficial
Slight	Moderate – Minor Adverse / Beneficial	Minor Adverse / Beneficial	Minor / Negligible
Negligible	Negligible	Negligible	Negligible

Assessment of Effects

6.13 Two key areas of impact have been identified:

- Impacts on agricultural land quality, i.e. the effects of the loss of agricultural land as a national resource;
- Impacts on farm businesses, i.e. the effects of the non-agricultural development on the viability of farm businesses operating within the Proposed Development Area.

6.14 These impacts can be split down into construction phase and operational phase impacts.

6.15 Construction phase impacts have been identified as:

- Effects on the national resource of agricultural land. This effect will be permanent and will continue throughout the operation of the proposal;
- Effects on farm size and structure. Again this impact will be permanent and will continue throughout the operation of the proposal;
- Effects on field drainage, water supplies and on-farm irrigation. These will also be permanent effects and will continue throughout the operation of the proposal;

6.16 The following effects have been identified as being operational phase impacts:

- Effects of trespass.

Baseline Conditions

6.17 The Site is located to the east of Whaddon Road, to the south of the A421 and to the north of the Oxford to Bletchley railway line. It is at the western edge of Far Bletchley.

6.18 The Site is primarily agricultural land and is broadly sub-divided by the Weasel Lane ridge into two segments; north and south. The Application Site contains two isolated farm buildings and

a small group of dilapidated traditional farm buildings and surrounds the existing buildings and dwelling at Dagnall House off Weasel Lane.

Agricultural Land Quality

- 6.19 The Agricultural Land Classification (ALC) system divides land into five grades according to the extent to which inherent characteristics can be exploited for agricultural production. Grade 1 is described as being of excellent quality and Grade 5, at the other end of the scale is described as being of very poor quality. ALC is based upon an assessment of limiting factors, including soils, climate and other physical limitations and the way in which these factors interact. The current MAFF system was last revised in 1988.
- 6.20 The Application Site is shown on the 1:250,000 published Provisional Agricultural Land Classification Map (MAFF 1976) as being of Grade 3 and 4 quality. Since these “provisional” maps were produced, there have been changes to the classification including the sub-division of Grade 3 to include sub-grades 3a and 3b. The effects of the interaction between climate and soils are now more clearly stated, which puts the land quality more clearly into the local context.
- 6.21 As a result the provisional maps cannot be relied upon for assessing land quality of a particular site. Accordingly enquiries were made to Natural England regarding the availability of any published detailed ALC survey work.
- 6.22 We were provided with a copy of an ALC survey which was carried out by FRCA in 1998. This covers the entirety of the site. The survey shows mainly sub-Grade 3b land with small areas of better quality (3a). The moderate quality land is limited by soil wetness and significant wetness / workability problems. The better quality land is described with lighter textures or having soils with calcareous topsoils.
- 6.23 The findings of the FRCA survey are attached at **Appendix 6.1** and a breakdown of grades across the Site is set out in Table 6.4 below. The remaining 5 hectares of land which make up the remainder of the Proposed Development Area were not surveyed by the FRCA as they comprise of existing Highways controlled land.

Table 6.4 Breakdown of ALC Grades across the Site

ALC Grade	Description	Area (Ha)	Area (%)
3a	Good	16	11
3b	Moderate	122	88
	Other	1	1
	Total	139	100

Farming Circumstances

- 6.24 The Site was inspected in March 2014 and telephone interviews were held with the farming occupiers to update information obtained during survey work carried out in 2008 and 2009. Table 6.5 sets out a list of the farming occupations across the Site, these are illustrated on Figure 6.1 in **Appendix 6.2**.

Table 6.5 Description of Farming Businesses Occupying Land at SWMK

Farm	Area of Site	Tenure
Dagnall Farm	20 hectares	Tenanted
Part of Hurdlesgrove Farm	98 hectares	Part Owned and Part Tenanted on a 2 year Farm Business Tenancy
Messers Cook	16 hectares	Rented on a 2 year Farm Business Tenancy
Leys Ground Farm	36 hectares	Owner Occupied

- 6.25 Set out below is an overview of the occupying farm businesses. Figure 6.1 (in **Appendix 6.2**) illustrates the land occupation across the Site.
- 6.26 Dagnall Farm: Land at Dagnall Farm comprises a single arable field extending to approximately 20 hectares. The field is rented by a local farmer on a short-term, non-secure arrangement. In total he farms some 230 hectares on the edge of Aylesbury and Milton Keynes, all of which is rented on short-term lets from developers. The occupier also carries out agricultural contracting work. The buildings at Dagnall Farm, which are outside the site area, are no longer used for agricultural purposes.
- 6.27 Part of Hurdlesgrove Farm: Hurdlesgrove Farm is a mixed arable and livestock unit (30 Suckler Cows) which extends to approximately 607 hectares (1500 acres). The farm comprises a mix of owner occupied and rented land. The majority of the land is arable land 485 hectares (1200 acres). The land farmed at Salden Chase comprises of approximately 105 hectares, of which 60 hectares are owned, 38 hectares are rented on a 2 year Farm Business Tenancy and 7 hectares are farmed on a contract farming arrangement. The land at Salden Chase has been in arable production for a number of years. There is one grain store located on the Site, however the majority of the grain is hauled approximately 12 miles back to the main farm near Whitchurch.
- 6.28 Messers Cook: A block of land comprising of approximately 16 hectares rented on a 2 year Farm Business Tenancy. The land forms part of a small part-time farming business which is operated from Newton Longville. In total the farm business extends to 19.5 hectares. The remaining 3.5 hectares, which are located off the Site, are owned and comprise grazing land and farm buildings. On Site approximately half of the block of land is grassland which is used for hay production and / or the grazing of sheep / horses. The remaining land is in arable production and is currently contract farmed by Hurdlesgrove Farm. There are a range of brick and timber buildings within the holding. However these have fallen into a state of disrepair and as a consequence are no longer used for agricultural purposes.
- 6.29 Leys Ground Farm: Leys Ground Farm extends to approximately 36 hectares of permanent pasture land. The owners run a part-time farm business comprising of approximately 25 Suckler Cows, with off-spring sold as Stores and a flock of approximately 75 breeding ewes. The owners also keep a number of horses which they breed and show. There are a range of equine and agricultural buildings, adjacent to the farmhouse.

Potential Effects

Construction Phase Impacts

Effects on the National Resource of Agricultural Land

- 6.30 The Site comprises predominately of Grade 3b land with patches of good quality grade 3a land, extending to 16 hectares in total. In summary the Site comprises of 16 hectares of “best and most versatile agricultural land”. The magnitude of impact on the national resource of agricultural land as a result of the irreversible development of this quantity of “bmV” land is deemed to be slight negative. As agricultural land is a receptor of high sensitivity, the significance of impact is moderately - minor adverse.

Effects on Farm Size and Structure

- 6.31 The development will involve the loss of land from four agricultural holdings. In summary the impacts on the holdings are set out below.
- 6.32 Dagnall Farm: The land at Dagnall Farm comprises a single arable field which is occupied on a short term non-secure arrangement. The field comprises approximately 9% of the total area farmed. However, as the land is only occupied on a short term non-secure arrangement the magnitude of impact on the farm business as a result of this loss can at worst only be slightly negative.
- 6.33 Part of Hurdlesgrove Farm: The land farmed at Salden Chase comprises of approximately 105 hectares, of which 60 hectares is owned with the remainder being rented on a 2 year Farm Business Tenancy / contract farmed. The loss of this land represents approximately 17% of the total area farmed and approximately 22% of the total arable area. The loss of this land will significantly reduce the area of land that is farmed by the business. However the loss of this land will not prejudice the continued viability of the livestock enterprise, which is not dependent on the land at the Site. The arable enterprise will also continue as a viable enterprise, albeit the overall profitability of the business will be reduced somewhat due to the reduction in total area farmed. However as the land at the Site represents some of the least profit arable land farmed the business, due to it having higher input costs (labour and machinery) due to its distance from the main holding, the reductions in farm profit will not be significant. The buildings on the site are only occasionally used to store crops grown on site accordingly their loss will not affect the farm business. In summary the magnitude of impact of the proposal on Hurdlesgrove Farm is slightly negative.
- 6.34 Further the release of this land for development will provide the farm with a much needed cash injection enabling them to clear their debts and purchase additional land closer to the main farm holding, which will be more economical to farm due to its closer proximity to the main holding.

- 6.35 Messers Cook: Approximately 16 hectares of land will be lost to development. This represents a significant proportion of the farm business (82%). However the farm business is only a small part time business which involves the rearing of relatively small numbers of store lambs. Furthermore, only approximately 40 % of the land occupied by the business is farmed in hand with the arable land being contract farmed. Although the land which will be lost to development has been occupied by the current tenants for a number of years it is only occupied on a short term, non-secure tenancy arrangement. Due to the part-time nature of the occupying farm business and the short-term tenancy arrangements the magnitude of impact on the farm business is deemed to be slightly negative.
- 6.36 Leys Ground Farm: Leys Ground Farm will lose approximately 0.75 hectares of permanent grassland. Land take will comprise of a narrow strip along the farm's north eastern boundary where it adjoins the Pearce Recycling Depot. The loss of this land will have negligible effects on what is already a part-time farm business.

Farm Water and Drainage

- 6.37 Parts of the Site are known to be under drained. However the Proposed Development affects predominately whole fields accordingly there will be no severance of individual field drains. There are field water supplies to some of the permanent pasture fields which will be severed. However as the scheme involves whole fields there will be no land that will be left without water. The magnitude of impact on field drainage and water supplies is negligible.

Operational Phase Impacts

- 6.38 Once in operation the non-agricultural use of sites can lead to the spread of trespass onto neighbouring agricultural land. The spread of such trespass can prohibit the full agricultural exploitation of adjacent land.
- 6.39 On completion the Proposed Development will have no common boundary with existing agricultural land, abutting existing residential development on the east, the railway line on the south, the A421 on the north and Whaddon Road on the west.
- 6.40 The presence of these strong physical boundaries will restrict trespass. The potential magnitude of impact of trespass is deemed to be negligible.

Mitigation

- 6.41 It is not possible to mitigate the loss of agricultural land.
- 6.42 However, to minimise the impact where soils are to be retained for use within the development soil handling and conservation should be undertaken in accordance with the relevant chapters in "The Good Practice for Handling Soils" (MAFF 2000).
- 6.43 There is no need for any mitigation in relation to the occupying farm businesses. Three of the businesses will remain operating off-site as viable businesses and the fourth business is only a part-time business.

Residual Effects

6.44 As set out above there is nothing that can be done to mitigate the loss of agricultural land or the effects on farm businesses. Therefore, in this case, the residual impacts are the same as those set out above i.e. the effects before mitigation.

6.45 In summary the residual effects of the development on soil resources and farm businesses are:

Magnitude of Impact on Soil Resources: Slight Negative

Magnitude of Impact on Farm Businesses: Slight Negative on 3 occupying farm businesses and negligible on the other business

Significance of Impact on Soil Resources: Moderate – Minor Adverse

Significance of Impact on Farm Businesses: Minor Adverse

Summary

6.46 This Chapter considers the effects on soils and other agricultural factors of the non-agricultural development of approximately 144 hectares of predominately agricultural land on the south western edge of Milton Keynes.

Baseline Conditions

6.47 The Site was the subject of a detailed ALC survey in 1998. The survey identified the majority of the site to comprise of Grade 3b land (122 hectares / 88%) and a small area (16 hectares / 11%) of Grade 3a land.

6.48 The Site is predominately in arable use with a small area of permanent pasture land. The site is occupied by four farm businesses.

Likely Significant Effects

6.49 The Proposed Development involves the development of less than 20 hectares of “best and most versatile agricultural land” accordingly the magnitude of impact of the loss of this quantity of BMV land is Slight Negative. The significance of impact is Moderate – Minor Adverse.

6.50 The land is farmed by four separate businesses. The magnitude of change on three businesses is Slight Negative with the remaining businesses only being negligibly affected. The Significance of Impact on farm businesses is Minor Adverse.

Mitigation and Enhancement

6.51 There is nothing that can be done to mitigate against the loss of agricultural land. There is no need for any mitigation in relation to the occupying farming businesses. Two of the businesses will remain operating off-site as viable businesses and the other two businesses are already only part-time businesses. The minor adverse effects on the existing farm businesses are a

consequence of development on undeveloped land which cannot be addressed through mitigation measures.

7. ECOLOGY

Introduction

- 7.1 This chapter assesses the likely significant effects of the Proposed Development in terms of ecology and nature conservation and is based upon an ecological assessment of desk study information and habitat and species surveys.
- 7.2 The chapter describes the assessment methodology; establishes the baseline conditions currently existing at the Application Site and surroundings; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed.
- 7.3 This chapter should be read in conjunction with **Appendices 7.1 to 7.6**, which provide further detail regarding habitat and species survey and assessment.

Assessment Methodology

Existing Data

- 7.4 Historically a wider study area was surveyed which included a significant area of arable farmland south-west of Whaddon Road and this survey data was submitted as part of an Environmental Statement seeking outline planning permission. Where appropriate, data from this study is referred to here to provide additional baseline information.
- 7.5 This information concerning the ecological interest of the Site and its wider context includes:
- Salden Chase Environmental Statement, North East Aylesbury Vale: Chapter 7 Ecology Outline Planning Application (Aspect Ecology, 2010), which also covered land outside the Application Site to the south-west of the Whaddon Road;
 - Desk Study data and targeted protected species survey results from 2008 for reptiles, birds, great crested newts and bats.
- 7.6 In order to compile existing baseline information, relevant ecological information was also requested from a range of organisations/individuals for the purposes of this assessment:
- Multi Agency Geographic Information for the Countryside (MAGIC) website
 - Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC)
 - Buckinghamshire Badger Group (BBG)
 - North Buckinghamshire Bat Group (NBBG)

- 7.7 Further inspection, using colour 1:25,000 OS base maps (www.ordnancesurvey.co.uk) and aerial photographs from Google Earth (www.maps.google.co.uk), was also undertaken in order to provide additional context and identify any features of potential importance for nature conservation in the wider countryside.
- 7.8 The search area for biodiversity information was related to the significance of sites and species and potential zones of influence are described in Table 7.1.

Table 7.1: Search Area

Distance	Source of Information
10km	Sites of International Importance, e.g. Special Areas of Conservation (SAC), Special Protection Area (SPA), Ramsar Site
2km	Sites of National or Regional Importance, e.g. Sites of Special Scientific Interest (SSSI) and Sites of County Importance, i.e. Sites of Importance for Nature Conservation (SINCs)
1km	Species records, e.g. protected, Species of Principal Importance, Wiltshire BAP or notable species

Flora

- 7.9 The Study Area encompassed all land within the Site boundary as indicated on the Phase 1 Habitat Plan (**Appendix 7.1**).
- 7.10 Survey methods followed the extended Phase 1 Survey technique as recommended by Natural England. This involved a systematic walk over of the Study Area to classify the broad habitat types and to particularly identify any habitats of principal importance for the conservation of biodiversity as listed within Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act (2006).
- 7.11 Species lists were compiled for representative habitats. Suitably qualified and experienced botanists, who are members of the Institute of Ecology and Environmental Management (IEEM), undertook all botanical survey work.
- 7.12 Hedgerows were surveyed using the Hedgerow Evaluation and Grading System (HEGS). This method of assessment includes noting canopy species composition, associated ground flora and climbers, structure of the hedgerow including height, width and gaps, associated features including number and species of mature trees, banks, ditches and grass verges.
- 7.13 Each hedgerow is given a grade using HEGS with the suffixes '+' and '-', representing the upper and lower limits of each grade respectively. These grades represent a continuum on a scale from 1+ (the highest score and denoting hedges of the greatest nature conservation priority) to 4- (representing the lowest score and hedges of the least nature conservation priority) as follows:

- Grade 1 - High to very high value

- Grade 2 - Moderately high to high value
- Grade 3 - Moderate value
- Grade 4 - Low value

7.14 Hedgerows graded 1 or 2 are considered to be a priority for nature conservation.

7.15 The hedgerows were also assessed against the Wildlife and Landscape criteria contained within Statutory Instrument No: 1160 - The Hedgerow Regulations 1997 to determine whether they qualified as 'Important Hedgerows' under the Regulations. This was achieved using a methodology in accordance with both the Regulations and DEFRA guidance.

7.16 An arboricultural assessment and survey of trees within the Application Site was also conducted by FPCR arborists, the results of which and relevant recommendations are detailed in the Arboricultural Assessment.

Fauna

7.17 Detailed survey methodologies for fauna are provided in the species specific reports in **Appendices 7.1 to 7.6**. A summary of the surveys undertaken is provided in Table 7.2 below.

Table 7.2: Faunal Survey Timetable

Species/Taxa	Survey	Date
Great Crested Newt	Presence/absence survey as described in the Great Crested Newt Mitigation Guidelines (English Nature 2001)	Various surveys completed in 2002, & 2006,2009 and most recently in 2013 on the: 25th April, 09th May,14th May, 27th May 2013
Bats	Activity surveys comprising transect surveys in each month from April to October based on the methods outlined in the Bat Surveys Good Practice Guidelines, 2nd Edition (L Hundt 2012) Automated Static Bat Detector Survey up to 3 static detectors deployed from April to October in strategic locations within Site. Assessment of mature trees for bat roost potential	Completed summer 2006 and 2008 and Updated Spring to Autumn 2013 Undertaken April 2013 and November 2014
Reptiles	Presence/absence survey following survey protocol outlined in the Herpetofauna Workers Manual (Gent and Gibson, 1998) and the Froglife Advice Sheet 10 - Reptile Survey (Froglife 1999).	Undertaken from April 2013
Birds	Breeding bird survey. Three visits to estimate species richness and territories held.	Completed in 2006 and subsequently on the 12th May, 1st June and 21st

Species/Taxa	Survey	Date
	Winter Bird Survey. Visits conducted in each month from December to February following WeBS methodology	June 2013 Completed in 2006 and subsequently in 2012/13
Badgers	Survey of all habitats within the Site for signs of use or occupation following methods of Cresswell, Harris and Jeffries.	Completed 2006 and May 2013

Assessment Approach

Methodology

- 7.18 Reference has been made to the Guidelines for Baseline Ecological Assessment (1995) and to the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment (EclA) in the United Kingdom (July 2006). These guidelines aim to give a degree of consistency in approach to evaluating the importance of the ecological features within the Site and any effects or impacts a scheme will have upon them.
- 7.19 The activities associated with the construction and operation of the Proposed Development have been identified, together with the likely range within which their influence will be felt, given the nature of the area. The ecological features, which may be affected by such activities, have been evaluated within a geographical framework which is based on the ecological status of the features, but which also reflects a wide range of legislation and governmental guidance.

Assessment Evaluation

- 7.20 An assessment of the nature conservation value of the Site (sensitivity) was made following the criteria suggested in the above CIEEM as follows; International, National, Regional, County, District and Local. A summary is also provided in Table 7.3.

Table 7.3: Evaluation of Nature Conservation Importance

Value / sensitivity	Receptors
International / High	<p>An internationally designated site or candidate site (SPA, pSPA, SAC, cSAC, pSAC, Ramsar site, Biogenetic Reserve) or an area which meets the published selection criteria for such designation, irrespective of whether or not it has yet been notified.</p> <p>A viable area of a habitat type listed in Annex I of the Habitats Directive or smaller areas of such habitat which are essential to maintain the viability of a larger whole.</p> <p>Any regularly occurring population of an internationally important species, which is threatened or rare in the UK (i.e. it is a UK Red Data Book species or listed as occurring in 15 or fewer 10km squares in the UK, of uncertain conservation status</p>

Value / sensitivity	Receptors
	<p>or of global conservation concern.</p> <p>A regularly occurring, nationally significant population/number of any internationally important species.</p>
National / High	<p>A nationally designated site (SSSI, NNR, Marine Nature Reserve) or a discrete area, which meets the published selection criteria for national designation (e.g. SSSI selection guidelines) irrespective of whether or not it has yet been notified. Any regularly occurring population of a nationally important species which is threatened or rare in the region or county (local BAP).</p> <p>A regularly occurring, regionally or county significant population/number of any nationally important species.</p>
Regional / High	<p>Viable areas of key habitat identified in the Regional BAP or smaller areas of such habitat which are essential to maintain the viability of a larger whole.</p> <p>Viable areas of key habitat identified as being of Regional value in the appropriate Natural Area profile.</p> <p>Any regularly occurring, locally significant population of a species listed as being nationally scarce which occurs in 16-100 10km squares in the UK or relevant Natural Area on account of its regional rarity or localisation.</p> <p>A regularly occurring, locally significant number of a regionally important species.</p> <p>Sites which exceed the County-level designations but fall short of SSSI selection guidelines, where these occur.</p>
County / Metropolitan / Medium	<p>Semi-natural ancient woodland greater than 0.25 ha.</p> <p>County/Metropolitan sites and other sites which the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves selected on County / metropolitan ecological criteria (County/Metropolitan sites will often have been identified in local plans). A viable area of habitat identified in County BAP.</p> <p>Any regularly occurring, locally significant population of a species which is listed in a County/Metropolitan “red data book” or BAP on account of its regional rarity or localisation.</p> <p>A regularly occurring, locally significant number of a County/Metropolitan important species.</p>
District / Borough	<p>Semi-natural ancient woodland smaller than 0.25 ha.</p> <p>Areas of habitat identified in a sub-County (District/Borough) BAP or in the relevant Natural Area profile.</p> <p>District sites that meet the published ecological selection criteria for designation, including Local Nature Reserves selected on District/ Borough ecological criteria (District sites, where they exist, will often have been identified in local plans).</p>

Value / sensitivity	Receptors
	<p>Sites/features that are scarce within the District/Borough or which appreciably enrich the District/Borough habitat resource.</p> <p>A diverse and/ or ecologically valuable hedgerow network.</p> <p>A population of a species that is listed in a District/Borough BAP because of its rarity in the locality or in the relevant Natural Area profile because of its regional rarity or localisation.</p> <p>A regularly occurring, locally significant number of a District / Borough important species during a critical phase of its life cycle.</p>
Local/Low	<p>Areas of habitat considered to appreciably enrich the habitat resource within the context of the Parish or neighbourhood (e.g. species-rich hedgerows).</p> <p>Local Nature Reserves selected on Parish ecological criteria.</p>

Features with a value of local or above were considered to represent a 'Valued Ecological Receptor' (VER). Those features not meeting the criteria for VERs were classified as having either Site level or negligible ecological value.

Impact Assessment

- 7.21 The impacts of the proposals have been predicted, taking into account different stages and activities within the development process. The significance of likely effects was determined by identifying those receptors likely to be affected. The features were evaluated to identify the important ones, i.e. those which, if their level of value reduced, national or local policies (or in some cases legislation) would be triggered. The nature of the individual and combined impacts were characterised on each important feature, to determine the longevity, reversibility and consequences for the feature in terms of ecological structure and function. Where it was concluded that an effect would be likely to reduce the value given to an important feature, it was described as significant. Therefore, the ecological significance of these impacts has then been assessed based upon the likely effect on the integrity or conservation status of each feature. The assessment of impact significance is undertaken both to identify the need for mitigation and also to assess residual impacts.

Significance Criteria

- 7.22 The ecological significance of these impacts has then been assessed, based upon the likely effect on the integrity or conservation status of the feature. The assessment of impact significance is completed both to identify the need for mitigation and also to assess residual impacts.

7.23 The significance of likely effects was determined by:

- identifying those ecological features likely to be affected;
- evaluating them to identify the important ones (i.e. those which, if their level of value reduced, national or local policies (or in some cases legislation) would be triggered); and
- characterising the nature of the individual and combined impacts on each important feature, to determine longevity, reversibility and consequences for the feature in terms of ecological structure and function.

7.24 Where it was concluded that an effect would be likely to reduce the value given to an important feature, it was described as significant.

7.25 To provide some consistency with other chapters, the significance of impacts is also assessed using a series of matrices. The approach is a three-stage process where the value of the ecological receptor and the magnitude of the impact are cross-tabulated to identify impact significance. The details are set out in Tables 7.3 (sensitivity), above and 7.4 (magnitude) and 7.5 (significance) below.

Table 7.4 Magnitude of Impact

Magnitude	Description
Large	The proposal (either on its own or with other proposals) may adversely affect the integrity of the site/habitat/feature, in terms of the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and / or the population levels of species of interest.
Moderate	The sites/habitat/features integrity will not be adversely affected, but the effect on the site is likely to be significant in terms of its ecological objectives. If, in the light of full information, it cannot be clearly demonstrated that the proposal will not have an adverse effect on integrity, then the impact should be considered significant.
Small	Neither of the above apply, but some minor negative impact is evident.
Negligible	No observable impact in either direction.
Positive	Impacts which provide a net gain for wildlife overall.

Table 7.5: Significance of ecological impacts

MAGNITUDE	SENSITIVITY		
	High	Medium	Low
Large	Major	Major	Moderate

Moderate	Major	Moderate	Minor
Small	Moderate	Minor	Minor
Negligible	Minor	Negligible	Negligible

Mitigation and Enhancement

- 7.26 For the purpose of the Ecological Assessment impacts on Valued Ecological Receptors are assessed *without* mitigation in place.
- 7.27 Mitigation or compensation is given for significant impacts on features of nature conservation importance. In line with current CIEEM guidelines the mitigation for the Project should aim to:
- Avoid significant adverse ecological impacts;
 - Reduce adverse impacts that cannot be avoided; and
 - Compensate for any residual significant ecological impacts.
- 7.28 Priority is given to avoidance of impacts, where possible, through scheme design and/or regulation of the Project through aspects such as timing, storage of materials etc. Where this is not possible opportunities are sought to reduce the impacts as much as is feasible. If significant impacts cannot be mitigated (i.e. avoided through an alteration in layout, programme etc), then compensation (i.e. replacement of habitat to be lost/affected) that is considered appropriate minimise adverse impacts of the Project should be outlined.

Planning Context

Aylesbury Vale District Local Plan (2004) (AVDLP)

- 7.29 At the local level the 'saved policies' of the Aylesbury Vale District Local Plan will eventually be replaced by the Local Development Framework (LDF), The Vale of Aylesbury Plan.
- 7.30 Those 'saved policies' of the Local Plan that are relevant to ecology and nature conservation value matters include:
- GP38 - Landscaping of new development proposals
- GP39 - Existing trees and hedgerows
- GP40 - Retention of existing trees and hedgerows
- GP66 - Access corridors and buffers adjacent to watercourses

7.31 Relevant policies the Milton Keynes Core Strategy include Policy CS19:

The Historic and Natural Environment

Developments will protect and enhance the significance of the Borough's Heritage Assets, including important elements of the 20th Century New Town architecture. Development proposals must consider the character, appearance and setting of sites, buildings, structures, areas, parks and gardens and landscapes that are of historic, architectural, cultural, biodiversity or archaeological significance.

Green infrastructure will be protected and enhanced. Open space will be provided in line with the Council's standards. The existing linear parks system along the Broughton, Caldecotte and Loughton Brooks will be extended into the urban extensions and along the Ouse and Ouzel Valleys to the north to provide multi-purpose green infrastructure that:

- 1. is attractive*
- 2. is safe and well used for recreation*
- 3. meets the needs of existing and future residents*

National Context

The National Planning Policy Framework (NPPF) March 2012

- 7.32 The NPPF supersedes the former Planning Policy Statement 9: Biodiversity and Geological Conservation (PPS9) and provides relevant information relating to the approach to be taken within the planning system by the various issues and disciplines encompassed by sustainable development, including in the production of local development plans and the determination of planning permissions for local councils. Planning applications should seek to conform to the principles set out within this framework, which should be reflected at a local level in local development frameworks and other planning policy documents for that area.
- 7.33 The existing Government Circular: Biodiversity and Geological Conservation, ODPM Circular 06/2005; for the former PPS9 which provides the background and further information and detail on the content of PPS9, still applies to the new NPPF until such a time as this has been reviewed and revised (and for which there is no timetable).
- 7.34 Of relevance to this particular assessment is Section 11: Conserving and Enhancing the Natural Environment (paragraphs 109 – 125) of the NPPF. The following provides the overarching approach that should be taken with respect to the natural environment:

"...The planning system should contribute and enhance the natural and local environment by:

- Protecting and enhancing valued landscapes, geological conservation interests and soils
- Recognising the wider benefits of ecosystem services
- Minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressure
- Preventing both new and existing development from contributing to or being put at an unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability"

7.35 In addition the following paragraphs of Section 11 are of particular relevance to nature conservation:

"112. Local planning authorities should set criteria based policies against which proposals for any development on or affecting protected wildlife or geodiversity sites or landscape areas will be judged. Distinctions should be made between the hierarchy of international, national and locally designated sites, so that protection is commensurate with their status and gives appropriate weight to their importance and the contribution they make to wider ecological networks.

118. When determining planning applications local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:

- If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or as a last resort compensated for, then planning permission should be refused.
- Project on land within or outside a SSSI likely to have an adverse effect on a SSSI (either alone or in combination with other developments) should not normally be permitted, Where an adverse effect on the site's notified special interest is likely, an exception should only be made where the benefits of the development at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of SSSI.
- Development proposals where the primary objective is to conserve or enhance biodiversity should be permitted.
- Opportunities to incorporate biodiversity in and around developments should be encouraged
- Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged, or veteran trees found outside ancient woodland unless the need for and benefits of the development in that location clearly outweigh the loss.

- The following wildlife sites should be given the same protection as European sites
 - *Potential Special Protection Areas and possible Special Areas of Conservation*
 - *Listed or proposed RAMSAR sites*
 - *Sites identified or required as compensatory measures for adverse effects on European sites*

125. By encouraging good design, planning policies and decisions should limit the impact of light pollution on local amenity, intrinsically dark landscapes and nature conservation.”

Local Context

Non-Statutory Plans

Biodiversity Action Plans

- 7.36 Priority species and habitats of principal importance for biodiversity (former UKBAP priority species/habitats) are listed within S41 of the Natural Environment and Rural Communities Act (NERC) 2006.
- 7.37 Under the Countryside and Rights of Way Act (CROW) (2000) and the NERC Act (2006) the government and Local Authorities have a duty to extend regard to biodiversity in so far as this is consistent with the proper exercise of their function. At a more local level, the LBAP targets those species of specific relevance to the county.
- 7.38 The following UK and/or LBAP priority species are of potential relevance to the Project Area, due to either their widespread distribution, existing local records and/or the site’s suitability:

Table 7.6 UK and Local BAP species of relevance to this assessment

Priority Habitat or Species	S41 NERC Act (2006)	Buckinghamshire and Milton Keynes LBAP
Broadleaved Woodland	✓	
Hedgerows	✓	✓
Ponds	✓	✓
Noctule Bat	✓	✓
Soprano Pipistrelle	✓	
Daubenton’s Bat		✓
Whiskered Bat		✓
Natterer’s Bat		✓

Common Pipistrelle		✓
Brown Long-eared Bat		✓
Great Crested Newt	✓	✓
Common Lizard	✓	✓
Grass Snake	✓	✓
Bullfinch	✓	✓
Dunnock	✓	✓
House Sparrow	✓	✓
Skylark	✓	✓
Song Thrush	✓	✓
Yellowhammer	✓	✓
Linnet	✓	✓
Reed Bunting	✓	✓
Yellow Wagtail	✓	✓
Curlew	✓	✓
Tree Sparrow	✓	✓
Starling	✓	✓
Blackbird		✓
Blackcap		✓
Fieldfare		✓
Goldcrest		✓
Goldfinch		✓
Great Spotted woodpecker		✓
Green Woodpecker		✓
Greenfinch		✓
Grey Partridge	✓	✓
Grey Wagtail		✓
Hobby		✓
House Sparrow		✓
Kestrel		✓
Lapwing		✓
Mallard		✓
Meadow Pipit		✓
Red Kite		✓
Redwing		✓
Reed Bunting		✓
Reed Warbler		✓

Sedge Warbler		✓
Swallow		✓
Swift		✓
Treecreeper		✓
Willow Warbler		✓
Black Poplar		✓

- 7.39 Specific habitats that are listed within the Buckinghamshire and Milton Keynes LBAP and present within the Site are limited to hedgerows and ponds. Both are also NERC priority habitats.

Overview of Planning Policy Context

- 7.40 With regards to the Proposed Development the policies identified above require that up to date information on the ecology of the Site is submitted and that biodiversity is maintained and enhanced, restored or added to as part of the Proposed Development. Applications should include biodiversity enhancements wherever possible.
- 7.41 There is a requirement that Local Planning Authorities have policies to avoid damage to nationally important sites and also to seek to ensure damage to non-statutory sites of ecological importance is avoided.

Baseline Conditions

Statutory Sites

- 7.42 There are no statutory sites of international nature conservation importance (e.g. Special Protection Areas (SPAs), Special Areas of Conservation (SACs) or Ramsar Sites) present within the Site or within a 5km radius.
- 7.43 Howe Park Wood SSSI is approximately 1.2km north of the subject Site and designated for its semi-natural woodland.

Non-statutory Sites

- 7.44 Two non-statutory sites of ecological interest lie partially within the Site (refer to **Appendix 7.1** - Figure 1). These and three other non-statutory Local Wildlife Sites (LWS) and Wildlife Corridor within 1km of the Site are detailed in Table 7.7 below:

Table 7.7 - Non-statutory Sites of Ecological Interest

Site Name/Reference	Designation	Habitat/Feature	Approximate Distance and Orientation from Subject Site
Railway sidings east of Salden Wood/83F08	Local Wildlife Site (LWS)	Species-rich grassland and scrub mosaic	7m west
Milton Keynes Wildlife Corridor	Wildlife Corridor	Wetland	Within the north-west of the site
Milton Keynes Wildlife Corridor	Wildlife Corridor	Woodland	Within the north-west of the site
Milton Keynes Wildlife Corridor	Wildlife Corridor	Railway	300m north-east
Broadway and Thrift Wood/83B16	Local Wildlife Site (LWS)	Mixed replanted ancient woodland	200m west

7.45 Milton Keynes Wildlife Corridor Wetland and Woodland fall partially within the Site. They have not been formally assessed against the LWS criteria¹ but provide linking habitat to the surrounding area. The next nearest non-statutory site is Railway sidings east of Salden Wood/83F08, a site of county level importance supporting species-rich grassland and scrub mosaic within a disused railway cutting.

7.46 Adverse impacts to these and more distant non-statutory sites arising directly from the Development Proposals are considered unlikely since the Site supports none of the habitats for which the non-statutory sites are designated. Furthermore, the proposed access roads linking the Site to the A421 Standing Way and Whaddon Road are distant from the nearest non-statutory site Railway sidings east of Salden Wood/83F08.

Protected and Notable Species

7.47 Notable species records, such as those that receive some degree of statutory protection or non-statutory policy protection, were provided by a number of organisations including the BSBI, Natural England and WSBRC. A full list is provided in **Appendix 7.1** and a summary is provided in Table 7.8 below.

Table 7.8: Protected and Notable Species within 1km

Species	Location	Date of Record	Approximate Distance and Orientation from Site
Bullfinch Pyrrula pyrrhula	Railway siding east Salden Wood	2008	350m southwest
Song Thrush Turdus	Railway siding east Salden Wood	2008	350m southwest

¹ Buckinghamshire and Milton Keynes Environmental Records Centre and Thames Valley Environmental Records Centre, Criteria for the Selection of Local Wildlife Sites in Berkshire, Buckinghamshire and Oxfordshire. 2009.

philomelos			
Starling <i>Sturnus vulgaris</i>	Loughton Brook, Tattenhoe	1998	360m north
Great Crested Newt <i>Triturus cristatus</i>	Snelshall Pond Pond east Tattenhoe Church	2007 2002 2007 2002 2005 2002	60m north 150m north 200m north 250m north 300m north 850m north 1km north
Grass Snake <i>Natrix natrix</i>	Tattenhoe Park Snelshall east wildlife corridor Disused railway	2010 2002 2010	Within the site 550m north 850m southwest
Common Lizard <i>Zootoca vivipara</i>			
Badger <i>Meles meles</i>	Tattenhoe Park Railway siding A421 Milton Keynes Tattenhoe Park Thrift Wood A321	2008 2011 2008 2011 2004 2011	100m north 350m southwest 400m north 450m northwest 550m west 700m northeast
Grizzled Skipper <i>Pyrgus malvae</i>	Newton Longville, disused railway	2010	350m southwest
Wood White <i>Leptidea sinapis</i>	Disused railway		850m southwest
Wall <i>Lasiommata megera</i>	Newton Longville	2001	1km south
Common Pipistrelle <i>Pipistrellus pipistrellus</i>	North Newton Longville	2007	100m southwest
<i>Pipistrellus pipistrellus</i>	Snelshall west	2006	300m north
<i>Pipistrellus pipistrellus</i>	Snelshall East	2003	350m north
Brown Long-eared <i>Plecotus auritus</i>	Tattenhoe Park	2006	300m north
Brown Long-eared <i>Plecotus auritus</i>	Tattenhoe Park	2006	500m north
Daubenton's Bat <i>Myotis daubentonii</i>	Tattenhoe Park	2006 2010	300m north 300m east
Noctule <i>Nyctalus noctula</i>	Bottledump Roundabout Snellshall East	2007 2006	Within north site 350m north
Natterer's Bat <i>Myotis Nattereri</i>	Newton Longville	2002	650m southeast
Unidentified Roost	Newton Longville	2002	1km southeast

Unidentified Roost			
Brown Hare <i>Lepus europaeus</i>	Tattenhoe Park	2010	750m north
Common Gromwell <i>Lithospermum officinale</i> Green-winged Orchid <i>Orchis morio</i>	Railway sidings Loughton Brook, Tattenhoe	2008 1998	350m southwest 600m north

Evaluation of Valued Ecological Receptors

Habitats

- 7.48 Broad habitat types within the Site are identified on Figure 2: Phase 1 Habitat Plan (**Appendix 7.1**) and further habitat descriptions are provided in **Appendix 7.1**.
- 7.49 A range of habitats are present within the Site and are heavily influenced by the current agricultural management of the Site. The Site is dominated by arable fields with several small fields of poor semi-improved grassland divided by hedgerows. Areas of less intensive management were limited to the verges of Weasel Lane. Mature trees were confined to boundary hedgerows, mostly in the north of the Site including Weasel Lane. A single small pond in the north was overgrown with scrub and linked to a channelised brook bisecting an arable field and no aquatic vegetation was supported here. The intensively managed field compartments were considered to be of negligible significance.
- 7.50 Small sections of semi-natural woodland of low botanical diversity along the northern boundary are considered to be of Local significance. All the boundary hedgerows qualify as priority habitats under the NERC Act. Many were been assessed as 'Important' under the Wildlife and Landscape Criteria of the Hedgerow Regulations 1997. All enrich biodiversity at a local scale and are considered to be of Local/Low significance.

Fauna

- 7.51 A range of further faunal surveys have been conducted by FPCR within the Site in 2013, the reptile, great crested newt, breeding bird and badger surveys and support those undertaken by Aspect Ecology in 2007/2008. Details of these surveys are located in Appendices 7.2 to 7.6. A summary of identified potential receptors is outlined below.

Great Crested Newts

- 7.52 There are no statutory or non-statutory sites within 1km of the Site boundary that have been designated on the basis of the amphibian populations they support.
- 7.53 Surveys completed for on-site and off-site ponds confirmed the presence of great crested newt in a single pond to the southwest approximately 230m from the Site boundary. A summary of results for all ponds is provided in Table 7.9 below:

Table 7.9: GCN Results Summary

Pond Reference (refer Fig 3)	HSI score	GCN Presence?	Notes
P1	Dry	No	Dry on-site pond
P2	0.63 (Average)	No	Off-site lined garden pond
P3	0.68 (Average)	No	Heavily poached farm pond.
P8	0.59 (Below Average)	Yes	GCN confirmed 2013 (peak count 122)
P9	0.80(Excellent)	No	GCN confirmed in 2008 (peak count 1), no GCN found in 2013.

7.54 The population size class assessment as defined within the English Nature guidance (August 2001) is as follows:

- Small - for maximum counts up to 10
- Medium - for maximum counts between 11 - 100
- Large - for maximum counts over 100

7.55 The above classification is a broad category used to indicate the comparative status and importance of a population.

7.56 Pond P8 was observed to support a large population of GCNs, with the peak count being 122 adults and is sited approximately 230m east of the south-east corner of the site.

7.57 The disused railway line, adjacent to P8 and the Site, supporting tree and scrub cover provides good terrestrial habitat for GCN. However, habitats within the Site comprising largely intensively managed arable farmland are considered to be of low value to GCN during their terrestrial phase.

7.58 Previous surveys of the Site by Aspect Ecology found GCN only in pond P9 and 2013 surveys recorded no GCN in this pond. Data from the wider area suggest that great crested newts (GCN) are localised around Snelshall West, north of the Site and separated from it by the A421 Standing Way. No GCN were recorded in the ponds surveyed to the south of Standing Way within the vicinity of the Site in 2013. P8 is isolated from GCN records in the vicinity by Standing Way and over 2km of intensively managed arable of the Site suggesting the GCN population centred on P8 is isolated from GCN records noted in the wider area. The population recorded in P8, in this context, is considered to be of County significance.

7.59 Further detailed GCN survey information is provided in **Appendix 7.2**.

Bats

7.60 Extensive nocturnal transect and static surveys conducted throughout 2013 recorded 8 bat

species/groups comprising common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus* and Nathusius pipistrelle *Pipistrellus nathusii*, noctule *Nyctalus noctula*, brown long-eared *Plecotus auritus*, *Nyctalus* species, *Myotis* species and an unidentified pipistrelle species. Common pipistrelle was most frequently recorded comprising 95% of contacts from static detectors.

- 7.61 Arable and semi-improved grassland comprising the vast majority of habitats provided poor quality foraging and commuting habitat for bats. The network of hedgerows and associated trees provide greater suitability.
- 7.62 Transect surveys recorded bats in almost all areas of the Site though greater levels of activity were noted in the north of the Site and centrally along Weasel Lane including at H28, H29, H16 and H9. Fewer peaks of activity were recorded in the south, where hedgerows were poorly represented, though the highest level of activity from static recordings was at the confluence of H7 and H8 in July.
- 7.63 Overall levels of bat activity were low with no distinct seasonal pattern of activity over the survey period. Given the assemblage of bat species and level of activity the Site is considered to be of Local significance for foraging and commuting bats.
- 7.64 Eighteen mature trees were considered to provide significant potential for roosting bats, including woodpecker holes and large areas of lifted bark. A further eighteen provided low bat roost potential including woodpecker holes and branch socket cavities. Overall the trees within the survey area are considered to represent Local value for bat populations.
- 7.65 Detailed bat survey information is provided in **Appendix 7.3**.

Reptiles

- 7.66 Records of common lizard *Lacerta vivipara* and grass snake *Natrix natrix* have been noted in the vicinity, the former to the south within the disused railway line and the latter in the north-west corner of the site. Reptile surveys were undertaken within the Site in 2008 and no reptiles were recorded. These surveys were repeated in 2013; a single grass snake was recorded at the north boundary adjacent H29 and a single common lizard was recorded along Weasel Lane adjacent H16.
- 7.67 Grass snake and common lizard are known to be widespread in Buckinghamshire and though the Site supports some suitable habitat (confined to more mature boundary features including Weasel Lane and hedgerows/scrub at the north and south Site boundary) the majority of the Site is heavily cultivated arable land considered unsuitable for this group. A small population of grass snake and common lizard are supported within the boundary features of the Site and are of Local importance.
- 7.68 Further detailed survey information is provided in **Appendix 7.4**.

Breeding and Overwintering Birds

- 7.69 Breeding bird surveys were undertaken in 2008 and these were repeated in 2013; identifying a total of 46 species including a number of Principal Importance and/or on the RSPB BoCC² as declining (red or amber lists). Further results are provided in **Appendix 7.5**.
- 7.70 A range of nationally common and widespread, though declining, farmland bird species were recorded during summer surveys including small numbers of linnet and yellowhammer, all BoCC red list and species of principal importance. Hedgerows provided opportunities for species of woodland edge and scrub including dunnock, bullfinch, song thrush and redwing with hedgerows in the north providing greater opportunities. Starling and house sparrow were recorded at the east boundary adjacent to existing residential development.
- 7.71 Skylark occurred in field compartments throughout but were most frequently encountered in the south.
- 7.72 The summer bird assemblage recorded is considered to be typical of farmland habitats of the locality and are therefore of Local value.
- 7.73 Winter bird surveys were completed in 2012/13 identifying a total of 41 species of which 18 are either protected, appear on the RSPB BoCC as declining (red or amber lists) or are listed as Species of Principal Importance. This data is available at **Appendix 7.5**.
- 7.74 As for summer surveys, the winter bird assemblage comprised those typical of farmland habitats including linnet *Carduelis cannabina*, meadow pipit *Anthus pratensis*, skylark *Alaudia arvensis* and yellowhammer *Emberiza citrinella*. Linnet was recorded in small numbers and meadow pipit on one occasion. A large flock of skylark were recorded on one occasion in the south and otherwise this species occurred in low numbers. Again the north provided greater opportunities for species associated with hedgerows.
- 7.75 Winter bird assemblages are considered to be of Local value and consistent with that expected of farmland in the locality.

Badgers

- 7.76 Badger surveys were undertaken covering the Site and adjacent habitats in February 2013 and followed targeted surveys in October 2008 and June 2009.
- 7.77 A single active sett was identified comprising eight active holes, two partially used and four disused adjacent the south boundary within the disused railway. Low levels of activity were recorded within the Site itself, which is dominated by heavily managed habitats of limited value as foraging. More suitable habitats include boundary hedgerows and limited woodland.

² Eaton, M.A. *et al.* 2009. Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* 102:296-341

7.78 The site is likely to form part of the core territory for a single badger social group that has access to further habitat south of the disused railway line and is considered to be of Local value for badgers.

7.79 Further detailed badger survey information is provided in **Appendix 7.6**.

Field Survey Overview

7.80 The habitats present within the Site have been evaluated using guidelines provided by IEEM (IEEM 1995); further detail is provided in the Ecological Appraisal (**Appendix 7.1**).

7.81 The Site is currently mostly under agricultural management, comprising intensively managed arable and a small number of poor semi-improved grassland fields of low ecological value. Mature native species hedgerows bounded the fields (a good number being 'Important' under the Hedgerow Regulations 1997 and of nature conservation priority under HEGS) and a good number of mature trees were noted within boundary features to the north and bordering Weasel Lane.

Summary of Valued Ecological Receptors

7.82 A summary of the valued ecological receptors and their nature conservation value is provided in Table 7.10.

Table 7.10: Summary of nature conservation value of ecological receptors

Valued ecological receptor	Approximate distance and comments	Nature Conservation Value
Howe Park Wood SSSI	1.2km north of the Site	National
Railway sidings east of Salden Wood/83F08 LWS	7m west of the Site	County
Broadway and Thrift Wood/83B16 LWS	260m west of the Site	County
Milton Keynes Wildlife Corridor	Within north-west of the Site (wetland)	County
Milton Keynes Wildlife Corridor	Within north-west of the Site (woodland)	County
Milton Keynes Wildlife Corridor	300m east of the Project Area (disused railway)	County
Arable land	Intensively managed arable fields of limited interest to wildlife with narrow margins of coarse grasses and ruderal.	Negligible
Poor semi-improved grassland	Semi-improved grassland with low botanical diversity and homogenous structure.	Negligible

Semi-natural woodland	Limited area of semi-natural woodland with ground flora dominated by bramble and ivy.	Local
Mature trees	A good number of mature trees showing signs of damage and decay of value to wildlife	Local
Hedgerows	All UK priority habitat (S41 NERC Act (2006) and a good number being 'Important' under the Hedgerow Regulations 1997 and of nature conservation priority under HEGS. Provide good connectivity around the Site particularly in the north and link to off site habitats. Of interest as wildlife corridors and foraging habitat to a range of local fauna.	Local

Bats – foraging	Overall a low level of bat activity was recorded throughout the site with no discernible seasonal pattern. Established hedgerows linear boundary features are of greater value. All bats protected under EU and UK law with several species being UK priority species.	Local
Bats – roosting	A number of mature trees with potential to support roosting bats. No evidence of roosting was recorded during detailed aerial inspection. All actual roosts whether occupied or not are protected by law.	Local
Breeding birds	Moderate numbers of breeders considered potentially sensitive to habitat loss/change such as bullfinch and dunnock were recorded. Hedgerows in the north and the disused railway line adjacent to the southern boundary were of greater interest. The breeding bird assemblage is typical of the habitats available within the Project Area and that of the wider countryside. All nesting birds and their nests are protected.	Local
Winter birds – hedgerows	Supports moderate flocks of farmland birds over winter. Hedgerows and mature trees along Weasel Lane and to its north were most productive and a range of common and widespread bird species were recorded.	Local
Skylark	Open field compartments, particularly in the south recorded moderate numbers of breeding birds. A large flock noted on a single occasion in winter, small numbers noted on other occasions.	Local
Badgers	An active main sett was recorded in the disused railway line adjacent the south boundary and the Site forms part of the territory of a social group which has access to other suitable foraging in the locality. Hedgerows provide some limited suitable habitat for sett creation and potential movement corridors. Suitable limited foraging in arable and semi-improved grassland habitats. Low levels of activity were recorded throughout the site Badgers are protected by UK law.	Local

Great Crested Newts (GCN)	No GCN were recorded in ponds within the Site during the aquatic surveys. A single pond 200m from the south-east Site boundary was found to support a large population of GCN. Areas of the Site within 500m of the pond are dominated by heavily cultivated arable with limited hedgerow boundaries. Historically GCN have been recorded in a pond close to the north boundary in low numbers and were absent during recent surveys. GCN are protected from disturbance and killing by UK law.	County
Reptiles	Low numbers of reptiles (1 grass snake and 1 common lizard) recorded within the site at boundary features.	Local

Potential Impacts

7.83 This section describes the potential impacts *prior* to the implementation of any mitigation or enhancement measures such as green infrastructure framework/habitat creation. Impacts can be divided into those experienced during the construction phase, direct loss and damage to habitats. Operational impacts include those impacts that arise as a consequence of the development of the Site to its operation and include increased use of habitats. The legislation requires that attention be paid to all likely forms of impact. These may be:

- Direct or indirect,
- Short or long-term,
- Intermittent, periodic or permanent, and / or

7.84 The proposals and those impacts associated with them have been assessed. Potential impacts *prior* to mitigation include:

- Direct loss of habitats and associated flora and fauna within the Site boundaries, interruption of wildlife corridors, decrease in value to wildlife through reduction in species and/or habitats;
- Indirect impacts on retained vegetation within and bordering the Proposed Development through increase in noise and disturbance and through local changes in soils, drainage and hydrology;
- Potential impacts upon protected and scarce species through disturbance;
- Construction phase or operational impacts such as pollution incidents from chemical spills, pollution of watercourses and fragile habitats from runoff and incorrect storage of materials.

Construction Phase

Statutory and Non-statutory Sites of Nature Conservation Interest

- 7.85 The impact on statutory sites of nature conservation interest as a direct result of the Proposed Development during the construction phase is considered to be negligible. Marginal areas of two non-statutory sites (Milton Keynes Wildlife Corridor Wetland and Woodland) are within the Site boundary.
- 7.86 A single non-statutory site Railway siding east of Salden Wood LWS is 7m west of the Site and separated from it by Whaddon Road. The LWS is a linear species-rich grassland with the majority of its length being distant from the Site and Whaddon Road. As a result any impacts resulting from air pollution/deposition will be negligible and not significant. Milton Keynes Wildlife Corridor (wetland) within in the north Site boundary will not be affected by proposals and improvements to the road here will require the loss of limited ornamental vegetation marginal to the Milton Keynes Wildlife Corridor (woodland) which will not affect the integrity of, or have a significant impact on, this site.
- 7.87 No other non-statutory sites will be affected by the proposals due to their isolation from the proposed development.

Direct Habitat Loss

- 7.88 Land-take and habitat loss is an inevitable consequence of development. The Site supports few habitats or features of interest other than the existing network of hedgerows and small areas of semi-natural woodland.
- 7.89 The Site is currently dominated by intensively managed arable and semi-improved grassland of negligible intrinsic ecological value, of which there will be total loss and a high magnitude of change. Such habitats are considered to be of negligible botanical value and sensitivity. They are common and widespread in the local area and are of limited species diversity. The impact of their loss is considered to be Negligible and not significant.
- 7.90 Thirty hedgerows have been assessed as having high nature conservation value and 28 are 'important' under the Hedgerows Regulations 1997, the majority fall within both categories. All hedgerows have been assessed as Medium sensitivity due to their structure and continuity of habitat and situation within a large network of similar features. Minor losses of 11 hedgerows will be required to facilitate access into the development, seven of these are 'important' and 10 are of conservation priority. Two hedgerows considered 'important' under hedgerow regulations and of conservation priority will be partially lost. Given the overall extent to be lost from the existing hedgerow network, an unmitigated loss is likely to have a negative impact of Minor significance (refer to Table 7.5 Significance of Ecological Impacts).
- 7.91 A small section of semi-natural woodland adjacent to the A421 Standing Way will be lost to facilitate access into the development. This comprised recently developed woodland of low

botanical diversity and the limited loss will have a negligible impact to wildlife.

Indirect Impacts

- 7.92 Adverse impacts to the longevity of retained hedgerows and standard trees could potentially occur through physical damage to the root systems and the compaction of soils via works within the root zones. However the location of the majority of hedgerow lengths and associated trees adjacent to heavily cultivated arable land is likely to have limited any significant lateral root extension and impacts are not likely to be significant. In the absence of mitigation it is therefore probable that the construction operations would result in Local level Minor disturbance impacts in the short- to medium-term to the retained adjacent hedgerows and standard trees. Built development is not proposed adjacent to woodland.
- 7.93 There is potential for on-site spillages of inappropriately stored materials such as diesel and oil to pollute soil and ground water resulting in a localised reduction in soil quality. In the absence of mitigation measures it is considered likely that accidental pollution would result in short to medium-term Minor adverse significance on neighbouring features at a Local to County scale.

Impacts of Habitat Loss on Fauna

- 7.94 The proposed extent of the construction works will have limited potential impacts on fauna associated with the area, these impacts are detailed below.

Great Crested Newts

- 7.95 Habitats on the Site within 500m of the off-site pond (P8) supporting a large population of GCN are largely unsuitable for this species and those limited areas of sub-optimal suitability will be retained.
- 7.96 Development within 500m of P8 has the potential to injure small numbers of newts and without mitigation this would have a negative impact of Minor significance to this local GCN population.

Bats

- 7.97 Arable and semi-improved grassland comprising the vast majority of habitats to be lost provide poor quality foraging and commuting habitat for bats. The network of hedgerows and associated trees provide greater suitability, particularly for common pipistrelle with the majority of recorded activity coming from this species. Greater levels of activity were noted in the north of the site where the network of hedgerows is more continuous; including at H27, H28, H29 though the highest level of activity was recorded at the confluence of H8 and H7 in the south.
- 7.98 Overall the minor loss of limited sections of 11 hedgerows and partial loss of two hedgerows is

likely to have a small magnitude of impact on commuting and foraging bats leaving the hedgerow network fragmented. Much of the bat activity recorded on Site was from common pipistrelles or other bat species of medium to low sensitivity to fragmentation of commuting and foraging routes.

- 7.99 Without mitigation proposals are likely to result in a negative impact of Minor significance (refer to Table 7.5 Significance of Ecological Impacts).
- 7.100 Fourteen of thirty-one individual trees supporting significant potential for roosting bats will be lost under the proposed development. Further survey of these trees will also be undertaken prior to removal to ascertain the presence/absence of roosting bats and any resulting impacts.
- 7.101 Overall the tree network on the Site is considered to be of Local value to bat populations with the majority being retained within the proposals. These losses are considered to represent a small magnitude of impact on bats and without mitigation the limited loss of trees could have a Minor negative impact on local bat populations should they become occupied (refer to Table 7.5 Significance of Ecological Impacts).

Reptiles

- 7.102 A low population of grass snake has been identified in the north and a low population of common lizard has been identified centrally along Weasel Lane. Suitable reptile habitat in the vicinity of these populations will be largely retained though there will be some losses to suitable reptile habitat in the vicinity of small magnitude.
- 7.103 Without mitigation there is the potential for works to disturb and possibly kill small numbers of reptiles of medium sensitivity to change which will have a negative impact of Minor significance.

Breeding Birds

- 7.104 The nine notable species (listed on Schedule 1 of the W&CA, are a BoCC Red List species, or a species of principal importance) recorded during summer surveys are considered most vulnerable to impacts. All were noted as probable or confirmed breeders and the majority are considered to utilise hedgerows and the limited linear woodland features for foraging or breeding. Though the majority of this habitat is to be retained without mitigation the network will be largely fragmented with linear corridors maintained centrally along Weasel Lane.
- 7.105 Open field compartments will be lost to development and these habitats are utilised for foraging by yellowhammer and starling. Food resources are likely to be reduced as a result which, without mitigation is likely to reduce overall numbers of these species utilising the Site.
- 7.106 In the absence of mitigation the overall impact of long-term habitat loss will have a Moderate negative impact on breeding bird populations (refer to Table 7.5 Significance of Ecological Impacts).

- 7.107 There is potential for direct loss of active nests and for indirect impacts to breeding birds via disturbance due to removal of hedgerow sections and associated trees should such works be undertaken during the bird nesting season. Birds will habituate to certain noises and levels, although some noises may cause them to fly and abandon nests, although they may return once the disturbance has passed. During the breeding season such disturbance may lead to reduced breeding success through nest desertion or the avoidance of otherwise suitable habitat. The significance of the breeding bird receptor is considered to be Minor due to the low sensitivity of breeding birds to disturbance and the small magnitude of change, with the vast majority of such habitats retained. Impacts would be short-term and of Minor adverse significance at a Site level only. It is considered highly unlikely that disturbance impacts would affect the overall seasonal breeding status of any bird using the hedgerows, however in order to comply with the WCA 1981 no woody vegetation will be removed during the nesting season unless first confirmed to contain no active nests by a suitably experienced ornithologist.

Wintering Birds

- 7.108 Eleven notable bird species (listed on Schedule 1 of the W&CA, are a BoCC Red List species, or a species of principal importance) were recorded during winter surveys and are considered most vulnerable to impacts. The majority were noted utilising hedgerow and woodland habitats for foraging and shelter, again as for the breeding season habitats in the north were more productive. Flocks of starling were noted foraging in arable fields and a large flock of skylark were recorded in the south on one occasion.
- 7.109 Without mitigation the overall impact of long-term habitat loss will have a Moderate negative impact on wintering bird populations (refer to Table 7.5 Significance of Ecological Impacts).
- 7.110 Open field compartments will be completely lost to development and whilst it is acknowledged that Skylark will no longer use the Site given the wide availability of similar suitable habitat in the surrounding area loss of this habitat within the Site is considered to have a Minor impact on the local skylark population.

Badger

- 7.111 The more suitable badger foraging habitat, including hedgerows and woodland, will be largely retained within the development proposals. Minor losses to facilitate access will cause some fragmentation but retained hedgerows along Milton Keynes Boundary Walk and the Site boundaries will provide some connectivity. Habitats of similar value to those being lost are available in the local area including agriculture south of the disused railway.
- 7.112 Without mitigation the development will have a negligible impact on the local badger population (refer to Table 7.5 Significance of Ecological Impacts).
- 7.113 Due to the location of the sett outside the Site but close its boundary, with development proposed for the vicinity potential for disturbance is considered to be moderate. In the

absence of mitigation this will have a moderate negative impact on the identified badger population.

Operation Phase

Designated Sites

- 7.114 Once the Proposed Development is operational there is the potential for adverse impacts on nearby designated sites as a result of increased recreational pressure leading to trampling, littering and increased noise levels on the flora and fauna of these sites.
- 7.115 The nearest LWS, Railway sidings east of Salden Wood, lies close to Whaddon Road which separates it from the Site. Whaddon Road is a heavily used route linking the south of Bletchley to the A421 Standing Way. The increase in traffic resulting from the proposed development is likely to have a negligible effect on the species-rich grassland which will be habituated to air pollution/deposition. The majority of this linear grassland is distant from the pollution source which will only have a significant impact within a short distance of the road. Any impacts resulting from the proposed development will be Negligible.
- 7.116 Howe Park SSSI is accessible to pedestrian traffic from the Site only via approximately 2km of public paths and residential streets. Green open space provision within the Project will be 55.95 ha to 54.16 ha of proposed residential and considering this there will be no significant impacts to Howe Park SSSI.
- 7.117 Broadway and Thrift Wood LWS and Milton Keynes Wildlife Corridor (woodland and wetland) are also accessible to pedestrians from the Site via public paths. Broadway and Thrift Wood LWS is accessible via approximately 1.8km of footpaths. Considering the size of the LWS increased visitor pressure from the proposed development at this distance is likely to be limited and taking into account the extent of proposed open space creation within the Project there will be no significant impacts to these non-statutory sites.

Fauna

Great Crested Newts

- 7.118 There are considered to be no operation impacts to GCN and due to the largely unsuitable nature of existing habitats and following provision of GI a Moderate significant positive gain is anticipated in the long-term. Off-site Pond 8 supporting a large population of GCN and Pond 9 supporting a historical low population in the north are within open recreation/amenity areas and no significant increase in recreation pressure is likely due to the generous open space provision within the proposed development.

Bats

- 7.119 Any lighting around retained habitat used by bats as corridor or foraging habitat can lead to a reduction in use by this group. Some species such as *Myotis* species and brown long-eared

bats, which are generally slower flying and are known to occur in small numbers within the Site, are particularly sensitive to lighting and will avoid heavily lit areas as a predator avoidance strategy.

Reptiles

- 7.120 With an increase in domestic animals associated with residential development it would be expected that wildlife, including grass snake, common lizard and small mammals associated with retained habitats, might be subject to increased predation and disturbance from cats and dogs. While this impact may affect the local distribution of some species it is considered to be of minor significance; offset by the substantial increase in garden habitats, which will occur, alongside structural landscaping. The impacts arising could not realistically be mitigated with certainty, thus leading to minor impacts overall.

Birds

- 7.121 During the operational phase, in addition to the retained habitats, habitat creation proposals associated with the GI are proposed that will enhance the retained habitat for most bird species using the site. New and enhanced habitats are proposed including native hedgerow and woodland planting, wetland creation and species-rich grassland creation that will provide new nesting and foraging opportunities in time. In addition, areas of public open space created as part of the development will also provide a range of nesting and foraging opportunities within the development including for starling, redwing and fieldfare, notable species which use arable habitat.
- 7.122 In common with the effect on reptiles noted above, the increase in domestic animals, particularly cat, may lead to an effect on small bird populations. Current research is inconclusive as to the actual effect that domestic cats can have on wild populations, although it is highly likely that in combination with a change in land use the assemblage will change. Some species (e.g. Starling, finches and thrushes) are likely to benefit from any increase in available nesting habitat as a result of the implementation of landscape design proposals, although it is likely that those of open habitats (e.g. lapwing and skylark) would avoid the site. Nevertheless, neither species richness nor number of birds using the site is likely to decline and the effect is not considered to be of any greater than minor significance.

Badgers

- 7.123 Badger densities within urban habitats have been shown to be similar to those in rural areas therefore, any long-term impacts arising as a result of the change in land use on the continued viability on the local badger population are generally unlikely.
- 7.124 While the short to medium-term impact from loss of habitat is unlikely to significantly affect the viability of the badger social group centred to the south of the Site, as suitable foraging habitat, of similar value to that being lost is available south of the Site. In the long-term significant enhancement to existing sub-optimal habitat is expected as a result of the GI

proposals, particularly where existing arable habitats are replaced by woodland, permanent grassland and marginal wetland habitats, which are of greater value to foraging badgers, leading to a positive impact of Moderate significance.

- 7.125 Roads created within the proposed development will disrupt a number of existing commuting routes for badgers. These vehicular access routes will provide links through the Site between Buckingham Road, the A421 Standing Way and Whaddon Road and are likely to support moderate volumes of traffic. Signs of badger within the Site indicate that there are not significant foraging routes through it and because good quality habitat will be created close to the existing sett badgers are unlikely to be crossing the Site with frequency. Impacts from vehicular traffic are likely to be of negligible significance to the local badger population.
- 7.126 While some future badger access into residential habitats would inevitably occur and could not be realistically prevented, the potential for badger road casualties would be reduced due to the controlled traffic speeds associated with internal access routes.

Mitigation

- 7.127 The intensive management of the agricultural habitats within the Site boundary has generally limited the development of habitats of high nature conservation value within the majority of field compartments. Nevertheless, where relatively established and, in some cases, less intensively managed habitats occur, features of local value exist. These include hedgerows and the mature standard trees that they support which are mainly associated with the northern and central parts of the site. As a result many of these features have been retained within developmental design. A component of the mitigation of, and compensation for, any minimal impact associated with land-take will involve the sympathetic management of retained and created GI habitats and open space areas, which will ensure that any long-term impact is likely to be minimal within the vast majority of the Site area.

New and Retained Habitats

- 7.128 55.95 ha of the Project is dedicated to green open space with 4.84 ha of surface water attenuation for which wildlife enhancement is recommended; together providing 65.63 ha of green infrastructure (GI). This will include new native woodland and individual tree planting, species-rich grassland, scrub, native hedgerow and wetland areas (refer to Parameters Plan SWMK03\074). The GI will significantly increase the overall biodiversity and structural diversity of the Site with a wider range of habitats that will provide long-term permanent positive impacts at least at a Local level for a wide range of wildlife.
- 7.129 Retained habitats throughout the Site, including much of the existing hedgerow network, associated hedgerow trees and broadleaved woodland will form linkages with the new green infrastructure. Hedgerows and trees to be retained are shown on the Parameters Plan (SWMK03\074).
- 7.130 Following construction, without appropriate mitigation the effects of increased visitor pressure on retained habitats could be detrimental. This is particularly important when

considering effects of trampling and soil compaction on grassland and woodland flora, which can be susceptible to trampling. However no particularly sensitive species have been identified and many of the impacts associated with the use of GI habitats can be mitigated by the operation of appropriate site management and zoning; from relative seclusion to more intensive recreational use. Any impacts are therefore considered to be of Minor significance to habitats of Local value.

- 7.131 The development layout has sought to retain linkages between retained on-site wildlife corridors and off-site wetland and woodland and disused railway line wildlife corridor. These routes join with green infrastructure provision which provide broader corridors of enhanced habitat. However some operational impact may occur through the severing of corridor habitat, use of street lighting and vehicular use through the Site and also through disturbance of GI by occupants and their pets.
- 7.132 A Biodiversity Management Plan will therefore be produced for all habitats retained and created for nature conservation purposes. The plan will be produced in consultation with the LPA and statutory and non-statutory consultees to ensure that all aspects of site management are included within the plan. Where possible the long-term management of the Site will be carried out in consultation with an organisation with a proven track record of managing areas to maximise their nature conservation potential. Full details would be provided as a site habitat creation and management plan more appropriately produced at the detailed design stage.

Fauna

- 7.133 All relevant legislation in relation to nature conservation will be adhered to during construction to ensure that no offences are committed under the Wildlife and Countryside Act 1981 (as amended), the Conservation of Species and Habitats Regulations 2010 (as amended) and the Protection of Badgers Act 1992.

Great Crested Newts

- 7.134 GCN are afforded full legal protection under the Conservation of Habitats and Species Regulations 2010 (as amended) and the Wildlife & Countryside Act 1981 (as amended). This is to ensure their favourable conservation status is maintained and makes it illegal to recklessly or intentionally kill, injure or take them and recklessly or intentionally damage or destroy their places of rest and shelter or disturb them whilst occupying such places.
- 7.135 Habitats to be lost within the site 500m from the off-site Pond 8 comprise heavily cultivated land unsuitable for terrestrial GCN. It is possible that GCN are present in low numbers here and these areas will be subject to terrestrial trapping prior to development which will be carried out under a Natural England European Protected Species Licence and following a detailed mitigation strategy. This will ensure the risks of killing or injuring this species are minimised.

- 7.136 Further aquatic surveys will be undertaken at Pond 9 where a small population of GCN have historically been recorded to identify the current status of GCN here prior to commencement of this phase of the proposed development.

Bats

- 7.137 All bats and their roosts are afforded full legal protection under the Conservation of Habitats and Species Regulations 2010 (as amended) and the Wildlife & Countryside Act 1981 (as amended). This is to ensure their favourable conservation status is maintained and makes it illegal to recklessly or intentionally kill, injure or take them and recklessly or intentionally damage or destroy their places of rest and shelter or disturb them whilst occupying such places.
- 7.138 During the construction phase, no night-working will be permitted and lighting will be kept to an absolute minimum for security purposes only to limit disturbance to foraging and commuting routes.
- 7.139 Furthermore, if during the course of development additional trees are deemed to require felling, as a result of wind damage, fungal decay or due to health and safety concerns for example, they should be assessed by an appropriately licensed/experienced bat worker to ensure that no features suitable for use by roosting bats are present.
- 7.140 Where breaks in hedgerows are required for access roads, hop-overs will be created to aid crossing of these breaks. These measures listed in Highways Agency Interim Advice Note Nature Conservation Advice in Relation to Bats are commonly used and are considered suitable for the bat species recorded within the Site. The measures comprise the retention of or planting of semi-mature / standard trees which will grow to be above the level of vehicle movement. The trees will be managed to remove the lower canopy and encourage more branched head structure. Once the trees reach an appropriate level of maturity tree surgeons should undertake crown lifting to produce a tree with suitable characteristics. The trees growth merges with that of the existing hedgerow to create an alternative route over the road. In addition, proposals include the use of low-level directional lighting, installed within/adjacent the gaps. This lighting will be below the flight line of the bats, i.e. not present in upper canopy of trees. The purpose of this lighting is to discourage bats flying below the vegetation line and avoid any potential road collision mortality.
- 7.141 The remaining hedgerows will be retained and incorporated within the overall landscape scheme and suitably buffered. In order ensure the maintenance of the favourable conservation status of bats within the local area
- 7.142 Once implemented the above measures will limit any significant affects to the local population, although some change in the use of the site could occur and a minor impact could be expected.

Reptiles

- 7.143 All common reptile species thought likely to occur within the site are partially protected under Schedule 5 (Sections 9(1) and 9(5)) of the Wildlife and Countryside Act 1981 (as amended). This legislation protects these animals from:
- reckless or intentional killing and injury; or
 - selling, offering for sale, possessing or transporting for the purpose of the sale or publishing advertisements to buy or sell a protected species.
- 7.144 The limited suitable reptile habitat will be largely retained within the proposals. However as such habitat comprises narrow margins of grassland in close proximity to proposed construction works there is the potential to cause disturbance and killing of reptiles within this habitat.
- 7.145 To reduce the likelihood of disturbance 10m buffer zones will be implemented adjacent to suitable habitats along Weasel Lane and field margins at the north boundary where reptiles were recorded and will be protected with Heras type fencing to prevent encroachment and disturbance during works. This will be detailed in a method statement and completed at an appropriate time of year under the watching brief of a suitably qualified ecologist to ensure that works may proceed without causing killing and injury.
- 7.146 Any reptiles encountered during this procedure will be moved to safety by the suitably qualified ecologist to another part of the Site with suitable reptile habitat that will remain undisturbed.
- 7.147 Following construction works, buffer zones will be retained with colonising vegetation managed for the benefit of reptiles as detailed within an agreed management plan. Proposed GI adjacent retained hedgerows linking reptile populations to each other and the wider landscape will comprise grassland corridors managed to benefit reptiles.

Birds

- 7.148 Nesting birds are afforded general protection during the breeding season (typically March to August inclusive) under Schedule 1 of the Wildlife and Countryside Act (WCA) 1981 (as amended). This legislation protects all breeding birds and their nest sites whilst in the process of building a nest until the chicks have fledged.
- 7.149 During the construction phase, there is the potential for breeding birds to be adversely affected as a result of the removal of some small areas of hedgerow and scrub leading to potential disturbance and loss of habitat. To avoid disturbance to breeding birds utilising the site, all construction activities or the initial hedgerow removal/soil-stripping of any working area should occur outside of the bird-breeding season (March – August). Where any site preparation works are proposed within the bird-breeding season, the area will first be checked for nesting birds by a suitably experienced ecologist. Where nesting birds are confirmed an

appropriate stand-off would be agreed and maintained until all young have fledged or the nests is otherwise deemed inactive.

- 7.150 For species such as swift and starling that have been recorded within the site as a non-breeder/possible breeder species but that typically nest in buildings, nest boxes or nesting features will be incorporated onto new buildings to provide nesting opportunities. Further nesting opportunities will also be available to house sparrow, also associated with residential dwellings and recorded at the periphery of the Site. Nest boxes would also be provided within retained woodland habitat

Badgers

- 7.151 In accordance with best practice a full badger survey will be conducted prior to each stage of site clearance in the development programme. This will identify the current status of the previously identified sett as well as the presence of any newly excavated setts that may be lost and / or disturbed during site clearance. Where any existing or recently excavated setts are identified and disturbance impacts are considered significant, mitigation will be put in place for any affected setts and may be ratified under licence by Natural England. This is likely to involve either supervised and licensed sett closure and / or the use of protective badger fencing where appropriate.
- 7.152 Additional measures considered good practice could be expected to be included within a suitable construction site management plan such as ensuring that retained habitat is fenced to prevent inadvertent disturbance and badgers are prevented from entrapment where deep excavations are likely to occur within their range or close to routes of movement.
- 7.153 The early provision of green infrastructure habitats within Phase 1 of the development will be undertaken and include significant areas of scrub, grassland and wetland adjacent the disused railway line in the south. These habitat types would provide enhanced foraging to replace sub-optimal arable habitat lost in the early stages of development meaning short-term impacts to badgers are likely to be negligible.

Summary and Conclusions

- 7.154 The dominant habitat types identified within the site were considered to be of negligible conservation value. Areas of Local nature conservation value included woodland, hedgerows and mature trees. These areas occupy a small proportion of the Site and will be largely left in situ.
- 7.155 Green infrastructure proposals include a significant area of open space throughout the Site including hedgerow buffers that provide connectivity through the Site. The GI proposals have been designed to complement and augment the retained habitats within the Site that are considered to be of greatest nature conservation value.
- 7.156 A wide range of new habitats will be provided including native broadleaved woodland, species-rich grassland and wetland. A Biodiversity Management Plan will also be prepared,

balancing habitat establishment with recreational requirements. Although some limited disruption to wildlife is unavoidable, the scale and diversity of the GI proposals will provide comprehensive mitigation, compensation and substantial enhancement of the Site compensating for any initial losses.

7.157 Protected and otherwise notable fauna known to use the Site include:

- a) Badgers, centred on a main sett adjacent the south boundary;
- b) Common lizard and grass snake; a small population adjacent the north Site boundary and centrally along Weasel Lane where limited suitable habitat exists;
- c) Seven species of bat, that utilise the established hedgerows and woodland for foraging and commuting routes; and
- d) A range of common and widespread but nevertheless declining breeding and overwintering birds.

7.158 The provision of GI habitats and appropriate mitigation measures necessary to prevent direct impacts are considered to largely avoid significant impacts on these groups, although it is accepted that some short-term disruption would occur, leading to minor effects overall.

7.159 A summary of effects on valued ecological receptors, proposed mitigation measures and any residual impact is summarised in Table 7.11 below:

Table 7.11 Summary of Ecological Effects and Residual Impacts

Effects on valued ecological receptor	Sensitivity of receptor	Magnitude of effect	Mitigation measures	Significance of effect	Beneficial, adverse or neutral
Construction					
Loss of hedgerow	Medium	Small	New hedgerow and woodland planting	Minor	Adverse
Loss of semi-natural woodland	Low	Negligible	New woodland planting	None	-
Loss of bat foraging habitat	Medium-Low	Small	Hop-overs	Minor (short-term)	Adverse
Loss of bat roosting habitat	Low	Small	Appropriate felling methodology to be implemented where necessary	Minor	Adverse
Loss of reptile habitat	Low	Small	Protection existing habitat and creation enhanced	Minor	Beneficial

			movement corridors		
Disturbance/killing of reptiles	Low	Small	Protection of existing habitats	Negligible	Adverse
Loss of breeding bird habitat	Medium	Moderate	New hedgerow, woodland, wetland and species-rich grassland. Installation variety nest boxes	Minor	Adverse
Disturbance to breeding birds	Low	Small	Removal potential breeding habitat outside breeding season. New habitat creation	Minor (short-term)	Adverse
Loss of skylark breeding habitat	Low	Small	None	Minor	Adverse
Loss of wintering bird habitat	Medium	Moderate	New hedgerow, woodland, wetland and species-rich grassland	Minor	Beneficial
Loss of badger foraging habitat	Low	Small	New woodland, hedgerows, species-rich grassland and wetland	Moderate	Beneficial
Disturbance to badger sett	Medium	Moderate	Avoid construction in vicinity December-April. Demarking non-working areas within 30m. Badger check prior to works.	Negligible	Adverse
Disturbance/killing of GCN	Medium	Small	Trapping of areas within 500m of P8	Negligible	Adverse
Operation					

Damage to Howe Park Wood SSSI from increased recreation pressure	Low	Negligible	Provision extensive on-site open space	None	Neutral
Damage to Railway sidings east of Salden Wood/83F08 LWS from pollution	Low	Negligible	None	Negligible	Adverse
Damage to Broadway and Thrift Wood/83B16 LWS from increased recreation pressure	Low	Negligible	Provision extensive on-site open space	None	None
Damage to Milton Keynes Wildlife Corridor (wetland and woodland) from increased visitor pressure	Low	Negligible	Provision extensive on-site open space	None	None
Disturbance to foraging and commuting bats	Medium-Low	Small	Creation hop-overs, hedgerows and woodland. Avoid light spill on linear features.	Minor	Adverse
Disturbance to breeding birds	Low	Small	Nest box provision	Negligible	Adverse
Disturbance to badgers	Low	Small	Provision of enhanced foraging close to main sett	Negligible	Adverse
Disturbance/killing of reptiles from residents and domestic animals	Low	Small	None	Minor	Adverse

8. DRAINAGE

Introduction

- 8.1 This chapter of the ES assesses the likely environmental impacts of the Proposed Development in terms of drainage. The assessment incorporates the findings of the **Flood Risk Assessment** (FRA). The FRA sets out the drainage strategy for the Application Site.
- 8.2 The chapter describes the assessment methodology; 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

Aylesbury Vale

- 8.3 Saved policies of the Aylesbury Vale District Local Plan (AVDLP) form part of the development plan and show their policies and proposals for the use of land and buildings. The AVDLP was adopted in January 2004.
- 8.4 Two of the three related drainage policies in the AVDLP have not been saved: policy GP.65 under the 'Protection of River and Surface Waters' and policy GP.67 under 'Flooding and Surface Water Management'. Consequently, developers are advised to refer to the NPPF and associated guidance. The one saved drainage policy from the AVDLP is outlined below.
- 8.5 *GP.66 Protection of River and Surface Waters*

In riverside and canal side development proposals, the Council will require access corridors and buffers adjacent to the watercourse:

- a) Conserve and enhance existing areas of landscape or wildlife value;*
- b) Promote public access and provide recreational opportunity; and,*
- c) Protect or enhance the environment and habitat of those watercourses.*

Milton Keynes

- 8.6 The Milton Keynes Core Strategy was adopted in July 2013. The following Core Strategy policies are relevant for the Application Site. There are no relevant saved policies from the Milton Keynes Local Plan.
- 8.7 Policy CS12 – Developing Successful Neighbourhoods states:
- New developments and major redevelopment must be designed to support sustainable lifestyles for all. This includes:*
- Appropriately locating developments to maintain and improve current flood risk and air quality standards; and*
 - Ensuring flood and water management is planned at the largest appropriate scale of new development and, wherever possible, designed as public space.*

8.8 Policy CS19 – The Historic and Natural Environment states:

Green infrastructure will be protected and enhanced. Open space will be provided in line with the Council's standards. The existing linear parks systems along the Broughton, Caldecott and Loughton Brooks will be extended into urban extensions and along the Ouse and Ouzel Valleys to the north to provide multi-purpose green infrastructure that:

- *Meets the need of existing and future residents; and,*
- *Is designed to manage flood risk.*

8.9 Buckinghamshire Minerals and Waste Core Strategy (adopted November 2012) states that options for alleviating issues such as flood risk through restoration should be sought.

8.10 Policy CS5- Preferred Areas states:

Preferred areas for sand and gravel extraction should avoid the adverse impacts upon water quality, water resources and flood risk including designated water interests such as groundwater Source Protection Zones and water-dependant habitats and species.

National Planning Policy

8.11 A fundamental principle of sustainable development is that the condition of land, its use and its development should be protected from potential hazards.

8.12 The National Planning Policy Framework (NPPF) aims to ensure that flood risk is taken into account at all stages in the planning process, to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at high risk. Local planning authorities should prepare and implement planning strategies that help to deliver sustainable development by: appraising risk, managing risk and reducing risk.

8.13 The National Planning Practice Guidance, Flood Risk and Coastal Change section, advises on how planning can take account of the risks associated with flooding and coastal change in plan-making and the application process. The general approach is that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk.

Assessment Methodology

8.14 The environmental impacts in relation to drainage have been considered in accordance with the legislation set out in NPPF. For the purposes of this report, the study area is considered to encompass the Application Site situated to the east of Whaddon Road, south west of Milton Keynes. The Tattenhoe Brook does not pass through Sites of Special Scientific Interest (SSSI) downstream and therefore has not been included within the study area. The Environment Agency (EA) and Internal Drainage Board (The Bedford Group of Drainage Boards) were consulted at the outset of the project and endorse the methodology in principle. The topography and geology of the Application Site was also analysed to assess the risk of flooding at the study area. A topographic survey of the Application Site was carried out in December 2008.

- 8.15 An assessment was undertaken in relation to flood risk associated with the Application Site's surface water runoff regime. This included an assessment of the existing greenfield runoff rates for the whole study area (144 ha) and for each of the 6 sub-catchments.
- 8.16 The Phase 2 Ground Investigation Report (ref number 796 GI BG BF SG/23-04-14/V20) carried out in March 2014, was reviewed in relation to the infiltration potential of the site. The results indicated that the soakaway testing undertaken at three infiltration pits was unsuccessful as the infiltration observed in the cohesive soils was very poor and therefore soakaway devices were not considered further in the drainage design.

Assessment of the Nature of Impact

- 8.17 The nature of the impacts has been categorised through the criteria set out in Table 8.1 below.

Table 8.1 Assessment of the Nature of Impact

Type of Effect	Description	Potential Effect
Beneficial	Positive Influence	Reduction in flood risk to the area
Adverse	Negative influence	Major upgrading to system required. Risk of pollution which cannot be mitigated
Neutral	No tangible influence	Hydrological regime unaffected

Level of Geographical Importance

- 8.18 The level of geographical importance has been assessed in relation to local, regional and national importance.

Duration and Reversibility of Impact

- 8.19 The duration of the impacts have been assessed in relation to permanent and temporary impacts and the reversibility of the impacts have been assessed as either reversible or non-reversible.

Significance of Impact

- 8.20 The significance of the impacts have been assessed as major, moderate or minor in terms of flood risk to the Application Site. Those impacts which are major or moderate are considered to be significant in EIA terms.

Baseline Conditions

- 8.21 The EA Flood Map indicates that the north west corner of the study area is located within Flood Zone 3; an area at high risk of flooding. The National Planning Practice Guidance (2014) indicates that Flood Zone 3 comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (<0.1%). The majority of the Application Site is within Flood Zone 1; an area at low risk of flooding (<0.1% annual probability of flooding in any given year). This

zone comprises land as having a less than 1 in 1000 annual probability of river or sea flooding in any year (0.1%). The EA have no records of flooding at the study area in relation to the ordinary watercourse, a brook that is a tributary of the River Ouzel and field drains. Based on the EA indicative flood mapping, it would appear that during heavy rainfall conditions, when there is a 1 in 100 year flow on the Tattenhoe Brook, the culvert surcharges at Bottledump roundabout and the brook is likely to back up onto the site. An Anglian Water DG5 register also indicates that there are no records of flooding at the Application Site, and that the nearest recorded incident of sewer flooding is located approximately 500 m east of the Application Site. The Strategic Flood Risk Assessment (SFRA) states that there are no records of groundwater flooding in the area hence, the Application Site is considered to be at low risk from this source of flooding.

- 8.22 The topographic survey indicates that there is a ridge along Weasel Lane that splits the Application Site into six sub catchments. The land to the north of Weasel Lane slopes towards Standing Way (A421) to the north and the land south of the ridge slopes southwards towards the brook; at the north west of the Application Site the relief falls eastward towards the wooded area. The highest level on the northern section of the Application Site is along Weasel Lane at 120.38 mAOD and the lowest level in this area is 102.79 mAOD towards the northern Application Site boundary. Mapping (Worcester Sheet 199 1993 Edition) indicates that the Application Site is underlain by Mudstone from the Oxford Clay Formation with superficial deposits of Till. In the north west corner, there are superficial deposits of Alluvium – Clay, Silt, Sand and Gravel that follow the course of the Tattenhoe Brook.
- 8.23 The Greenfield runoff rates were calculated using the Institute of Hydrology Report 124 Method (ICP SUDS) as the Application Site is currently undeveloped. The results have been summarised in Table 8.2 below.

Table 8.2 Existing Greenfield Runoff Rates

Return Period	1 Year (l/s)	30 Year (l/s)	100 Year (l/s)
Entire Application Site (142 ha)	344	949	1406
1 ha	2.42	6.68	9.90
Sub-Catchment 1	63.11	174.09	257.90
Sub-Catchment 2	36.51	100.71	149.19
Sub-Catchment 3	36.10	99.58	147.51
Sub-Catchment 4	50.07	138.14	204.63
Sub-Catchment 5	105.31	290.51	430.35
Sub-Catchment 6	46.56	128.45	190.28

- 8.24 Soakaway testing was undertaken at the by RAW Group in August 2008. Review of the data by Pell Frischmann indicated that the calculations did not use the full effective depth of the trial pit, as set out in the BRE Digest 365 guidelines. Consequently, further testing was undertaken in March 2014 (ref number 796 GI BG BF SG/23-04-14/V20) at three infiltration pits as part of a wider Phase 2 Ground Investigation. The results indicated that the infiltration rates were very poor therefore infiltration devices are not suitable at the site.

Likely Significant Effects

- 8.25 The following section describes the likely significant effects of the Proposed Development in terms of drainage. For the purposes of this chapter, all the impacts have been assessed as having local importance, since the brook does not flow through any land based designations and therefore there are no receptors downstream of the site. All the impacts are considered to be non-reversible.

Impacts During Construction

- 8.26 During the construction phase there is potential for an increase in surface water runoff at the Application Site due to a slight increase in the amount of impermeable area. This may lead to an increase in flows in the surface water runoff regime in the local area prior to mitigation. As a result, this impact has been classed as a temporary minor adverse impact.
- 8.27 There is a risk of hydrocarbon pollution to the groundwater from vehicles and the storage of any liquids or chemicals at the Application Site. This has been classed as a temporary minor adverse effect.

Impacts of Completed Development

- 8.28 The proposal is for a mixed use development, including residential use, employment, infrastructure, a local centre, primary school and secondary school. This will lead to an increase in the amount of impermeable area, approximately 80.62 ha, at the Application Site. As a result, rainwater is unable to drain as freely into the soil, therefore an increase in surface water runoff from rain falling directly onto roofs, driveways and roads. This results in an increase in the surface water runoff, and the risk of flooding at the Application Site and downstream on the Tattenhoe Brook prior to mitigation. This impact has been categorised as a permanent moderate adverse impact.
- 8.29 An increase in surface water runoff on the Application Site may lead to the erosion of local drainage features at the Application Site. This has been considered as a permanent moderate adverse impact.
- 8.30 An increase in the surface water runoff rates may lead to changes in the groundwater table at the Application Site. This effect has been classed as a permanent minor adverse effect.

Mitigation Measures

During Construction

- 8.31 In order to mitigate the risk of flooding during the construction stage, it is proposed to construct temporary attenuation ponds at the beginning of the construction programme.

These shall be designed to collect and attenuate surface water, which will mitigate the risk of flooding from the increase in surface water runoff at the Application Site. The ponds will allow sediment from the construction phase to settle which will mitigate the adverse effect of the construction phase on the water quality of the surface water run-off.

- 8.32 The construction phase of the Proposed Development will adhere to the Pollution Prevention Guidance 6 (PPG6) Working at Construction and Demolition Sites produced by the EA. It states that there should be plant; wheel and boot washing facilities in an area of hardstanding situated at least 10 m from any surface waters.
- 8.33 Fuel tanks will also be stored in bunded hardstanding areas and oil interceptor devices will be used in accordance with PPG6.

Completed Development

- 8.34 A surface water management strategy has been proposed for the Application Site incorporating Sustainable Drainage Systems (SUDS) which will ensure there will be no increase in surface water runoff rates as a result of the Completed Development. SUDS mimic the natural runoff regime by holding back surface water on the Application Site and limiting discharge to Greenfield rates. Detailed design of surface water drainage will be undertaken in consultation with the Environment Agency, Milton Keynes Council and Aylesbury Vale District Council, to ensure that the surface water causes no adverse effect in terms of flow rates on the receiving watercourses.
- 8.35 The proposed surface water management strategy follows the principles of the surface water management hierarchy as detailed in Building Regulations H3 (2000). The soakaway testing concluded that infiltration is not viable at the Application Site. Therefore it is recommended that the Application Site uses above ground storage, which is the next preferred option in the management hierarchy.
- 8.36 Surface water attenuation will be provided on the Application Site in the form of above ground green SUDS features such as, lined swales, a cascading attenuation system for sub-catchment 1-3 along the northern boundary, and additional attenuation ponds situated along the southern Application Site boundary. In accordance with the National Planning Practice Guidance (2014), the surface water runoff from the impermeable areas at the Application Site will be attenuated up to the 1 in 100 year flow event, plus a 30% allowance for climate change. The attenuation also includes an allowance for Greenfield runoff from the catchment. Using flow control devices, such as hydrobrakes, discharge from the attenuation areas into the Tattenhoe Brook or existing field drains will be restricted to flows that are less than Greenfield rates, therefore providing a betterment to the existing surface water drainage regime.
- 8.37 Surface water runoff at the Application Site will be treated by the SUDS Treatment Train in line with the SuDS Manual C697 produced by CIRIA. A range of SUDS techniques will be employed to treat the runoff prior to discharge into the watercourses, such as swales and attenuation ponds. It is recommended that water butts, rain water harvesting, green roofs or permeable paving are also incorporated into the detailed design in order to provide a level of source control at the Application Site. Swales encourage settlement of sediment and associated pollutants and provide a level of site control in line with the SUDS Treatment Train concept,

whilst attenuation ponds offer an additional level of treatment to the runoff prior to discharge, and is categorised as providing regional control for the Application Site. The treatment of surface water runoff by using a range of SUDS techniques improves the quality of storm water leaving the Application Site, thus reducing the potential risk at the Completed Development to acceptable levels. Using this approach, no adverse impacts on the receiving watercourses are envisaged.

- 8.38 It is considered that there is little scope for non-compliance with environmental standards as regulatory authorities are involved with the planning process to ensure compliance with relevant policies and guidelines.

Residual Effects

- 8.39 It is considered that there will be no major or moderate adverse effects following the implementation of the mitigation measures. There will be an increase in surface water runoff as a result of the Completed Development however; it will be mitigated by the provision of surface water attenuation at the Application Site which will restrict runoff to pre-development rates as detailed in the Flood Risk Assessment (**Appendix 8.1**).

Cumulative Effects

- 8.40 It is anticipated that there will be no adverse effects on the water resources or flood risk following the implementation of the mitigation measures due to the requirement for compliance via legislation and regulatory bodies.

Summary

- 8.41 The baseline conditions of the Application Site indicate that the north west corner of the Application Site lies within Flood Zone 3 as indicated on the EA Flood Map. However, the majority of the Application Site is situated within Flood Zone 1 of the EA Flood Map. During the construction phase, temporary attenuation ponds will be provided to reduce the surface water runoff at the Application Site. This will reduce the flood risk to and from the Application Site associated with the potential increase in surface water.
- 8.42 When the development is constructed, there will be no increase in flood risk to the Application Site as SUDS will be incorporated. The SUDS will take the form of above ground 'green' SUDS features such as swales and attenuation ponds. The attenuation will be designed to control the 1 in 100 year event, plus an allowance of 30% for climate change in line with Planning Practice Guidance (2014).
- 8.43 The north west corner of the Site will remain at high risk of fluvial flooding however development has been sequentially located outside of the area of high risk.
- 8.44 Where necessary, oil interceptor devices will be used on the Application Site to reduce the risk of contamination by vehicles or the storage of liquids or chemicals on the Application Site.
- 8.45 In addition, the surface water runoff will be treated using a variety of SUDS techniques in line with the SuDS Manual produced by CIRIA C697. The runoff will undergo various levels of treatment as defined in the SUDS Treatment Train such as swales and attenuation ponds.

These measures will reduce the risk of pollution from storm water from the Application Site and therefore will have no adverse impact on the drainage regime of the Application Site.

9. LANDSCAPE & VISUAL

Introduction

- 9.1 This chapter sets out the methodology and assessment criteria adopted and identifies the likely significant landscape and visual effects which will arise as a result of the Proposed Development. This chapter summarises relevant planning policy, describes the baseline landscape character and visual resources, (identifying viewpoints from publicly accessible locations), makes an assessment of the likely significant effects of development on these baseline resources and then describes the landscape framework proposals and methods to mitigate any potentially adverse effects. The Application Site is shown in Figure 9.1 (in **Appendix 9.3**).

Planning Policy Context

Local Planning Context

- 9.2 The site is located in Aylesbury Vale and close to the boundary of Milton Keynes. The ‘saved policies’ of the Aylesbury Vale District Local Plan that are of relevance to landscape and visual matters include:

- GP35 – Design of new development proposals
- GP38 - Landscaping of new development proposals
- GP39 - Existing trees and hedgerows
- GP40 - Retention of existing trees and hedgerows
- RA4 - Considerations for countryside recreation
- RA8 - Areas of attractive landscape
- Appendix 5 - Local landscape areas (including Whaddon-Nash Valley)

- 9.3 The site adjoins the administrative boundary of Milton Keynes. The ‘saved policies’ from the Milton Keynes (MK) Plan that are of relevance to landscape and visual matters include:

- D2a - Urban Design Aspects of New Development
- D2 - Design of Buildings
- NE4 - Conserving and Enhancing Landscape Character
- LC1 - New Local Centres
- L1 - Facilities Acceptable in the Parks System
- L2 - Protection of Public Open Space and Existing Facilities
- C1 - Location of Community Facilities
- C6 - Place shaping principles

9.4 The MK Core Strategy was adopted in May 2013. The objectives in the MK Core Strategy include:

- To seek the protection of existing key services and facilities in sustainable rural settlements and to encourage the development of further provision, including shops, education, community and health services
- To protect, maintain and enhance the important environmental features, character and assets of the New Town and the towns and villages throughout the Borough;
- To encourage healthy lifestyles with the provision of recreation facilities and biodiversity by enhancing the linear park network and extending it into new developments while conserving and enhancing key landscapes and important habitats; and
- To develop Milton Keynes as an International Sporting City.

9.5 Within the MK Core Strategy new development areas are identified and discussed. The principles of the new development should include:

- Create a sustainable, safe and high quality urban extension which is well integrated with and accessible from the existing city. Its structure and layout should be based on the principles that have shaped the existing city, especially the grid road system, the linear parks and strategic flood water management;
- Maintain the character and integrity of existing settlements and provide clear separation between the new development and adjacent existing settlements.
- Link to the surrounding road, redway and grid road network;
- Provide new social and commercial facilities and services, to meet the day to day needs of new and existing residents;
- Create strategic landscape boundaries to the outer edges of the development area and to soften the effect of the development on the adjacent and surrounding open countryside; and
- Take a strategic and integrated approach to flood management and provide a strategic and sustainable approach to water resource management, including sustainable Drainage Systems (SuDS) and flood risk mitigation.

National Planning Context

9.6 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these will be applied.

9.7 Paragraph 7 of the NPPF sets out three dimensions to sustainable development; economic, social and environmental. The economic role aims to contribute '*... to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by*

identifying and coordinating development requirements, including the provision of infrastructure.'

- 9.8 A commitment to the protection of the countryside remains a planning principle that is supported within in the NPPF. One of the dimensions to sustainable development (at Para 7) is the environmental role of the planning system which is described (inter alia) as:-

"...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."

- 9.9 Section 7 of the NPPF deals with *"Requiring good design"* and Section 8 deals with *"Promoting healthy communities"*. In terms of design, the NPPF states at Paragraph 56 that:

"The Government attaches great importance to the design of the built environment. Good design is a key aspect of sustainable development, is indivisible from good planning, and should contribute positively to making places better people"

- 9.10 Section 11 is concerned with *"Conserving and enhancing the natural environment"*. The NPPF seeks to conserve and enhance the natural environment – protecting and enhancing valued landscapes, and affording great weight to the protection of areas of natural and scenic beauty.

"The planning system should contribute to and enhance the natural and local environment by: Protecting and enhancing valued landscapes..."

- 9.11 The Planning Practice Guidance provides guidance to be read in conjunction with the NPPF. It provides a web based resource covering elements such as the natural environment, EIAs and design.

- 9.12 Under the heading Natural Environment, the guidance provides some useful notes on subjects such as landscape character and green infrastructure and refers the reader to the relevant sections of the NPPF. The guidance points out that one of the core principles of the NPPF is that 'planning should recognise the intrinsic character and beauty of the local countryside'.

Other policy related documents

Buckinghamshire GI Strategy (2009)

- 9.13 Aylesbury Vale has significant gaps in GI provision (Buckinghamshire Green Infrastructure Strategy, 2009). Whaddon Chase is recognised as an area of strategic significance and opportunity for Green Infrastructure in the county (Priority Action Area 1: North Aylesbury Vale). The strategic aims for Priority Area 1 are:

- To contribute to the Green Infrastructure needs of communities on the west side of Milton Keynes and Leighton-Linslade in Bedfordshire. Both areas are identified for significant growth and population expansion up to 2026.
- To provide Green Infrastructure for communities in Buckinghamshire and focused on Buckingham and Winslow.
- To provide Green Infrastructure for the new communities in Buckinghamshire from the expansion of the South West of Milton Keynes.

9.14 The former medieval hunting forest of Whaddon Chase, adjacent to the proposal site, has been highlighted as a GI ‘Strategic Opportunity Area’. The study has suggested how the area could be restored to its pre-19th century form with the replanting of extensive woodland cover for recreational use, and perhaps supplying fuel for sustainable bio-power generation. Ancient monuments, historic ponds and routeways could provide foci of interest whilst protecting these valuable assets. Biodiversity could be enhanced through maintaining and restoring woodland and species-rich grassland. The development will consider these aspirations and continue these themes along the proposed GI corridors to the south and west of the site.

Aylesbury Vale Green Infrastructure Strategy 2011-2026 (2011)

9.15 The Aylesbury Vale Green Infrastructure Strategy (October 2011) builds upon the vision that is contained within the Buckinghamshire Green Infrastructure Strategy (2008).

9.16 The Aylesbury Vale Green Infrastructure Strategy sets out the “framework for the creation and management of Green Infrastructure (GI) in the Aylesbury Vale District”. 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”

9.17 Priority Action Areas are identified, which includes Area 1- North Aylesbury Vale, which includes the following notes:

“Area 1 – North Aylesbury Vale

Opportunities to create new and enhance existing greenspaces and to provide access links between these sites have been identified for the Action Area such as Whaddon Chase, Stockgrove Country Park, Ouse Valley, Stowe Landscape Gardens and Bernwood Forest. There are a number of strategic issues for this area to be addressed:

- *There is a notable lack of larger areas of accessible greenspace in the arc around the south and west of Milton Keynes; this deficit will be exacerbated as Milton Keynes expands.*
- *Detailed Landscape Character Assessments highlight the priority to strengthen the character and distinctiveness of the ridge landscapes through active land management actions. To conserve and reinforce historic elements along the Great Ouse River and the currently disused Buckingham Arm of the Grand Union Canal by encouraging recreational access along the valley and interpretation of historic features.*
- *Landscape Character Assessments also highlight the opportunities for enhancing the character and distinctiveness of the extensive Vale landscape types through positive landscape intervention measures.”*

9.18 The strategy includes ten flagship projects to deliver green infrastructure provision. One of which is “Whaddon Chase”, which is a distinctive historic landscape providing major wildlife, access and heritage restoration and creation opportunities. The area will help to improve links between existing settlements and new communities.

“Key features and benefits

- *A very ancient relict landscape with a special local character due to the preservation of the former hunting chase landscape.*
- *Providing strategic and multifunctional network of GI for existing residents at Milton Keynes and Aylesbury Vale.*
- *Supporting economic viability of agriculture and rural enterprise located in the area with increased profile and visits.*
- *Protecting and enhancing important historic features and supporting Biodiversity Action Plan habitats such as lowland mixed deciduous woodland pastures and lowland meadows.”*

Whaddon Chase GI Plan (2010)

9.19 This plan sits below and complements the Buckinghamshire green Infrastructure Strategy. It covers a smaller area, includes a degree of local public consultation, and provides more locally derived detail and identifies more specific priorities, aspirations and projects. There are 60 listed aspirations and opportunities including (near to the proposal site):

- Opportunity to enhance public access within Snelshall Priory;
- Opportunity to plant woodland along the Shenley Ridge to enhance the North Bucks
- Way and protect views from within Whaddon Chase Area; and
- Opportunity to plant woodland corridor along Route 51 cycleway and link with existing woodlands. (Although Figure 3 in the Whaddon Chase GI Plan shows this along the disused railway line rather than along Weasel Lane (Route 51).

- 9.20 This list was later reviewed to produce the key priorities for the area.

“Over-riding aspiration - To protect the integrity of the whole Whaddon Chase area including views into and out of the area, from the encroachment of Milton Keynes.”

Milton Keynes GI plan (2008)

C1 – Green Infrastructure Action Areas (GIAAs)

- 9.21 These are priority areas for new or enhanced green infrastructure in relation to proposed/allocated development as well as a means of addressing perceived deficit or lack of opportunity in relation to existing development. These are typically located close to existing development and those areas allocated for development in the period to 2017. They also recognise the need to provide Green Infrastructure and facilities for growth beyond this time period, which is likely to occur to the south of the ‘City’. The purpose of GIAAs is to provide locally accessible green space that contributes to as many of the Key Environmental Issues set out in Section 4 as possible. The GIAA most relevant to this scheme is the South Western Green Infrastructure Action Area.

“South Western Green Infrastructure Action Area - this Action Area is located to the south west of Milton Keynes and extends into neighbouring Aylesbury Vale.

This Action Area includes the existing villages of Whaddon and Little Horwood. The proposed/new developments of Kingsmead South, Oxley Park, Tattenhoe Park and Westcroft also fall into this Green Infrastructure Action Area

Existing Green Infrastructure assets within this Area include Whaddon Chase, the Linear Park along Loughton Brook and various promoted routes including the North Bucks Way and the Mid Shires Way

This Action Area could help to continue the linear park system, provide a basis for the conservation and enhancement of Whaddon Chase and helping to integrate/serve the new development in the south west of Milton Keynes

ANGSt analysis shows a deficit of 100Ha open spaces through the centre of this Action Area, a deficit of 20Ha spaces within Aylesbury Vale where population numbers are low and a deficit of 2Ha open spaces for most of the Area

Potential projects in this Action Area include: the protection, enhancement and management of the medieval historic park and hunting grounds; improvements to the corridors of the North Bucks Way and other promoted routes; linking and creating habitats and wildlife corridors; and additional district and neighbourhood parks.”

A Strategy for Growth to 2031 (2006)

- 9.22 This document, produced for the Milton Keynes Partnership by GVA Grimley in June 2006, built upon earlier option evaluations to create a proposed strategy up to 2031, with the imperative to enhance, rather than detract, from the unique 'green' character of the city.

Table 9.1 set out the Strategic Objectives of the proposed growth strategy, with two of the twelve objectives being of particular landscape and visual relevance, as follows:-

- Landscape/countryside protection - Maintain and extend green infrastructure and historic environments and ensure that potential effects on landscape character and coalescence of settlements are addressed.
- Retain distinctive character of communities - Ensure that development of the city complements surrounding towns and villages and maintains the distinctive character and identity of existing settlements and communities through the creation of principles leading to the establishment of long term development boundaries.

9.23 The document also identifies the importance of robust protection for the setting of existing communities including Newton Longville.

Milton Keynes Cycling Strategy (2012)

9.24 The Cycling Strategy addresses the need to continue to encourage visitors and residents to cycle for work and leisure, through a range of measures including information, promotion, education, infrastructure provision, maintenance, lighting and trip end facilities.

“Expansion of the Redway network

In Central Milton Keynes, new developments, regeneration areas and the older towns, the Redway network will be expanded to help realise its full potential as a choice network for short and medium length trips for leisure and active travel purposes. The council has already committed to expanding the Redway network into new developments, and the preferred model is for wide, well lit, direct routes.”

Milton Keynes Walking Strategy (2003)

9.25 The aim of the walking strategy is to encourage more people to walk instead of using their cars. Measures proposed to assist and encourage pedestrian movements include:

- At grade pedestrian crossings where appropriate;
- High quality and safe pedestrian crossings;
- Active ground floor uses and mix of uses which provide activity at different times of the day;
- Public art;
- Lighting for aesthetic and safety purposes;
- Responsive landscaping;
- Attractive civic spaces, and,
- Uncluttered streetscape.

Assessment Methodology

9.26 The assessment methodology used in the preparation of this assessment has been developed from guidance provided in the ‘Guidelines for Landscape and Visual Impact

Assessment’ - Third Edition (GLVIA3), published by the Landscape Institute and the Institute of Environmental Management and Assessment, in April 2013.

9.27 In summary the GLVIA3 states :

“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.”

9.28 The guidance recognises a clear distinction between the impact, as the action being taken, and the effect, being the result of that action.

9.29 There are two components of LVIA:-

1. Assessment of landscape effects; assessing effects on the landscape as a resource in its own right;
2. Assessment of visual effects: assessing effects on specific views and on the general visual amenity experienced by people.

9.30 These two elements are described separately in this report.

9.31 The GLVIA3 recognises that professional judgement is a very important part of landscape and visual assessment, and states that whilst there is some scope for quantitative measurements of some relatively objective matters, much of the assessment must rely on qualitative judgements (para 2.23). It also states that in identifying significant effects,

“...the need for an approach that is in proportion to the scale of the project that is being assessed and the nature of the likely effects judgement needs to be exercised at all stages in terms of the scale of the investigation that is appropriate and proportional.”

(Paragraph 1.17)

9.32 The components of the LVIA include: a project description, baseline studies, identification and description of effects, assessment of the significance of effects and mitigation. This report outlines these components.

9.33 In terms of baseline studies the assessment provides an understanding of the landscape in the area to be affected, its constituent elements, character, condition and value. For the visual baseline this includes an understanding of the area in which the development may be visible, the people who may experience views, and the nature of views.

9.34 The overall significance of effects is determined by making judgements about the two following components:-

- Nature of receptor likely to be affected (known by the shorthand “sensitivity”) and;
- Nature of the effect likely to occur (known by the shorthand “magnitude”)

9.35 Judgements on sensitivity are made by considering:-

- The susceptibility of the receptor to the type of change arising from the specific proposal; and
- The value attached to the receptor.

9.36 Judgements on magnitude are made by considering:-

- The size and scale of the effect – for example, whether there is a complete loss of a particular element of the landscape or a minor change;
- The geographical extent of the area that will be affected; and
- The duration of the effect and its reversibility.

9.37 Consideration of all these criteria feeds into a comprehensive assessment of significance.

9.38 Mitigation includes measures proposed to prevent, reduce and where possible offset any significant adverse effects. Mitigation provided as part of the development is described and is included within the overall assessment of effects.

Assessment of Landscape Effects

9.39 GLVIA3 states that “An assessment of landscape effects deals with the effects of change and development on landscape as a resource”. The baseline landscape is described by reference to existing landscape character assessments, and by a description of the Site and its immediate context. For this assessment the following published landscape work has been reviewed;

- Natural England National Character Areas
- Character Areas Assessments

9.40 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
- Combined effects of these changes

9.41 These are discussed in the assessment.

Susceptibility to Change And Value Of The Landscape Receptor

9.42 The characteristics of the existing landscape resource are considered in respect of the susceptibility of the landscape resource to the change arising from this development.

9.43 The value of the existing landscape is also considered. GLVIA3 indicates information that contributes to understanding landscape value. This information is set out in paragraph 5.20 of the GLVIA3 and includes;

- Information about areas recognised by statute such as (depending on jurisdiction) National Parks, National Scenic areas, Areas of Outstanding Natural Beauty;

- Information about Heritage Coasts, where relevant;
- Local planning documents, for local landscape designations
- Information on individual or groups of features such as conservation areas, listed buildings, special historic or cultural sites
- Art and literature identifying value attached to particular areas or views
- Material on landscape of local or community interest

9.44 Where there is no clear existing evidence on landscape value, an assessment is made based on the following factors, based on the guidance in GLVIA3;

- Landscape quality (condition)
- Scenic quality
- Rarity
- Representativeness
- Conservation interest
- Recreation value
- Perceptual aspects
- Associations

Magnitude of Landscape Effects

9.45 Each effect on landscape receptors is assessed in terms of size or scale, geographical extent of the area influenced and its duration and reversibility.

9.46 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 addition of new elements. This assessment describes scale and size by reference to the terms High, Medium and Low.

9.47 The geographical extent of the effect is described by reference to the site, its immediate context and wider landscape character areas.

9.48 The duration and reversibility of effects are described. In respect of this assessment short term is defined as less than 5 years, medium term 5 to 10 years, and long term 10 to 25 years. Landscape effects are summarised in the Landscape Effects Table (LET) at **Appendix 9.1** at Year 0, upon completion of the development, and at Year 15 post completion.

Overall Significance of Landscape Effects

9.49 The overall significance of landscape effects is determined by considering the sensitivity of the landscape receptors and the magnitude of effect on the landscape.

9.50 The landscape sensitivity is determined by considering the susceptibility to change and the value of the landscape receptor. Judgements about the susceptibility to change are recorded on a scale of High, Medium and Low. The value of the landscape is recorded on a scale of National, Regional or Local. The magnitude of landscape change is defined in terms of High, Medium, Low or negligible effects.

- 9.51 GLVIA3 notes at paragraph 5.46 that there can be complex relationships between the value attached to landscape receptors, and their susceptibility to change. As an example a nationally valued landscape does not automatically have a high susceptibility to all types of change.
- 9.52 Final conclusions on the overall significance of landscape effects are drawn from the assessment components described. GLVIA3 notes at paragraph 5.56 that there are no hard and fast rules about what makes a significant effect. However it is reasonable to say that:-
- Major loss or irreversible adverse 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 adverse 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 landscapes of community value are likely to be of least significance and may, depending on the 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.
- 9.53 This assessment includes conclusions on the significance of the landscape effects.

Assessment of Visual Effects

- 9.54 An assessment of visual effects deals with the effects of change and development on the views available to people and their visual amenity.
- 9.55 The first stage in the assessment is to map visibility. This can be done by a computer generated Zone of Theoretical Visibility (ZTV), or by manual methods using map study and site visits. For this project a combination of computational and manual methods was used. The computational study only rules out areas where views are not possible and does not take into account surface features such as buildings and structures. A series of viewpoints was determined within the ZTV. These represent a range of potential viewpoints in the vicinity of the site, some of which are likely to be affected by the Proposed Development.
- 9.56 The viewpoints include:-
- views to aid description of the site itself;
 - public viewpoints, including rights of way and open access land;
 - public locations representing residential areas;
 - transport routes; and
 - places where people work.
- 9.57 The views seek to represent what can be seen from a variety of distances from the Proposed Development, and different viewing experiences.

Sensitivity of Visual Receptors

- 9.58 It is important to remember that visual receptors are all people. For each affected viewpoint the assessment considers both susceptibility to change in views and the value attached to views.
- 9.59 The visual receptors most susceptible to change are generally likely to include:-
- residents at home;
 - people engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focused on the landscape or 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.
- 9.60 Travellers on road, rail or other transport routes tend to fall into an intermediate category of susceptibility to change. Where travel involves recognised scenic routes awareness of views is likely to be particularly high.
- 9.61 Visual receptors less likely to be 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.
- 9.62 Judgements about susceptibility to change are recorded in this assessment on a scale of High, Medium and Low.
- 9.63 Judgements on the value attached to views experienced, take account of:-
- recognition of the value attached to particular views, for example in relation to heritage assets, or through planning designations; and
 - indicators of the value attached to views by visitors, for example through appearances in guidebooks or visitor maps.
- 9.64 Judgements on visual value in this assessment are noted in this assessment in terms of; National, Regional and Local.

Magnitude of The Visual Effects

- 9.65 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.
- 9.66 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;
- 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.

9.67 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.

9.68 As with landscape effects the duration of the effect could be short to long term or permanent and the same definitions apply.

Overall Significance of Landscape And Visual Effects

9.69 The final conclusions on significance are drawn from the separate judgements on the sensitivity of the receptors and the magnitude of the effects, allowing a final judgement on whether the effect is significant or not.

9.70 For this assessment the following descriptive thresholds have been used:-

- Major – An effect considered very important in the decision process;
- Major/Moderate – An effect that is considered material in the decision process;
- Moderate – An effect that is notable, but not material in the decision process;
- Minor – An effect that will be noticed, but is not relevant to the decision process;
- Negligible – An effect that will be discernible but of very limited consequences that is it not relevant to the decision process.

9.71 For this assessment effects of “Major” or “Moderate / Major” are considered to be significant.

Landscape Character Baseline Conditions

Natural England Character Areas

9.72 The site and surrounding area lie within NCA Profile 88 ‘Bedfordshire & Cambridgeshire Claylands’ as defined by Natural England. This area is described as follows:

Key Characteristics:

- *Gently undulating, lowland plateau divided by shallow river valleys that gradually widen as they approach The Fens NCA in the east.*
- *Underlying geology of Jurassic and Cretaceous clays overlain by more recent Quaternary glacial deposits of chalky boulder clay (till) and sand and gravel river terrace deposits within the river valleys. Lime-rich, loamy and clayey soils with impeded drainage predominate, with better-drained soils in the river valleys.*

- *The River Great Ouse and its tributaries meander slowly across the landscape, and the River Nene and the Grand Union Canal are also features. Three aquifers underlie the NCA and a large manmade reservoir, Grafham Water, supplies water within and outside the NCA.*
- *Brickfields of the Marston Vale and Peterborough area form distinctive post-industrial landscapes with man-made waterbodies and landfill sites. Restoration of sand and gravel workings has left a series of flooded and restored waterbodies within the river valleys.*
- *Variable, scattered woodland cover comprising smaller plantations, secondary woodland, pollarded willows and poplar along river valleys, and clusters of ancient woodland, particularly on higher ground to the north- west representing remnant ancient deer parks and Royal Hunting Forests.*
- *Predominantly open, arable landscape of planned and regular fields bounded by open ditches and trimmed, often species-poor hedgerows which contrast with those fields that are irregular and piecemeal.*
- *Wide variety of semi-natural habitats supporting a range of species –some notably rare and scarce – including sites designated for species associated with ancient woodland, wetland sites important for birds, great crested newt and species of stonewort, and traditional orchards and unimproved grassland supporting a rich diversity of wild flowers.*
- *Rich geological and archaeological history evident in fossils, medieval earthworks, deserted villages and Roman roads. A number of historic parklands, designed landscapes and country houses – including Stowe House and Park, Kimbolton Park, Croxton Park, Wimpole Hall and Wrest Park – combine with Bletchley Park, Second World War airfields, the Cardington Airship Hangars and brickfields to provide a strong sense of history and place.*
- *Diversity of building materials including brick, render, thatch and stone. Locally quarried limestone features in villages such as Lavendon, Harrold and Turvey on the upper stretches of the River Great Ouse.*
- *Settlements cluster around major road and rail corridors, with smaller towns, villages and linear settlements widely dispersed throughout, giving a more rural feel. Small villages are usually nucleated around a church or village green, while fen-edge villages are often in a linear form along roads.*
- *Major transport routes cross the area, including the M1, M11, A1, A6, A5 and A14 roads, the East Coast and Midlands mainline railways, and the Grand Union Canal.*
- *Recreational assets include Grafham Water, the Grand Union Canal, Forest of Marston Vale Community Forest, Chilterns AONB, woodland and wetland sites, an extensive rights-of-way network and two National Cycle Routes. The cities of Cambridge*

and Peterborough and several of the historic market towns in the NCA are popular tourist destinations.

9.73 A pressure for the expansion of Milton Keynes has been noted by the NCA profile: ‘There are growth plans for all of the main towns and cities and Milton Keynes continues to expand.’

9.74 Part of the Environmental Opportunities for the area include, ‘SEO3: Plan and create high-quality green infrastructure to help accommodate growth and expansion, linking and enhancing existing semi-natural habitats.’ Examples to achieve this are stated in the NCA profile and include:

‘Supporting initiatives that include well-planned green infrastructure that will increase people’s access to and contact with the natural environment to benefit their health and wellbeing.

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.’

Local Landscape Character Assessments

9.75 A number of landscape studies and strategies provide a finer grain of local landscape character, and relevant information for the landscape and visual analysis, these include:

- The Landscape Plan for Buckinghamshire; and
- Aylesbury Vale Landscape Character Assessment;

The Landscape Plan for Buckinghamshire (BCC, Jan 2001)

9.76 This study was carried out by Hyder Consulting for Buckinghamshire County Council and provides a finer grain of landscape characterisation. The Application Site sits within the Clayland Villages zone, and key extracts are included below:

Clayland Villages Z2

9.77 Key characteristics include:

- An undulating and enclosed landscape with numerous small ridges and meandering streams;
- A strong hedgerow pattern with prominent hedgerow trees and low woodland cover at approximately 3%;
- Small villages with a number of vernacular buildings
- Remnants of the ancient woodlands of Whaddon Chase; and
- Intrusive edge of Milton Keynes, huge poultry sheds, large agricultural barns and small industrial units.

- 9.78 Current trends identified for this zone include development pressures for the area immediately adjacent Milton Keynes as the urban areas are expanding and a loss of hedgerow trees. Priorities for the zone include the development of design guidelines for both the villages and the landscape. Hedgerow trees should be established and small community woodlands encouraged, close to settlements.

Aylesbury Vale Landscape Character Assessment (AVLCA) (May 2008) (Figure 9.3)

- 9.79 The site falls within the Stoke Hammond Claylands Character Area:

LCA 4.9 - Newton Longville – Stoke Hammond Claylands

- 9.80 The AVLCA states, *'Overall the condition of the landscape is moderate. There is scant woodland cover, however, trees are a feature of some hedgerows... The settlements of Newton Longville and Stoke Hammond have expanded significantly as a result of new housing development.'*

- 9.81 It also notes, *'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 undulating landform and the general lack of tree cover. Overall the degree of sensitivity remains low.'*

- 9.82 Key Characteristics are described as follows:

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

- 9.83 Intrusive Elements stated in the assessment include:

- *Suburban edge of Bletchley*
- *Former Brickworks site at Newton Longville*
- *Suburban fringe of Newton Longville*

- 9.84 Adjacent areas to the site are described in the following character areas:

LCA 4.7- Whaddon Chase

- 9.85 Overall the condition of the landscape is considered to be very good. The area is particularly noted for the coherent pattern of elements, namely the relationship of steeper valleys streams and woodland cover. Cultural integrity is good, represented by the remnant woodland, landscape features and archaeology of the historic Chase. The area is noted as a unique/rare landscape because of the surviving relics of Whaddon Chase. There is a strong sense of place. Overall the degree of sensitivity is high. Key Characteristics are described as follows:

- *Incised valleys*
- *Settlement on local promontory*

- Extensive woodland cover
- Irregular shaped field pattern
- Heritage of Whaddon Chase

LCA 4.8 – Horwood Claylands

9.86 Overall the condition of the landscape is considered to be good. The area covers an undulating clay plateau eroded by a network of local streams into a series of shallow valleys and broad flat ridges. The area maintains its distinctiveness due to its rural characteristics and the historic continuity of the area. Sense of place is considered to be moderate. Overall the degree of sensitivity remains moderate. Key Characteristics are described as follows:

- Rolling clay landform
- Shallow valley and ridges
- Two distinctive water courses draining to the Claydon Brook
- Mixed farmland
- Irregular field pattern around settlements
- Loss of field pattern structure to east of the area

Local Landscape Baseline Conditions

Topography (Figure 9.2 in Appendix 9.3)

9.87 The site itself covers two sides of a gently sloping east-west ridge along the top of which runs Weasel Lane. The site reaches a low point of 95m along the former railway which runs along the southern boundary and a high point of 120m along Weasel Lane. To the west and south west of the site the land rises beyond the Ouzel Valley to a height of 150m AOD at Mursley. To the south east, the green sand ridge at Woburn is a prominent feature on the skyline.

Woodland and Biodiversity (Figure 9.4 in Appendix 9.3)

9.88 To the west of the site, there are a number of areas of woodland, including Broadway, Salden, Thrift and Hogpound wood. These are designated as areas of Ancient & Semi-natural Woodland and are relics of the former Whaddon Chase. However, the site itself is not covered by any environmental designations. A BS:5837 Tree survey and Veteran Tree Survey has been carried out for the site and is submitted as a free standing document as part of this application. The majority of the existing trees and all veteran trees will be retained within the green infrastructure.

Settlement & Communications

9.89 The A421 immediately north of the site provides a strategic route between Oxford and Cambridge. The southern boundary is formed by the disused Oxford to Bletchley rail line, which may reopen in the future. A number of long distance walks also pass through the area including the Milton Keynes Boundary Walk and the Midshires Way. (Figure 9.4 in **Appendix 9.3**) The bridleway along Weasel Lane passes through the centre of the site. Whaddon Road forms the western boundary of the site.

Night Time Character

- 9.90 Whilst the study area itself is predominantly unlit, the surrounding development influences result in numerous light sources which have a bearing on the character and visual amenity of the environment. The conurbation of Milton Keynes creates a significant and wide reaching level of sky glow to the north and east, with secondary areas of light being generated by the A421. Newton Longville is comparatively unlit.

Landscape and Environmental Designations

- 9.91 A limited number of designations have been identified that may be of relevance to the Application Site. Refer to Figure 9.4: Landscape and Environmental Designations Plan.
- Scheduled Ancient Monument - Fishpond in Water Spinney 600m SE of St Giles's Church Tattenhoe (500m from Site).
 - Scheduled Ancient Monument - Moated site, fishponds and deserted medieval village of Tattenhoe, 300m west of Home Park Farm (1km from Site).
 - Scheduled Ancient Monument - Snelshall Benedictine Priory: a moated priory site and fishponds north of Briary Plantation (1.8km).
 - SSSI - Howe Park Wood, public access woodland (1.3km).
- 9.92 On the Application Site itself there are no landscape designations but there are locations of archaeological interest which are detailed in Section 5 of this ES, which are to be protected in the green spaces on site.

Conservation Areas

- 9.93 The Newton Longville Conservation Area is approximately 1.1km away from the site at its nearest point. The setting of Newton Longville conservation area is created by the remainder of the village. There are limited views out of the conservation area due to the surrounding built form.

Visual Baseline Conditions

- 9.94 A detailed visual assessment has been undertaken in order to identify receptors that have a viewing opportunity over, towards or within the Site. The baseline appraisal seeks to explore the nature of the existing visual amenity of the area and to establish the approximate extents of visibility of the Site from all surrounding receptors.
- 9.95 Discussions with AVDC emphasised the importance of following the latest methodology guidelines, producing a ZTV, thoroughly examining the area, and including the worst case locations, including winter assessments.
- 9.96 Wherever possible viewpoints have been recorded from publicly accessible locations within the Zone of Theoretical Visibility (ZTV) however, it is important to note that not all receptors with a view of the Site have been accessible and as such this assessment seeks to establish a representative sample of receptors surrounding the Site. Figure 9.5 (in **Appendix 9.4**) identifies viewpoint locations together with receptors which have a viewing opportunity. Each viewpoint is illustrated by an annotated photograph available within Figures 9.6 to 9.18

(in **Appendix 9.4**) inclusive. Worst case and winter viewpoints have been included to illustrate the most significant effects.

- 9.97 Receptors encompass residents, users of Public Rights of Way, highways and people at work. In overall terms the first two categories (residents and Public Rights of Way) are of higher sensitivity than the latter two (highways and people at work), although the context of individual receptors can have a bearing on their sensitivity. The main findings are described below:

Viewpoint 1 (Figure 9.6)

- 9.98 This viewpoint is from Bottle Dump Roundabout, north of the site and represents the first view that vehicular users of the road travelling from the west will have of the site, as Broadway Wood screens all views further west. The views are restricted by a combination of existing tree and shrub planting and contours, with only a partial area of the site north of Bletchley Leys farm visible.

Viewpoint 2 (Figure 9.6)

- 9.99 This viewpoint is from the long distance footpath that runs along the edge of Snelshall East and West, north of the site and represents the view of pedestrian users of the footpath. Views of the site are restricted by the existing hedgerows and tree and shrub planting, although the northern section of the Application Site can be seen in the distance, with power lines that cross the site more strongly visible on the skyline.

Viewpoints 3 & 4 (Figure 9.7)

- 9.100 These viewpoints are from the long distance footpath (Mid Shires Way) adjacent to Thrift Wood. The views are of small scale grazing fields, with sheep and horses. Broadway Wood is visible from viewpoint 4, hedges include a large number of large trees, and the views are fairly enclosed due to the topography.

Viewpoint 5 (Figure 9.8)

- 9.101 This elevated viewpoint is from the access road to Chase Farm. The topography allows more long distance views east towards the site. The green sand ridge around Woburn is visible on the skyline, with several mature trees within hedgerows.

Viewpoint 6 (Figure 9.8)

- 9.102 This viewpoint is from the group of approximately ten houses at Chase Farm and represents a typical view from the residents. Broadway and Salden Woods enclose the view to the north and south, with a long thin horizontal area of the fields within the site visible behind existing hedgerow planting beyond a single field used for grazing. The white warehouse development at Snelshall East and West detracts from the view, as do the overhead power cables.

Viewpoint 7 (Figure 9.9)

- 9.103 This elevated viewpoint is from the access road to Lower Salden Farm, adjacent to Springfield Farm. Milton Keynes centre is visible on the distant skyline, with the residential

area of Bletchley below the skyline. Overhead power cables are dominant. Salden Wood, to the right of the picture, and Broadway Wood to the left, create a strong woodland structure.

Viewpoint 8 (Figure 9.9)

- 9.104 This viewpoint is from Lower Salden Farm. The view is open in character, with glimpses of existing development in Milton Keynes visible on the skyline. The grazing fields are bounded by low hedgerows and post and wire fences, which create a more open feel than the area further north.

Viewpoints 9 & 10 (Figure 9.10)

- 9.105 These elevated viewpoints are from the footpath south of the site from Mursley towards Newton Longville. The housing at Bletchley is visible in the middle distance, with Milton Keynes on the skyline.

Viewpoint 11 (Figure 9.11)

- 9.106 This shows a view north from the entrance to Cowpasture Farm. The site itself forms a long horizontal strip along the horizon. Housing in Bletchley is visible to the right of the view. This also represents similar views from Hounslow Hall. To the west, Middle Salden and Salden Wood combine and can be seen on the left. The planting alongside the railway along the southern boundary of the site screens the lower half of the site. The residential receptors and users of the footpath are considered to be of high sensitivity.

Viewpoint 12 (Figure 9.11)

- 9.107 This shows a view north from a footpath west of Newton Longville and this also represents similar views from housing along the western edge of Newton Longville. The south facing slope of the site is partially visible from this viewpoint with the trees along Weasel Lane visible on the skyline.

Viewpoint 13 (Figure 9.12)

- 9.108 This shows a view north from a footpath through the playing fields in Newton Longville, and also represents users of the Milton Keynes Boundary Walk Long Distance Footpath. Tree planting north of Newton Longville filters views of the site, although fields within the site are visible.

Viewpoints 14 & 15 (Figure 9.12)

- 9.109 These show glimpses of the site between houses along the northern edge of Newton Longville. Approximately 20 homes will have clear views towards the site, although the properties along the road are predominantly bungalows, with reduced views.

Viewpoint 16 (Figure 9.13)

- 9.110 This shows a view towards the site from Bletchley Road and represents the view of vehicular users of the road. The hedgerows of Weasel Lane are visible from this viewpoint over the hedgerow.

Viewpoint 17 (Figure 9.13)

- 9.111 This viewpoint from Hamilton Lane represents similar views from approximately 29 properties along the western boundary of Bletchley including Aintree Close, Carmel Close, Haydock Close and Thirsk Gardens, Dagnall House and New Leys.
- 9.112 These are the closest residential receptors to the site (not including the two farm buildings adjacent to the site) The tree and hedge planting along the rear of the properties screens some views of the countryside, but properties currently have long distance views to the west, particularly from upper storey windows.

Viewpoint 18 (Figure 9.14)

- 9.113 This represents the view south from users of Weasel Lane, the public footpath that runs through the centre of the site along the ridgeline. The views are fairly open and long distance from the western end of the lane, whilst to the east, the surrounding hedgerows and trees restrict views out into the surrounding countryside. The housing and church within Newton Longville are visible beyond the site boundary.

Viewpoint 19 (Figure 9.14)

- 9.114 This represents the views from users of the public open space between Snellshall East and Tattenhoe Park. The views are screened by existing planting within the park.

Viewpoint 20 (Figure 9.15)

- 9.115 This represents a view from the pedestrian underpass, but also represents to a similar extent, views from the A421. The existing planting along the A421 screens all views into the site.

Viewpoint 21 (Figure 9.15)

- 9.116 This represents the view from within Tattenhoe Park. The area of the site north of Weasel Lane is partially visible on the skyline but is seen in the context of the industrial development within Snellshall East and West and with the recently completed school at Tattenhoe Park in the foreground.

Viewpoint 22 – Farmhouses at The Leys and Bletchley Leys (Figure 9.16)

- 9.117 Farmhouses at Bletchley Leys and The Leys currently have views into the surrounding countryside.

Viewpoint 23 – Whaddon Road (Bridge) (Figure 9.16)

- 9.118 The proposals will be clearly visible from the elevated bridge on Whaddon Road. Planting along the disused railway line can be seen on the right, and Whaddon Road leading towards the A421 can be seen on the left. The barn at The Leys Farm can be seen near the top of hill along with the hedgerows alongside Weasel Lane.

Viewpoint 24 – Shenley Road (Receptor-Vehicular Users) (Figure 9.17)

- 9.119 The northern slope north of Weasel Lane can be seen through a gap in the woodland in the foreground. There are several hedgerows between the viewpoint and the site, which help to filter views towards the site.

Viewpoint 25 – Whaddon Road near Fire Lane, Newton Longville (Receptors – Residents and Vehicular Users) (Figure 9.17)

- 9.120 Part of the site south of Weasel Lane can be seen from the road when leaving Newton Longville towards the A421. Properties along Whaddon Road can be seen alongside the road. The barn at The Leys Farm can be seen at the top of the hill, which marks the western boundary of the site.

Viewpoint 26 – Weasal Lane (West of Site) (Receptors-Users of Weasal Lane) (Figure 9.18)

- 9.121 The stretch of Weasel Lane to the immediate west of the site has hedgerows along either side and tall trees along some of its length. This serves to channel views along Weasel Lane rather than out to the countryside.

Visual Baseline Conclusion

- 9.122 This selection of representative viewpoints has highlighted the following:
- There are relatively few residential receptors with views of the site. These are limited to residents on the northern edge of Newton Longville, residents at the hamlet of Chase Farm, residents within the row of houses on the western boundary of Bletchley and the two farmhouses adjacent to the site.
 - Other high sensitivity receptors include the users of Weasel Lane and the Milton Keynes Boundary Walk that cross the site, in particular Weasel Lane which runs through the centre of the site.
 - The site is visible from public vantage points to the south due to the rising ground. However, Bletchley is already visible on the similarly facing slope.
 - Long distance views from the west are restricted by the existing contours and woodland blocks of Salden and Broadway woods, and from the east by existing urban fabric within both Bletchley and more specifically Far Bletchley.
 - The existing planting and contours along Weasel Lane currently forms a strong positive visible element within the landscape.
 - The existing mature woodland blocks are visible from a wide area due to the lack of tree and hedgerow planting within the site.
 - Detractive visual elements within the landscape are the overhead power lines, buildings within Snelshall East and West and the abrupt urban edge of Far Bletchley.
 - The site constitutes a gateway view of Milton Keynes when travelling east along the A421.
 - There are close range views of the Site from Whaddon Road.

Construction Methods

- 9.123 During construction the site would be cleared and earthworks operations, followed by construction would occur in a gradual phased progression. This would include removal of small lengths of some of the hedgerows on the site and a small number of lower grade trees that have been marked for removal.
- 9.124 The removal of any mature trees or vegetation would be undertaken outside the bird nesting season (if this is unavoidable they should be inspected prior to removal by a suitably qualified ecologist and only removed following confirmation that there are no nesting birds present).
- 9.125 Protective fencing and measures in accordance with BS 5837 (Trees in relation to construction) would be implemented as required to protect the retained landscape features within the Application Site; existing hedgerows, associated hedgerow trees. These would be implemented prior to the commencement of construction work within the vicinity of the specific areas or planting.
- 9.126 Early in the construction period earthworks operations would also occur for a short period of time to construct the attenuation areas to the south and north of the site. The details of the proposed works are not known at this stage, however it is anticipated that they would comprise excavation of the existing ground levels to a depth of approximately 1.5 metres and removal of the excavated material from site. The ground would then be reinstated to grassland with tree, shrub and reed planting.

Likely Significant Effects

- 9.127 The Parameters Plan (SWMK03/074) has formed the basis of this assessment and the site and project are described in Chapter 2 of this ES.
- 9.128 A comprehensive landscape and visual impact assessment has been undertaken to determine the visual effects upon the surrounding receptors of the Proposed Development. Receptors with views to the Site and character areas have been assessed in terms of sensitivity, proposed changes to the view and resulting overall significance.
- 9.129 Three stages of development have been assessed for each of the receptors. The first stage considers the effects during construction, the second stage considers the effects upon completion of the Development (Year 1) and the third predicts the effects based upon 15 years after completion (residual effects). This enables the effectiveness of any mitigation planting to be evaluated. **Appendices 9.1 & 9.2** detail the landscape and visual impact assessment schedules. The GI framework that forms part of the mitigation for the landscape and visual effects is shown in Figure 9.19. The results of the assessment are summarised below.

Effects On Landscape Character

Bedfordshire and Cambridgeshire Claylands (NCA 88)

- 9.130 The Bedfordshire and Cambridgeshire Claylands area is extensive and covers most of central and northern Bedfordshire and western Cambridgeshire. In this regard, the assessment is only of relevance in appraising the very broad landscape context.
- 9.131 A pressure for the expansion of Milton Keynes has been noted by the NCA profile: 'There are growth plans for all of the main towns and cities and Milton Keynes continues to expand.'
- 9.132 Part of the Environmental Opportunities for the area include, 'SEO3: Plan and create high-quality green infrastructure to help accommodate growth and expansion, linking and enhancing existing semi-natural habitats. ' Examples to achieve this are stated in the NCA profile and include:
- 'Supporting initiatives that include well-planned green infrastructure that will increase people's access to and contact with the natural environment to benefit their health and wellbeing.
 - 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.'
- 9.133 The green infrastructure designed into the scheme will therefore provide beneficial effects for the area. The susceptibility to change of the character area is assessed to be Medium and the value of the landscape is considered to be local. During construction and in the short term the scale of the change would be low over the entire character area. Over time the scale of the change would be negligible. The proposals are considered to have a minor adverse effect during construction and on completion, over time there would be negligible effects on this landscape character area as a whole.

Newton Longville-Stoke Hammond Claylands

- 9.134 The Site lies within the Newton Longville – Stoke Hammond Claylands, in the Aylesbury Vale Landscape Character Assessment (2008). This area is part of the Landscape Character Type (LCT) Undulating Clay Plateau (LCT 4). The Site lies in the north west of this character area, with major influences from the suburban edges of Bletchley and Newton Longville.
- 9.135 The Proposed Development will physically alter the landscape character of a small part of this character area. Agricultural land will be changed to a high quality mixed used development and an extensive new green infrastructure network. The Proposed Development abuts the existing urban edge of Milton Keynes and Bletchley and would extend the existing settlement further south.
- 9.136 Indirect landscape effects would be experienced in the wider context of the landscape character area due to the changes in the perception of the qualities of the landscape. For a

limited area in the north of the character area (where views are possible) the perception of the site will change from views of an agricultural field to residential use.

- 9.137 The development of the Site has the potential to deliver benefits including softening of the existing suburban edge and improved landscape character through the management of open space and planting of small blocks of woodland and individual trees, improving the access and recreation opportunities to the local community.
- 9.138 Whilst the existing sense of openness will inevitably be lost, green infrastructure will break up the massing of the development, and the townscape quality of the Proposed Development will be high, with a strong hierarchy of streets and open spaces. Existing landscape features, such as Weasel Lane, will be retained within the Proposed Development. The proposed local footpath and cycleway network will provide enhanced recreational opportunities throughout the Proposed Development.
- 9.139 The Aylesbury Vale Landscape Character Assessment summarises the condition of the area as moderate and the sensitivity as low. Guidelines are to enhance and reinforce.
- 9.140 The susceptibility to change is low, and value is considered to be local. The scale of change is medium/low during construction and on completion, reducing to low over time, as the planting matures. The proposals will therefore have a moderate/minor adverse effect on this character in the short term. However, within 15 years and as the new GI matures there are likely to be minor adverse effects on landscape character.

Whaddon Chase

- 9.141 This character area lies adjacent to the north west of the Application Site and also lies within LCT 4. A small area along the existing A421 dual carriageway is included within the application boundary. The remainder of the site does not lie within this character area, so only indirect effects on the perceptual qualities of the landscape character area will be experienced.
- 9.142 There is extensive woodland cover, in this character area, including Thrift Wood, which provides distinctive character and also helps to screen the site from the majority of the character area. There is therefore limited intervisibility between the Site and this landscape character area.
- 9.143 The woodland blocks will be planted along the western and southern boundaries of the site, in wide landscape strips, which will continue the character of Whaddon Chase and help to integrate the edge of the new development and create an ecological and recreational corridor, continuing the woodland vision discussed in the Whaddon Chase GI Strategy. The susceptibility to change of the character area is high and value is regional. The scale of change is low to negligible due to the lack of intervisibility between the character area and the site. Therefore, there is likely to be an effect on Whaddon Chase of minor adverse during construction and in the short term. As the new high quality landscape habitats mature, and within 15 years, the Proposed Development will have negligible effects on landscape character of Whaddon Chase.

Horwood Claylands

- 9.144 This character area lies to the west of the Proposed Development site and also lies within LCT 4. A small area of works will be necessary in this character area on the existing Whaddon Road, so direct effects will be limited to this area and only indirect effects on the perceptual qualities of the landscape character area will be experienced in the remainder of the character area..
- 9.145 Small copses and fragments of woodland located to the northeast boundary of the area relate to the original Whaddon Chase (Hunting Forest). Salden Wood, Broadway Wood and Hogpound Wood provide screening for views from the west.
- 9.146 New small woodland blocks planted on the southern and western boundaries of the Application Site will deliver a strong green infrastructure linking into the Milton Keynes overall green infrastructure network and into Aylesbury Vale. There are also significant opportunities to draw on the character of this area within the site with a strong green infrastructure including retained hedgerows and mix of woodland planting and open spaces.
- 9.147 The character area has a medium susceptibility to change and local value. The scale of the change is considered to be low during construction and in the short term. Over time as the planting matures the scale of the change will reduce to low/negligible. The proposals are assessed as having a minor adverse effect on this character during the short term. However, within 15 years and as the new woodland planting matures there are likely to be minor/negligible adverse effects on landscape character.

Site Context

- 9.148 The immediate Site context would be changed as a result of the development, and some of the openness would be lost.
- 9.149 The area defined as the immediate site context, as shown in Figure 9.3, is contained in part by the built form and roadside vegetation. The new housing would extend the urban character, and the new planting, including the woodland to the south and west, would soften the urban edge. There would be a local change in character in this area.
- 9.150 There will be landscape enhancements including the establishment of new woodland and tree planting and green spaces, reinforcing existing landscape features. The wooded character of Whaddon Chase would be extended to the southern and western perimeters of the Site.
- 9.151 The susceptibility to change of the site context is considered to be medium/low and of local value. The scale of the change would be medium during construction and on completion, reducing to medium/low in the longer term. The proposals are assessed to have a moderate adverse effect in the short term and moderate/minor adverse effect on the landscape character of the site context in the longer term.

Site

- 9.152 On the site itself, the loss of existing arable fields would be permanent and irreversible.

- 9.153 The Site contains Weasel Lane; an attractive part of the Sustrans Route 51. This route would be retained and enhanced with further woodland planting. The Milton Keynes Boundary Walk will also be retained. New footpaths will be provided around the perimeter of the development and throughout the green spaces. This will enhance the footpath links between Milton Keynes and the wider countryside.
- 9.154 Balancing ponds will be added and enhanced with planting.
- 9.155 Although small lengths of hedgerows and hedgerow trees will be lost, these losses would be mitigated for with extensive areas of new woodland / tree planting and new hedgerows. Where hedgerows and hedgerow trees are to be retained they would be reinforced with new planting.
- 9.156 Overall whilst the magnitude of change to the Site would be high, the development as proposed would give rise to some longer term landscape benefits which help to balance the overall effects of the development.
- 9.157 The Site itself is considered to be of medium/low sensitivity and local value. The scale of change would be high during construction, high/medium at completion and medium at year 15. The landscape effects for the Site are considered to be major adverse during construction, major/moderate adverse at completion and moderate adverse at year 15.

Effects on Visual Resources

Viewpoint 1 (Receptors-Vehicular Users)

- 9.158 The proposals will include highway works at the Bottledump Roundabout. The Proposed Development will create a new gateway and sense of arrival into Milton Keynes from this viewpoint. The proposals include an area of balancing ponds and green infrastructure beyond the new roundabout, which will create a landscaped setting with the development forming a backdrop. Some of the vegetation will be removed to enable the widening works to the roundabout. Built development in the north west of the site will be visible, beyond the proposed planting. The new planting in the foreground will assist in filtering the views over time.
- 9.159 The susceptibility to change of the receptor (road users) is medium and the view is of local value. The scale of change is medium during construction and on completion, reducing to low in the longer term. Effects are assessed to be moderate adverse during the initial period changing to minor adverse following maturing of the proposed landscape which will create a new green gateway to Milton Keynes.

Viewpoint 2 (Receptors-Pedestrians)

- 9.160 A glimpse of the western edge of the development on the north facing slopes is visible in the short term from this view above the hedgerow in the foreground. The proposed planting in the linear parks will help to integrate the development in the longer term.
- 9.161 The susceptibility to change of the receptor is high and the value is regional. The scale of change is low during construction and on completion, reducing to low/negligible over time.

Effects are therefore assessed to be minor adverse changing to minor adverse / negligible within 15 years as the proposed planting matures.

Viewpoints 3 & 4 (Receptors-Pedestrians)

- 9.162 The roofs of the Proposed Development will be seen on higher ground beyond several hedgerows and the buildings at Bletchley Leys Farm.
- 9.163 The susceptibility to change of the receptor is high and the value is regional. The scale of change is low in the short term and low/negligible in the longer term. Effects are assessed to be minor adverse in the short term. As the proposed green infrastructure matures, and within 15 years, the effects will be minor adverse / negligible.

Viewpoint 5 (Receptors-Vehicular Users)

- 9.164 The western edge of the site on the north facing slopes is visible from this view; however, from this distance the visual effects would be minimal.
- 9.165 The receptor is also of medium susceptibility to change and the value is considered to be local. The scale of change would be low/negligible in the short term and negligible in the longer term. Effects are assessed to be minor adverse / negligible during the initial construction period and following completion, changing to negligible on maturing of the woodland planting.

Viewpoint 6 (Receptors-Residents)

- 9.166 Although in the short term, and during construction period, views would be seen from the properties at Chase Farm, the intervening hedgerows filter the views towards the site. The proposed woodland blocks within the linear park will also help to screen the development over time.
- 9.167 The susceptibility to change of these properties is high and the value is considered to be local. The scale of change is low/negligible during construction and upon completion reducing to negligible over time. Effects are assessed to be minor adverse / negligible in the short term changing to negligible following 15 years and maturing of the proposed woodland planting.

Viewpoint 7 (Receptors-Vehicular Users)

- 9.168 The roofs of a small part of the development may be seen from this viewpoint over the intervening hedgerows and trees, although the intervening topography and Salden Wood would screen the majority of the site. The development is a small element in the view from this distance.
- 9.169 The susceptibility to change of the transient receptor is medium and the value is local. The scale of change during construction and upon completion would be negligible. Effects are assessed to be negligible in the short and long term.

Viewpoint 8 (Receptors-Residents of Lower Salden Farm)

- 9.170 Tattenhoe Park School and the settlement edge of Milton Keynes / Bletchley are visible in this view. The roof tops of the proposals to the north west of the site may be visible beyond the intervening hedgerows and trees. Over time the new woodland planting will screen the development and some of the existing edge of Milton Keynes/Bletchley from this viewpoint. The overall nature of the view as the edge of Milton Keynes/Bletchley will remain the same.
- 9.171 Susceptibility to change of the residential receptors at Lower Salden Farm is high and the value is considered to be local. The scale of the change during construction and upon completion is low / negligible. Over time the scale of change would be negligible. Visual effects are therefore assessed to be minor adverse / negligible in the short term changing to negligible in the long term as the green infrastructure matures and views of the proposals and some of the existing settlement edge at Milton Keynes/Bletchley are screened.

Viewpoints 9 & 10 (Receptors-Users of the Footpaths)

- 9.172 The edge of Bletchley and the study area can be seen from these viewpoints, although the site is a fairly small element in the view. The proposed landscape planting and GI corridors will create a filtered view of the new settlement edge and partially screen the existing edge of Bletchley.
- 9.173 Susceptibility to change of these receptors is high and the value is local. The scale of the change is low during construction and upon completion. Over time the scale of change would be low/negligible. Visual effects are therefore assessed to be minor adverse reducing to minor adverse/negligible within 15 years as planting matures.

Viewpoint 11 (Receptors-Users of the Footpath and Residents)

- 9.174 This viewpoint represents an isolated area of higher ground where the site is more visible than in the surrounding area. The edge of Bletchley can be seen on the left of the viewpoint on the horizon. The farm building on Whaddon Road can also be seen. In the foreground some properties in Newton Longville can be seen on the left of the viewpoint. The proposals south of Weasel Lane will be visible from this viewpoint, due to the south facing contours of the site. However, the GI plan proposes to break up the mass of the development with belts of trees and green infrastructure corridors, (the pipeline corridor in particular will help from this viewpoint), which will reduce the visual effects of the proposals. The location of the sports pitches on the highest ground adjacent to Weasel Lane reduces the potential effect on the skyline.
- 9.175 The susceptibility to change of the single adjacent residential receptor and transient users of the footpath is high and the value is considered to be local. The scale of change is medium/low during construction and upon completion and low at year 15. Effects are therefore assessed to be moderate/minor adverse in the short term reducing to minor adverse as planting matures.

Viewpoint 12 (Receptors-Users of the Footpath)

- 9.176 This viewpoint is lower in elevation than viewpoint 11 but is closer to the development. The site is partially screened by the intervening trees and hedgerows. The edge of Bletchley can be seen on the left of the viewpoint on the horizon. The farm building on Whaddon Road can also be seen. In the foreground some properties in Newton Longville can be seen on the left of the viewpoint. The proposals will be visible in the winter behind the existing trees in the foreground. The mitigation proposals will reduce the visual effects over time.
- 9.177 Susceptibility to change of the receptors is considered to be high and the value is considered to be local. The scale of change is medium/low at construction and completion and low within 15 years. Effects are assessed to be moderate/minor adverse reducing to minor adverse within 15 years.

Viewpoint 13 (Receptors-Recreational Users of the Playing Fields and Milton Keynes Boundary Walk)

- 9.178 The proposals will be partially visible on the south facing slopes beyond the intervening existing trees which help to filter the views towards the site. The GI plan proposes to break up the mass of the development with belts of trees and green infrastructure corridors, which will reduce the visual effects of the proposals over time.
- 9.179 The susceptibility to change of the receptors is medium / low for the recreational users of the playing fields and high for walkers on the Milton Keynes Boundary Walk. The value is considered to be local. The scale of change is low during construction and upon completion and low/negligible over time.
- 9.180 For the users of the playing fields visual effects will be minor adverse/negligible changing to negligible within 15 years as the woodland planting along the former railway corridor and around the proposed balancing area matures.
- 9.181 For walkers on the Milton Keynes Boundary Walk effects will be minor adverse in the short term, reducing to minor adverse/negligible within 15 years as the woodland planting along the former railway corridor and around the proposed balancing area matures.

Viewpoints 14 & 15 (Receptors-Residents)

- 9.182 The proposals will be visible on the south facing slope of the site from the housing on the northern edge of Newton Longville, seen in the context of the existing settlement edge of Far Bletchley. The elevated tree lined ridgeline of Weasel Lane will be reinforced and protected with open space and woodland planting on the highest ground. The green infrastructure proposals will break up the mass of the development with belts of trees and green corridors running up the slope towards Weasel Lane, which will reduce the effects of the proposals from these receptors.
- 9.183 The susceptibility to change of the receptors is high and the value is considered to be local. The magnitude of change is medium during construction and upon completion and medium/low over time. Effects are assessed to be major/moderate adverse in the short term reducing to moderate adverse in the long term as the planting matures.

Viewpoint 16 (Receptors-Vehicular Users)

- 9.184 A short stretch of road between Newton Longville and Bletchley will experience some effects from the proposals. The south facing slope of the site below Weasel Lane can be seen from Bletchley Road adjoining the existing settlement edge of Far Bletchley. Development on the southern facing slope would be visible from this location. The mitigation proposals will reduce the visual effects over time.
- 9.185 The susceptibility to change of the receptors is medium and the value is local. The scale of change is medium during construction and upon completion, reducing to medium/low within 15 years. The visual effects are considered to be moderate adverse in the short term and moderate/minor adverse over time.

Viewpoint 17 (Receptors-Residents)

- 9.186 The Proposed Development will change the views from the outer row of houses on the edge of Far Bletchley. Some of the properties have low hedges and views over the southern facing slopes of the site. Other properties have higher boundary hedges and will only experience views towards the site from the upstairs windows. The views from the backs of houses will be towards the public open space corridor, with either housing (as from this viewpoint) or the school playing field beyond. The proposals will include a new footpath link between the existing and new housing, at the end of Hamilton Lane to ensure that there is movement and integration between the two areas.
- 9.187 The susceptibility to change of the receptors is high and the value is local. The scale of change is medium/high during construction and upon completion, reducing to medium within 15 years. Visual effects are assessed to be major/moderate adverse during construction and upon completion, reducing to moderate adverse following maturing of the tree planting.

Viewpoints 18 (Receptors-Users of Weasel Lane)

- 9.188 In general, views from Weasel Lane are limited by the hedgerows which run along its length on both sides of the footpath. In just a couple of places views open out to Newton Longville and the countryside beyond through an infrequent gap in the hedgerow. The proposals provide greater public access to land on the ridge to the south of Weasel Lane and channelled views out to the countryside will be made available along the green corridors and linear parks proposed in the GI Plan. The proposals will reinforce the existing tree and hedgerow planting along Weasel Lane and introduce woodland planting to form a robust green corridor. Over time the new green corridors and planting will help to balance the visual effects of the new development.
- 9.189 The susceptibility to change of the receptors is high and the value is regional. The scale of change is high during construction and upon completion, reducing to medium within 15 years. Visual effects will be major adverse during construction and upon completion, reducing to moderate adverse as the planting matures.

Viewpoints 19 & 20 (Receptors-Users of the Footpath and Vehicular Users)

- 9.190 The proposals will not be visible from these viewpoints due to the existing planting along the A421 and there will therefore be no adverse visual effects.

Viewpoint 21 (Receptors-Future Residents)

- 9.191 The development on the north facing slopes to the north of Weasel Lane will be partially visible on the skyline, but broken up by the retained and proposed planting. The proposals will be seen in the context of the existing industrial development at Snelshall East and West.
- 9.192 The susceptibility to change of the receptors is high and the value is local. The scale of change is low during construction and upon completion, reducing to low/negligible within 15 years. Visual effects will be minor adverse in the short term, reducing to minor adverse/negligible within 15 years.

Viewpoint 22 - The Leys and Bletchley Leys Farmhouses (Receptors-Residents)

- 9.193 The proposals will extend around 3 sides of The Leys farmhouse. Some existing boundary trees and hedges help to filter views towards the site. The proposals include green space, woodland and orchard planting near to the property which will help to further filter the views towards the development. The maturing of the proposed green infrastructure will help to reduce the visual effects over time.
- 9.194 The susceptibility to change of The Leys Farmhouse is high and the value is local. The scale of change is high during construction and upon completion, reducing to medium within 15 years. The Leys Farmhouse will initially have major adverse effects, due to the proposals that will surround them during the construction period and initial stages of development. However, this will reduce to moderate adverse with the maturing of the proposed green infrastructure along Weasel Lane and surrounding the property.
- 9.195 Development will be adjacent (on opposite side of the road) to Bletchley Leys farmhouse. The property does not have direct views over the site as there are no windows overlooking Whaddon Road; this reduces the susceptibility of this receptor. Views towards the site will be experienced when entering or exiting the property from the driveway. The existing hedges and trees on site help to screen the views to the site from this location. The maturing of the proposed green infrastructure along Weasel Lane and the western boundary of the site will help to reduce the visual effects of the development over time.
- 9.196 The susceptibility to change of Bletchley Leys Farmhouse is medium and the value is local. The scale of change is medium during construction and upon completion, reducing to medium/low within 15 years. Bletchley Leys Farmhouse will initially have moderate adverse effects, due to the proposals during the construction period and upon completion of the development. However, this will reduce to moderate/minor adverse with the maturing of the proposed green infrastructure along Weasel Lane.

Viewpoint 23 - Whaddon Road (Receptors-Vehicular Users)

- 9.197 There are views towards the settlement edge of Far Bletchley and the hedgerows and trees alongside Weasel Lane can be seen at the top of the ridge. The development on the southern slopes will be seen from this viewpoint. Mitigation alongside the railway and along the green corridors will help to filter the views towards the development.
- 9.198 The susceptibility to change of the transient receptors is medium and the value is local. The scale of the change is high/medium in the short term and medium in the longer term as the planting matures. The visual effects are assessed to be moderate/major adverse during the construction period and upon completion, reducing to moderate adverse in the longer term.

Viewpoint 24 - Shenley Road (Receptor-Vehicular Users)

- 9.199 The northern slope north of Weasel Lane can be seen through a gap in the woodland from this viewpoint. The site is a small element in the view and is mainly screened by the intervening hedgerows and trees.
- 9.200 The susceptibility to change of the transient receptors is medium and the value is local. The scale of change is low/negligible during construction and upon completion as the site is a small element in the view, over time the scale of the change will be negligible. The visual effects are assessed to be minor adverse / negligible in the short term and negligible in the longer term.

Viewpoint 25 - Whaddon Road near Fire Lane (Receptors-Residents and Vehicular Users)

- 9.201 The western part of the site, south of Weasel Lane, can be seen from Whaddon Road when leaving Newton Longville towards the A421. The site can be seen in the context of the existing 20th Century houses on Whaddon Road in Newton Longville. The majority of the residential properties do not have direct views towards the site and are therefore considered to be of medium susceptibility to change. Roof tops of the new residential development would be seen on the hill in the distance. Mitigation measures include reserving the highest ground south of Weasel Lane for open space and woodland and creating green corridors up the slopes which will break up the mass of the urban form from this viewpoint.
- 9.202 The susceptibility to change of the receptors is medium for road users and medium for residents. The value is considered to be local. The scale of the change will be medium/high during construction and upon completion and, after maturing of the planting, the scale of the change would be medium/low. The visual effects for residents will be moderate adverse in the short term and moderate/minor adverse in the longer term. The visual effects for the road users will be moderate adverse in the short term and moderate/minor adverse in the longer term.

Viewpoint 26 - Weasel Lane (West of Site) (Receptors-Users of Weasel Lane)

- 9.203 The stretch of Weasel Lane to the west of the site has hedgerows along either side and tall trees along some of its length. This serves to channel views along the majority of Weasel

Lane rather than out to the countryside. From isolated locations there are wider views out to the countryside such as is represented by this viewpoint. The development at Tattenhoe Park can be seen on the horizon. Rooftops of the Proposed Development would be seen beyond the intervening hedgerows and trees. The proposed woodland blocks will reduce the visual effects of the new development over time.

- 9.204 The susceptibility to change of the receptor is high and the value is regional. The scale of the change is medium during construction and upon completion and low after maturing of the planting. The visual effects are assessed to be moderate adverse effects in the short term and moderate/minor adverse effects in the longer term as the woodland blocks mature.

Night Time Effects

- 9.205 The large scale urban extension will have to be lit to appropriate levels in order to create a safe environment. However, modern lighting technology will be utilised in order to minimise light pollution in accordance with the guidelines prepared by the Institute of Lighting Engineers.

Mitigation Measures

- 9.206 The design process for the Proposed Development is an iterative one, involving continuous assessment of potential effects against the evolving masterplan and against the recommendations set out within the published evidence base.
- 9.207 A set of parameters has been established as a result of this assessment. These parameters set out the maximum extent of the proposed built development area, building height zones and maximum building heights within each zone, land use zones, residential density areas and green infrastructure parameters.
- 9.208 These parameters have developed from on-going assessments, with the design of the resultant scheme and associated green infrastructure provision adjusted to respond to potential significant effects to both landscape character and visual resources.

Mitigation During Construction

- 9.209 The location and design of temporary construction compounds, lighting, signage and perimeter screen fencing would seek to ensure that the potential landscape and visual effects are mitigated and minimised during the construction phase and will be subject to condition.
- 9.210 It is anticipated that the construction working methods would seek to adopt best practices and a Construction Management Plan will be agreed with the Local Planning Authorities and Statutory Bodies where necessary.
- 9.211 Landscape and visual impacts addressed by the Construction Management Plan would include:
- Soil movement and management

- Protection of valuable landscape features, including archaeological features, mature trees and hedgerows.
- Programming and site access will assist in the protection of valuable landscape features.
- Early peripheral green infrastructure planting, and implementation of measures to protect this new planting.
- The nature and placement of hoardings and signboards
- Feasibility of erecting temporary screen fences
- Working hours and minimisation of light spill

General Landscape Proposals (Figure 9.19 in Appendix 9.5)

9.212 The key objectives of the Landscape (Green Infrastructure) Strategy are as follows:

- Protects and enhances existing environmental assets;
- Enhances local landscape character;
- Contains the development to provide visual separation from Newton Longville;
- Introduces new habitats and wildlife corridors;
- Provides a range of formal and informal recreation opportunities for new and existing residents;
- Enhances public access and connections to the existing Chepstowe Local Park, Whaddon Chase and the wider countryside;
- Includes water management that provides biodiversity;
- Balances the multi-functional uses of GI with biodiversity interests within the site;
- Helps to deliver Biodiversity Action Plan targets;
- Helps to deliver the Aylesbury Vale GI Strategy aspirations; and
- Can be successfully established and managed in perpetuity.

9.213 Specific guiding principles that relate to landscape character and visibility are;

- Retention of landscape features within the GI for the development;
- Extension of Chepstowe Local Park to provide an appropriate green settlement edge character with planting to contain built edge;
- Creation of greenways through the development linking existing green spaces in Milton Keynes to the wider countryside in Aylesbury Vale;
- Protect the setting to Newton Longville village;
- Create the landscape frontage to Whaddon Road and introduce planting to reduce the visual influence of the development;
- Sympathetically integrate the development with the current western edge of Bletchley;
- Provision of internal green space to link into the surrounding GI;
- New planting to reflect local character of woodland blocks and hedgerows;
- Management of landscape features to ensure their continuity making provision for replacement planting where appropriate;

9.214 Analysis of local landscape character and visual resources has informed the proposed GI Framework, which is illustrated in Figure 9.19 (in **Appendix 9.5**).

- 9.215 Although the site area is predominantly arable farmland, there are some landscape features which are of value, including the Sustrans route 51, Weasel Lane, and a number of archaeological sites (see Section 5 of this ES). The Proposed Development has been designed in response to these features to enable their protection and enhancement. Specific landscape measures to mitigate potential landscape and visual effects are described in the following paragraphs.

The Perimeter Linear Park

- 9.216 A fundamental feature of the GI concept is the proposed linear park around the western and southern perimeters of the development. This will incorporate a site of archaeological interest and link the existing Chepstowe Local Park to Whaddon Chase and the wider countryside. It will provide a substantial green buffer to the edge of the development that will visually contain the proposed settlement edge.
- 9.217 Informal recreational routes are provided throughout the linear park, linking proposed recreational facilities and the settlement edge with the existing public rights of way through the site and providing links to the existing local park to the east and to the wider countryside to the west. Integral elements of the GI include substantial new areas of native woodland, tree and hedgerow planting, grassland and an attenuation area.
- 9.218 The perimeter linear park will incorporate retained features, provide new landscape structure and habitat opportunities (through planting and management of native woodland, tree and scrub planting, creation of meadow and wet grassland areas) and include formal and informal recreation opportunities, including play areas, footpaths and cycleways with enhanced connections to the wider network. The perimeter linear park will also enhance the screening and containment of the development and maintain separation from Newton Longville.

Whaddon Road

- 9.219 New native tree and hedgerow planting in the perimeter linear park would, as it matures, provide screening to the development along Whaddon Road. An informal parkland character is proposed with a mosaic of hedgerows, small woodland blocks and parkland trees within new grassland. Tree species could include a percentage of evergreen cover.

Railway Landscape Buffer

- 9.220 The perimeter linear park wraps around the southern edge of the built development proposals. Here woodland planting is proposed to screen the development from Newton Longville and provide a buffer to the disused railway which could be reopened in the future. Much of the flood attenuation ponds are proposed for this area. These will be planted with a mixture of wet grassland and native shrubs to create habitat opportunities and will have an organic shape with a variety of slopes and niches offering a variety of habitats.

Oil Pipeline Reserve Park

- 9.221 The oil pipeline reserve provides the opportunity for breathing space within the development. It cannot be planted with trees or shrubs, so instead will be a relatively open

area, in contrast to the woodland blocks provided elsewhere on site. The pipeline reserve park will be planted with a mixture of meadow grass and flowers with a network of paths to link the new communities together. It provides a strong green corridor between the development blocks, which breaks up the urban form and provides views through the development. Hedgerows with hedgerow trees are proposed on the edges of the park to contain the parkland space and filter, but not block, views to the Proposed Development.

Weasel Lane Active Park

- 9.222 Weasel Lane is an important existing feature on the site with mature hedgerows on both sides and some mature trees. These features will be retained as they provide an attractive leisure route to the surrounding countryside as well as an important ecological corridor. The built development will be set back from the lane beyond planting and other open space, particularly on the south of Weasel Lane.
- 9.223 Open space directly to the south of Weasel Lane has been incorporated to minimise development on the higher land near the ridge. The proposed sports pitches, parks, orchards and woodland blocks form the active green heart of the development and offer varying characters along Weasel Lane. The woodland blocks adjacent to the hedgerows on the Lane enhance the ecological benefits of the hedgerow and create a natural backdrop for the development.
- 9.224 A high quality entrance will be designed for the development incorporating hedgerows with hedgerow trees along the roads, cycle and walking routes, and attenuation ponds, sympathetically designed to provide a good landscape setting for the development.
- 9.225 A stretch of hedgerow along Weasel Lane will be removed to facilitate construction of the grid road reserve and the footway/cycleway alongside the length of the road. In addition short sections of Hedgerow along Weasel Lane will be removed to facilitate new vehicle and footway/cycleway access points.

Grid Road Reserve

- 9.226 Further hedgerows and hedgerow trees are proposed along the outside of the grid road reserve, along with the retained hedgerow. The proposed and existing hedgerows will run either side of the existing retained alignment of the Milton Keynes Boundary Walk, adjacent to the grid road reserve. The retained route of the Milton Keynes Boundary Walk will lead into the perimeter linear park and south onto the existing route under the disused railway.

Residential Area

- 9.227 Greenways running roughly north/south are proposed through the development. These incorporate retained hedgerows, enhanced where necessary and some newly proposed hedgerows. These greenways link from north to south through the proposed built development to Weasel Lane and the Milton Keynes Boundary Walk. The retained hedgerows would be managed and supplemented with new standard tree planting.
- 9.228 Throughout the development there are small areas of green space providing attractive areas for the development to overlook. Tree avenue planting along the main routes through the site link to these smaller green spaces.

- 9.229 New footpath links will be provided through the Greenways connecting the green heart of the development directly to the new neighbourhoods.

Flood Attenuation Areas

- 9.230 Three areas within the site are proposed to be excavated to provide attenuation ponds within the development. These will be suitably planted to provide ecological habitat combined with good water attenuation. These areas provide a natural buffer between the residential development and the surrounding countryside.

Promoting Cycling and Walking

- 9.231 In line with the Milton Keynes Cycling Strategy (2012), wide, well-lit and direct cycle routes have been designed in to the scheme to link in with the redways. Other cycleways have also been created to create a network of attractive safe routes through the development. These will extend the routes in and out of Milton Keynes. The strategy also states the need for cycle hire. The Site could provide an ideal location to provide cycle hire facilities in the local centre, to encourage new residents to cycle into work or into the countryside.
- 9.232 The scheme would also deliver walking routes throughout the development, including within the linear parks, making the green spaces accessible throughout the development.

Residual Effects

- 9.233 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 incorporated as an integral part of the scheme design. This iterative process has resulted in the Proposed Development being designed and modified to take account of the surveys and assessments undertaken. This has enabled the extent and scale of the potential adverse effects to be continually appraised as part of the evolving scheme design.
- 9.234 The design approaches adopted have included measures to avoid, reduce or remediate potentially significant adverse effects arising from the Proposed Development. Primary measures adopted as part of the proposals have considered many aspects, including, the location, extent, siting and height of the built development.
- 9.235 Other additional measures considered have included the use of woodland planting, trees and hedgerows. In this regard, the potential effects of the Proposed Development have been mitigated and minimised throughout the design process and consequently at the outset of the development the residual effects would reflect those described in the preceding Operational Effects section.

Cumulative Effects

- 9.236 Two schemes have been considered in the cumulative effects section these are:
- development at Tattenhoe Park; and
 - development at Newton Leys

- 9.237 The development of Tattenhoe Park, on the south-western side of Milton Keynes proposes a new neighbourhood of over 1,310 new homes, with shops and community facilities, public open space and a new primary school. The outline planning application was permitted in 2007 and phased building works are currently being carried out.
- 9.238 The proposed scheme will 'round off' the built development currently being built at Tattenhoe Park and improve the urban edge currently provided by the Snelshall Business units. The higher land north of Weasel Lane will be visible from Tattenhoe Park. The effects on the new residents of Tattenhoe Park have been discussed in the above landscape and visual effects sections.
- 9.239 There are a very limited number of receptors that can see both the Tattenhoe Park development and The Application Site. These include occasional glimpses from the A421 through roadside trees and possible views from the southern stretch of Shenley Road. If construction work at Tattenhoe Park is concurrent with construction work at Tattenhoe Park, there could be minor adverse visual effects from these receptors, due to additional visible construction works. However it is likely that construction work at Tattenhoe Park will be completed before work commences at the Application Site. Cumulative landscape and visual effects are considered to be negligible.
- 9.240 Newton Leys is a mixed use development (104 hectares) comprising housing up to 1650 homes with employment areas, shops, a combined school, community facilities, new park, hotel and leisure facilities. The development area sits next to man-made lakes created from the brick making industry. The outline planning application was permitted in 2005 and phased building works have commenced.
- 9.241 No receptors were found where visibility of both schemes is possible concurrently due to the intervening trees, hedgerows, settlements and topography between the developments. If travelling through Newton Longville on Stoke Road and then Whaddon Road, the new developments of Newton Leys and then Application Site would be seen successively with the existing village of Newton Longville in between. The sensitivity of this journey is considered to be medium and the scale of the effect is considered to be low. The cumulative visual effects are considered to be minor overall.

Interactive Effects

- 9.242 The landscape scheme has been prepared in collaboration with other disciplines (included in this ES) to ensure the proposed landscape will provide maximum benefits for the scheme, taking into account all the environmental perspectives including; visual, ecological, drainage and heritage.
- 9.243 Where buffer planting is proposed to visually screen or filter views, this planting will be a diverse range of native species to ensure ecological and biodiversity benefits as well as visual amenity benefit. The ecological effects are discussed in Chapter 7 of this ES.
- 9.244 Where drainage ponds are proposed these will be designed to give ecological benefits as well as being part of the accessible green infrastructure and drainage strategy. These ponds

will be designed to be as natural looking as possible, to improve the visual appearance. Drainage effects are discussed in Chapter 8 of this ES.

Summary

- 9.245 The character analysis identified that the majority of the study area sits within an area of low sensitivity landscape character area (Newton Longville-Stoke Hammond Claylands). The development will physically alter the landscape character of a small part of this character area. Agricultural land will be changed to a high quality mixed used development and an extensive new green infrastructure network. The development abuts the existing urban edge of Milton Keynes and Bletchley and would extend the existing settlement further south.
- 9.246 The development of the Site has the potential to deliver benefits including softening of the existing suburban edge and improved landscape character through the management of open space and planting of small blocks of woodland and individual trees, improving the access and recreation opportunities to the local community.
- 9.247 Whilst the existing sense of openness will inevitably be lost, green infrastructure will break up the massing of the development, and the townscape quality of the Proposed Development will be high, with a strong hierarchy of streets and open spaces. Existing landscape features, such as Weasel Lane, will be retained within the Proposed Development. The proposed local footpath and cycleway network will provide enhanced recreational opportunities throughout the Proposed Development.
- 9.248 The susceptibility to change of the Newton Longville-Stoke Hammond Claylands is low, and value is considered to be local. The scale of change is medium/low during construction and on completion, reducing to low over time, as the planting matures. The proposals will therefore have a moderate/minor adverse effect on this character in the short term. However, within 15 years and as the new GI matures there are likely to be minor adverse effects on landscape character.
- 9.249 The site lies adjacent to a character area of high sensitivity - part of the former hunting chase of Whaddon Chase. The wooded character of the overall area is distinctive. Woodland blocks that continue this character will be repeated around the western and southern boundaries of the site, it is expected that these green spaces will help to minimise adverse effects on landscape character to minor adverse in the short term and negligible in the longer term.
- 9.250 The susceptibility to change of the site context is considered to be medium/low and of local value. The scale of the change would be medium during construction and on completion, reducing to medium/low in the longer term. The proposals are assessed to have a moderate adverse effect in the short term and moderate/minor adverse effect on the landscape character of the site context in the longer term.
- 9.251 On the site itself the changes would inevitably cause greater landscape effects. The site itself is considered to be of medium/low sensitivity and local value. The scale of change would be high during construction, high/medium at completion and medium at year 15. The landscape

effects for the site are considered to be major adverse during construction, major/moderate adverse at completion and moderate adverse at year15.

- 9.252 The visual analysis showed that development will be initially visible from the countryside to the south due to the south facing contours of the site below Weasel Lane. However, there are few receptors within this area. Furthermore, there are significant opportunities to enhance the landscaped edge of Far Bletchley, which is visible from this area. The elevated tree lined ridgeline of Weasel Lane can also be reinforced and protected. The proposals also break up the mass of the development with belts of trees and green infrastructure corridors, which reduce the visual effect of the built form.
- 9.253 In general, the roads that will experience the greatest effects are those that are adjacent to the site. The scale of change from close up views from Whaddon Road (at the rail way bridge) [REF 23] will be high/medium. The susceptibility to change of the users of this road is medium and although the sense of openness will be lost and immediate effects are assessed as moderate/major adverse, after 15 years, when the high quality townscape and green infrastructure matures, effects will be moderate adverse. Effects on gateway views when travelling from the west along the A421 of the larger Bottledump Roundabout [REF 1] will be mitigated by substantial new planting and new balancing ponds with permanent water which will eventually create a new sense of place and arrival to the site, this helps to balance the effects of the development. Effects on road users near the Bottledump Roundabout are assessed to be moderate adverse in the short term and minor adverse in the longer term.
- 9.254 There are relatively few residential receptors with views of the Application Site. These are limited to the edge of Far Bletchley, a small number of properties in the hamlet of Chase Farm, 'The Leys' farmhouse on the east of Whaddon Road, 'Bletchley Leys' farmhouse on the west of the same road, and some longer distance views from Newton Longville. Although views from housing on the edge of the existing settlements will inevitably change, new structure planting will soften views towards the development. The Leys farmhouse [REF 22] will initially have major adverse effects, reducing to moderate adverse with the maturing of the proposed green infrastructure. The properties on the edge of Far Bletchley [REF 17] with back gardens backing on to the site will initially have major/moderate adverse effects. In the long term the effects are assessed as moderate adverse. Some houses on the edge of Newton Longville [REF 14&15] will see the development on the south facing slopes of the site. Visual effects are assessed as major/moderate adverse in the short term reducing to moderate adverse as the planting matures. North of the site there are no significant residential receptors, although development will be visible north of Weasel Lane from the Snelshall East and West and the Tattenhoe Park grid squares.
- 9.255 The short term effect on the views from the long distance footpaths that run through the site, in particular Weasel Lane [REF 18], will be major adverse. However, their retention within 'greenways' and areas of habitat creation will eventually create a strong network of open space that will provide important links between the countryside and town and will eventually reduce adverse effect to moderate adverse.

- 9.256 Long term adverse effects on sensitive receptors and character areas have been minimised through the extensive provision of woodland belts and open space. The substantial green infrastructure and high quality development framework plan will eventually establish a positive effect on the majority of visual receptors and character areas, providing an enhanced transition between the urban and rural area and linking the Application Site positively into the strategic wider green infrastructure network.
- 9.257 Well defined natural features establish the broader setting for the development. Nearby to the west of the Site, Salden Wood, Broadway Wood and Hogpound Wood provide the inspiration for the character of woodland blocks which have been repeated through the Application Site within the green infrastructure. This will provide a similar framework to that which already defines the western edge of Milton Keynes and successfully separates it from Whaddon and other villages in the Vale. The setting and character of Newton Longville, as a distinct and separate area to the Milton Keynes conurbation will be successfully protected and enhanced, using the railway line as the definitive boundary of The Proposed Development.
- 9.258 The proposal forms a logical urban extension to both Far Bletchley together with Snelshall East and West as it abuts the existing mixed use edge of the city and connects well with the Tattenhoe Park development to the north. The western expansion of the city has been successfully contained by the interaction of established woodland blocks, which reflect the areas historic role as part of Whaddon Chase. This principle will be continued in relationship to the Proposed Development.
- 9.259 The resulting urban extension will be completely contained within a very robust green infrastructure (GI) framework which surrounds and permeates the developed area. This will be truly multi-functional, encompassing broadleaved native structural woodland, extensive areas of species rich wet meadow, footpaths and bridleways, play areas, and community sports fields. Approximately 40% of the available land in The Proposed Development is allocated for the provision of GI, thus meeting Aylesbury Vale District Council's aspirations.
- 9.260 The Proposed Development has clear defensible boundaries. It has practical convenient links to the greenways such as Weasel Lane and the Milton Keynes Boundary Walk, which provide linkages to the open countryside.
- 9.261 Substantial landscape biodiversity and amenity enhancements would be delivered, both locally and regionally, with the green infrastructure Framework complementing and connecting to wider strategic corridors such as the Whaddon Chase Strategic Opportunity Area identified within the Buckinghamshire Green Infrastructure Strategy.

10. TRAFFIC AND TRANSPORT

Introduction

- 10.1 This chapter of the ES assesses the likely environmental impacts of the Proposed Development in terms of traffic and transport. The accompanying **Transport Assessment (TA)**, contained as a separate Appendix to the ES, provides full details of traffic impact assessment.
- 10.2 The 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

Aylesbury Vale District Local Plan (AVDLP), January 2004

- 10.3 The statutory development plan in Aylesbury Vale, insofar as it relates to transportation and highways matters, comprises the following saved policies of the Aylesbury Vale District Local Plan (AVDLP) which was statutorily adopted in January 2004.

GP.24 Car Parking Guidelines

- 10.4 This policy explains that *“New development will be required to provide vehicular parking in accordance with the Council’s operative guidelines published as Supplementary Planning Guidance”* and that *“... guidelines are intended to promote more sustainable transport options and will establish maximum levels of parking appropriate to the scale, type and location of development.”*
- 10.5 Policy GP.24 seeks to ensure that car parking is provided in accordance with the standards contained in the adopted Parking Guidelines SPG (May 2000). The maximum parking guidelines range from 1 space for a one bedroom flat to 3 spaces for a 4+ bedroom house. The National Planning Policy Framework (at Paragraph 39) has introduced a degree of flexibility to car parking standards, so that factors such as accessibility and availability of public transport for example are taken into account. The proposed residential areas will provide sufficient car parking, with the exact amount to be determined at detailed design stage.

GP.25 Re-opening of Rail Routes

- 10.6 In this policy the Council states that it *“... will resist development that might prejudice the use of the rail route running through the District between Bicester and Bletchley, and the northward link from Aylesbury, by passenger and freight services.”* A section of the Bicester to Bletchley route, which is part of Phase 2 of the East West Rail scheme, comprises the south east boundary of the Proposed Development site.
- 10.7 Phase 2 of the East West Rail scheme comprises the routes from Bicester to Bedford and Milton Keynes to Aylesbury Vale. At the present time this phase is the subject of public consultation as topographical, environmental and structural surveys continue and a

consultant has been appointed to develop the railway design. The Proposed Development assumes that the link will be reopened during the lifetime of the scheme and consequently it has been designed to accommodate the likely impacts of rail traffic from noise and vibration. As such the Proposed Development will not prejudice the use of the rail route.

- 10.8 Furthermore, the Proposed Development has made provision of land to accommodate the alignment of a new grid road (Policy RA.35 below) at a point where it would be expected to cross the Bicester to Bletchley route by means of an underpass.

RA.35 Safeguarded Road Corridor at Newton Longville Brickworks

- 10.9 The development of the Newton Longville Brickworks site in Milton Keynes has made provision for a link road to the A4146 Fenny Stratford bypass. Policy RA.35 states that the Council “.... will also seek to ensure that the opportunity for construction of a link between the proposed development in Milton Keynes and the Buckingham Road (A421) is not prejudiced by development.”
- 10.10 As noted above, the Proposed Development will provide land to accommodate the alignment of a new grid road and will not, therefore, prejudice the construction of a new link road between the A4146 and the A421.

RA.37 New accesses to inter-urban A-class or Trunk Roads

- 10.11 This policy states that new accesses to such roads “ will not be permitted, unless they are required as part of any other proposal in this Plan...” The only access to the Proposed Development from an A-class road is within Milton Keynes Council’s administrative area. This policy therefore has no statutory force with regard to the proposed access arrangements. However, it is noted as Policy RA.35 does envisage a new link road connecting with the A421. In this regard, it is therefore considered that Policy RA.37 would not apply in any event.

Milton Keynes Local Plan (MKLP), December 2005

- 10.12 The statutory development plan, insofar as it relates to transportation and highways matters, comprises the following saved policies of the Milton Keynes Local Plan (MKLP) which was statutorily adopted in December 2005, along with the Milton Keynes Core Strategy (MKCS) which was statutorily adopted in July 2013 and considered in more detail in paragraphs 10.45 to 10.62.
- 10.13 Whilst the adopted development plan policies will only carry statutory force insofar as they relate to the elements of the scheme that fall within the Council’s administrative area; the relevant policies are considered to demonstrate how overall the Proposed Development reflects the requirements of local planning policy.
- 10.14 With regard to the saved policies of the MKLP the following are relevant to the Proposed Development in terms of highways and transport matters.

Policy D1 – Impact of Development Proposals on Locality

- 10.15 Policy D1 states that planning permission will be refused for development that would be harmful for a number of reasons including:

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

and

“(vi) Inadequate access to, and vehicle movement within, the site”

10.16 The Proposed Development will not conflict with this policy. It is a mixed use sustainable proposal which will encourage significant numbers of internal trips negating the need to travel externally. In order to further encourage the use of more sustainable modes of travel both a Public Transport Strategy and a Travel Demand Management Strategy will be implemented at the Proposed Development. The additional traffic generation will not overload the existing road network or cause undue disturbance.

10.17 Access to the Proposed Development is adequate as is demonstrated within the Transport Assessment and the Design and Access Statement, as are the arrangements for vehicle movement within the site.

Policy T1 – The Transport User Hierarchy

10.18 This policy describes an order of priority in terms of meeting future transportation need, starting with pedestrians and those with impaired mobility; then cyclists; then public transport users, taxis and motorcyclists; and then ‘others’.

10.19 The Proposed Development responds to this order of priority by ensuring that pedestrian and cyclist interconnectivity is a key aim of its movement strategy.

Policy T2 – Access for those with Impaired Mobility

10.20 Policy T2 requires development proposals to be designed to meet the access needs of those with impaired mobility. In particular specifically identified and convenient parking spaces should be provided and the layout of the external environment, including links to adjoining areas, must provide convenient, direct and safe access.

10.21 The Proposed Development will accommodate the access needs of those with impaired mobility with all public parking areas being equipped with sufficient accessible parking. The principal footway/cycleway routes will provide convenient, direct and safe access throughout the Proposed Development and will be suitable for those with impaired mobility.

Policy T3 – Pedestrians and Cyclists

10.22 This policy sets out the Council’s requirements of development in meeting the needs of pedestrians and cyclists with particular reference to layout of the external environment and the provision of direct, secure and legible routes that are not isolated from other transport uses. The policy also requires the provision of cycle parking and associated facilities to meet its standards.

10.23 The needs of pedestrians and cyclists are at the forefront of the movement strategy for the Proposed Development. State-of-the-art cycle storage and parking will be provided where required to meet the needs of all users of the development. The Design and Access

Statement prepared as part of this outline planning application provides full details of the movement strategy.

Policy T4 – Pedestrians and Cyclists

- 10.24 Policy T4 sets out the Council's priorities for improving access and conditions for pedestrians and cyclists. These are, in order, routes from nearby settlements to Milton Keynes City; routes to and within CMK and Town Centres and The National Cycle Network.
- 10.25 The Proposed Development seeks to maintain and improve where possible linkages with existing pedestrian and cycle facilities, both the urban Redway system and rural footpath/bridleway routes.

Policy T5 – Public Transport

- 10.26 This policy requires development proposals to meet the needs of public transport operators and users. In particular:
- “(i) Road layouts must include direct, convenient and safe bus routes*
 - (ii) Bus priority measures must be implemented, where appropriate*
 - (iii) All houses and most other development must be no more than 400m from a bus stop*
 - (iv) Bus stops must have suitable shelters, good pedestrian access and be open to public supervision*
 - (v) Specific consideration must be given to the provision of public transport services in planning new development”*
- 10.27 The Proposed Development has been designed to ensure that the requirements of this policy are met. A main consideration in the design of the road layout has been the need to provide for public transport services within the development to ensure that all houses and other development is within 400 metres of a bus stop and bus routes are direct, convenient and safe. Bus stops and facilities will be to the latest design, with shelters, information and access for all users.
- 10.28 In relation to Policy T5 MKLP also states that:
- “7.17 In major developments and in new development areas, Developers will be expected to help ‘pump prime’ public transport services through planning obligations, to provide a satisfactory level of bus service. This is a minimum of three buses per hour between 7am-7pm Monday – Saturday, 2 buses per hour between 10 am – 6pm on Sunday and an hourly service at other times or the appropriate level of service set out in the Bus Strategy.”*
- 10.29 A Public Transport Strategy has been developed as part of the Proposed Development. Through this strategy the Consortium will fund a satisfactory level of bus service which will be developed to meet the continuing needs of the Proposed Development.

Policy T9 – The Road Hierarchy

- 10.30 Policy T9 establishes a road hierarchy within MK, comprising Primary Distributors, District Distributors, Local Distributors and Access Roads. It states that planning permission will be refused if proposed highways do not comply with the Council's Highway Design Guide, unless it is necessary to achieve good urban design.
- 10.31 The Proposed Development will also have a road hierarchy, based broadly on that already established for MK and providing the same priorities with regard to the needs of pedestrians and cyclists, and that of public transport.

Policy T10 - Traffic

- 10.32 This policy indicates that planning permission will be refused for development if it would be likely to generate motor traffic that exceeds the environmental or highway capacity of the local road network or which would cause significant disturbance, noise, pollution or risk of accidents.
- 10.33 It is considered that this older policy is not consistent with the new test in paragraph 32 of the National Planning Policy Framework which is that development should only be prevented or refused on transport grounds where residual cumulative impacts of development are severe.

Policy T11 – Transport Assessments and Travel Plans

- 10.34 Policy T11 explains that planning applications for development proposals that will generate significant levels of traffic, must be accompanied by a Transport Assessment and a Travel Plan produced in consultation with local transport providers and agreed with the Council. There is an associated table which provides thresholds based on land-use over which a Transport Assessment is required.
- 10.35 This Transport Assessment has been prepared to fully explain the likely impacts of the Proposed Development and also to provide details of the strategies proposed to mitigate these impacts. An important element of the mitigation strategy will be the implementation, management and monitoring of Travel Plans for all key elements of the Proposed Development.

Policy T12 - Major Transport Schemes

- 10.36 This policy states that planning permission will be refused for development that would prejudice certain road and rail improvement schemes. These include the East West Rail scheme and the Standing Way to Newton Road road link, Bletchley.
- 10.37 As already noted, the Proposed Development will make provision of land to accommodate the alignment of a new grid road. The Proposed Development therefore assumes that the East West Rail link will be reopened during the lifetime of the scheme and consequently it has been designed to accommodate the likely impacts of rail traffic from noise and vibration. There will be no prejudice to any relevant road or rail improvement scheme.

Policy T15 – Parking Provision

- 10.38 Policy T15 provides guidance relating to car parking provision. Car parking standards must not exceed the Council's 'maximum standards', nor be reduced below these if it is likely to result in off-site car parking problems; car parking areas must be well designed and assist pedestrian and cycle access.
- 10.39 Parking will be provided to meet the standards of the Aylesbury Vale Parking Guidelines SPG (May 2000). The maximum parking guidelines range from 1 space for a one bedroom flat to 3 spaces for a 4+ bedroom house. The National Planning Policy Framework (at Paragraph 39) has introduced a degree of flexibility to car parking standards, so that factors such as accessibility and availability of public transport for example are taken into account. The proposed residential areas will provide sufficient car parking, with the exact amount to be determined in conjunction with the local planning authority at detailed design stage.

Policy T17 – Traffic Calming

- 10.40 This policy explains that the Council will expect new development areas to secure traffic calming as an integral part of street design, whilst ensuring that there is adequate provision for efficient and convenient public transport provision.
- 10.41 As the Illustrative Master Plan is developed, traffic calming features will be designed to be an integral part of the public realm rather than something which is 'bolted on' retrospectively. The type of features used will be carefully selected for their appropriateness within the road hierarchy.

Policy KS1 – Newton Leys

- 10.42 Newton Leys is an allocated site for a comprehensive development including housing, employment and retail. It specifically states that within the site there will be a safeguarded route "... for a link road between the A4146 Fenny Stratford bypass and the A421 Buckingham Road / H8 Standing Way." A similarly safeguarded route is to be provided within the Proposed Development.

Milton Keynes Core Strategy (MKCS), July 2013

- 10.43 The Milton Keynes Core Strategy (MKCS), adopted July 2013, contains a 'Spatial Vision' for the Borough in 2026 and identifies a number of specific objectives that will assist in its delivery. Whilst these are not development plan policies, they are material to the consideration of the Proposed Development in transportation and highways terms. In particular the Spatial Vision states in part that:

- "9. The city's iconic grid road system will have been conserved and extended into any major new development areas. The layout of development areas will route through-traffic onto suitable arteries whilst providing direct routes for public transport and a network of redways for convenient cycling and walking.*
- 10. New public transport routes for low carbon vehicles (such as guided electric buses) will link new and existing communities to the city centre and other important centres and facilities. This will have reduced overall congestion and lowered peak*

hour commuting by car from 68% to 57% by 2026. Low carbon transport such as electric cars will also be supported.

11. *Transport links to other towns, including Aylesbury, Bedford, Luton and Northampton, will have been improved. These include the East - West rail link between Oxford and Cambridge via Milton Keynes, the A421 corridor through the city (linking the A1, M1 and M40)...*

10.44 The following 'Core Strategy Objectives' are of particular relevance.

"To work jointly with neighbouring authorities and other key organisations on the planning of any development located on the edge of Milton Keynes (but outside the current MK boundary) so that these areas are integrated with the city and contribute to its role and character."

and

"To manage increased travel demands through:

- Promoting improvements to public transport and supporting the development of an East - West rail link between Oxford and Cambridge...*
- Encouraging an increased number of people to walk and cycle by developing an expanded and improved Redway network*
- Extending the grid road pattern into any major new development areas*
- Utilising demand management measures to reduce the growth of road congestion, whilst upgrading key traffic routes such as the A421 and the A509"*

10.45 The Public Transport Strategy for the Proposed Development includes improvements to existing public transport ensuring that a satisfactory level of service is provided that will be development the ongoing needs and assist in reducing the growth of road congestion.

10.46 A main feature of the Proposed Development is also its linkages with the existing Redway system and an extension of these into all areas allowing ease of access for pedestrians and cyclists which again will assist in reducing the growth of road congestion. This along with a continuation of the grid road pattern into the Proposed Development will ensure that it is integrated with the city and contributes to its role and character.

Policy CS6 Place-shaping Principles for Sustainable Urban Extensions in Adjacent Local Authorities

10.47 Policy CS6 provides a policy framework setting the basis for MKC to respond to development proposals for Sustainable Urban Extensions (SUE) adjoining the City. It establishes principles that the Council will apply and a number of these relate to transportation and highways matters:

- "2. A sustainable, safe and high quality urban extension should be created which is well integrated with, and accessible from, the existing city. Its structure and layout should*

be based on the principles that have shaped the existing city, especially the grid road system, redways

- 5. Linear parks should be extended into the development where possible to provide recreational, walking and cycling links within the development area and to the city's 'extensive green infrastructure and redway network.*
 - 6. Technical work to be undertaken to fully assess the traffic impacts of the development on the road network within the city and nearby town and district centres and adjoining rural areas, and to identify necessary improvements to public transport and to the road network, including parking.*
 - 7. A route for the future construction of a strategic link road(s) and/or rail link should be protected where necessary.*
 - 9. The opportunity for new 'Park and Ride' sites for the city should be fully explored and where possible provided and efficiently and effectively linked to the city road system."*
- 10.48 The Proposed Development will be a sustainable, safe and high quality urban extension which will be integrated with, and easily accessible from, the existing Central Milton Keynes. The principles that have shaped the existing city have been used to develop the Illustrative Master Plan that is described in detail in the Design and Access Statement.
- 10.49 A main feature of the Proposed Development is its linkages with the existing Redways system and an extension of these into all areas allowing ease of access for pedestrians and cyclists.
- 10.50 The Transport Assessment contains details of the technical work that has been carried out to fully assessment the traffic impacts of the Proposed Development on the road network within Milton Keynes and also Aylesbury Vale. Necessary improvements to public transport have been discussed with Arriva and a strategy is provided also within this Transport Assessment.
- 10.51 It has been agreed with Milton Keynes Council that the Proposed Development site is not a suitable location for a 'Park and Ride' facility.

Policy CS10 Housing

- 10.52 Policy CS 10 promotes design that encourages access by walking, cycling and other forms of non-car travel within the neighbourhood and across the city; and notes that car parking standards should meet projected levels of car ownership (in addition to visitor parking).
- 10.53 Access by walking, cycling and other forms of non-car travel is at the forefront of the design concept for the Proposed Development. The design provides excellent walking and cycling facilities within the development and safe, convenient linkages to the existing Redway system.

Policy CS11 A Well Connected Milton Keynes

10.54 Policy CS11 states that the Council will work with its partners to accommodate increasing demand for movement and deliver a reduction in the Borough's carbon footprint. It identifies measures that will be used in this regard:

- “1. A step change in improvements to public transport... new bus services will be provided to major new areas of development when sufficient buildings are occupied.*
- 2. More sustainable transport choices for car owners and information and measures to encourage them to use non-car modes for more journeys.*
- 3. Encouraging greater movement within the Borough by cycling and walking through improvements to the existing Redway network and other paths including more direct routes, enhanced facilities and signage, better integration with transport interchange hubs, and improved surveillance; by extending the Redways network throughout major development areas (including the creation of routes that are shorter than the equivalent road journey).*
- 4. Planning the development of large housing and employment areas... so that it is well served by public transport and easily accessible by walking and cycling...*
- 5. Demand management in order to help achieve a shift from journeys by car to more sustainable transport.*
- 6. Maintaining and future-proofing the city's grid road network and extending it into new development areas whilst safeguarding the corridors for possible mass transit schemes. Road networks in new development areas in neighbouring authorities will be dependent on the strategies and preferences of those neighbouring authorities and partnership working.*
- 7. Maximising the capacity of the Borough's highway network through phased improvements in step with housing and employment growth...*
- 8. The highway network will be served by high quality transport interchanges well located to transport nodes and the strategic highway network, and by park and Ride sites on the edge of the city and in close proximity to the strategic highway network.*
- 9. To engage with Network Rail and relevant stakeholders along the East-West Rail line to identify operational benefits which thereby provides additional support for a more sustainable transport strategy and/or economic growth of the city.”*

10.55 The Proposed Development has been designed to satisfy all elements of this policy particularly by virtue of its mixed-use nature which will significantly reduce the need to travel to other parts of the Borough for work, education and leisure. It will also be well served by public transport from first occupation with this provision also improving services along the remainder of the route into Central Milton Keynes. Travel planning and personal journey planning will provide information from the outset designed to encourage car users to switch to sustainable modes of travel.

- 10.56 There will be good linkages with the existing Redway network and allowance will be made for the extension of the City's iconic grid road network through the development.

Policy CS12 Developing Successful Neighbourhoods

- 10.57 Policy CS 12 encourages development that will support 'sustainable lifestyles' indicating in part that this will include creating *"... walkable neighbourhoods and extensions of the existing walking, cycling and key public transport networks"*

and

"siting key day-to-day facilities, including schools, shops, leisure and employment in locations easily accessible on foot, by bike and by public transport."

- 10.58 The Proposed Development has been carefully designed to support sustainable lifestyles, incorporating a mix of uses that are to be easily accessible for pedestrians and cyclists.

Policy CS13 Ensuring High Quality, Well Designed Places

- 10.59 Policy CS13 deals with the 'Character of Place' and the 'Design of Place'. With regard to Design this policy encourages new developments to *"Champion new approaches to sustainable urban form and structure, which build on the concept of the grid, so that everyone lives within walking distance of a viable bus route, local shops and other day-to-day facilities"*

- 10.60 Policy CS13 also states that *"Redways (another unique element of MK) should be built within the landscape corridor of all new grid roads, as well as elsewhere within new developments, having regard to delivery of other sustainable transport and landscape character requirements."*

- 10.61 The Proposed Development is designed to accommodate the concept of the grid, and provides for an extension of this through the development. It also provides safe, efficient and user-friendly linkages to the existing Redway network while mirroring its concept within the development itself.

National Planning Policy Framework (2012)

- 10.62 Paragraph 1 of the NPPF states in part that:

"The National Planning Policy Framework sets out the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so..."

- 10.63 In paragraph 17 the NPPF identifies a series of 'Core planning principles' that should underpin both plan making and decision taking. Key amongst these is to:

"actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are or can be made sustainable"

10.64 Section 4 of the NPPF addresses the matter of ‘Promoting sustainable transport’. The following extracts are considered to be of relevance to the Proposed Development:

“Encouragement should be given to solutions which support reductions in greenhouse gas emissions and reduce congestion. In preparing Local Plans, local planning authorities should therefore support a pattern of development which, where reasonable to do so, facilitates the use of sustainable modes of transport” (paragraph 30)

and

“All developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment. Plans and decisions should take account of whether:

- the opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;*
- safe and suitable access to the site can be achieved for all people; and*
- improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.”* (paragraph 32)

and

“Plans and decisions should ensure developments that generate significant movement are located where the need to travel will be minimised and the use of sustainable transport modes can be maximised...” (paragraph 34)

and

‘... developments should be located and designed where practical to

- accommodate the efficient delivery of goods and supplies;*
- give priority to pedestrian and cycle movements, and have access to high quality public transport facilities;*
- create safe and secure layouts which minimise conflicts between traffic and cyclists or pedestrians, avoiding street clutter and where appropriate establishing home zones;*
- incorporate facilities for charging plug-in and other ultra-low emission vehicles; and*
- consider the needs of people with disabilities by all modes of transport.’* (paragraph 35)

and

“A key tool to facilitate this will be a Travel Plan. All developments which generate significant amounts of movement should be required to provide a Travel Plan.” (paragraph 36)

and

“... Where practical, particularly within large-scale developments, key facilities such as primary schools and local shops should be located within walking distance of most properties.” (paragraph 38)

- 10.65 In reflection of paragraph 32 of the NPPF, a Transport Assessment supports the Proposed Development and demonstrates that the opportunities for sustainable transport modes have been fully explored in order to reduce the need for major transport infrastructure. There will be safe and suitable access into and within the Proposed Development for all users, with the needs of pedestrians and cyclists at the forefront of the access hierarchy. The Transport Assessment demonstrates that the residual cumulative impacts of the Proposed Development are not severe and that it should not therefore be prevented on transportation grounds.
- 10.66 The mixed-use nature of the Proposed Development will minimise the need to travel and its location ensures easy and safe access for pedestrians and cyclists on to the established Milton Keynes' Redway network. Paragraph 34 of NPPF will therefore be satisfied as will paragraph 38 given that all key facilities will be easily accessible from all properties.
- 10.67 NPPF recognises the importance of Travel Plans as a key tool to facilitate the use of sustainable transport modes for the movement of goods or people and therefore considers that large development proposals should be required to provide a Travel Plan. A Framework Travel Plan, providing details of travel planning at all key elements of the Proposed Development, has been prepared in conjunction with this Transport Assessment to be considered as part of the planning application.

National Planning Practice Guidance (2014)

- 10.68 On 6th March 2014 the Department for Communities and Local Government launched its planning practice guidance web-based resource. This guidance has updated and replaced a wide range of planning policy and circular guidance. It addresses transportation and highway matters under the headings of 'Travel plans, transport assessments and statements in decision-taking' and 'Design'.

Travel plans, transport assessments and statements in decision-taking

- 10.69 The NPPG explains that Travel Plans (TP) and Transport Assessments (TA) are ways of assessing and mitigating the negative transport impacts of development in order to promote sustainable development and that they are required for developments which generate significant amounts of traffic movements. It goes on to advise that a TA may propose mitigation measures to promote sustainable development. Where that mitigation relates to matters that can be addressed by management measures, the mitigation may inform the preparation of a TP (Paragraph: 004 Reference ID: 42-004-20140306).
- 10.70 The guidance goes on to state (Paragraph: 006 Reference ID: 42-006-20140306) that TAs can positively contribute to:
- encouraging sustainable travel;

- lessening traffic generation and its detrimental impacts;
- reducing carbon emissions and climate impacts;
- creating accessible, connected, inclusive communities;
- improving health outcomes and quality of life;
- improving road safety; and
- reducing the need for new development to increase existing road capacity or provide new roads.

10.71 With regard to TPs, the guidance advises that these should identify the specific required outcomes, targets and measures, and set out clear future monitoring and management arrangements all of which should be proportionate. TPs should also consider what additional measures may be required to offset unacceptable impacts if the targets are not met.

10.72 It is necessary for TPs to set out explicit outcomes rather than just identify processes to be followed. A TP should also address all journeys resulting from a proposed development by anyone who may need to visit or stay and it should seek to fit in with wider strategies for transport in the area (Paragraph: 011 Reference ID: 42-011-20140306)

10.73 An important part of the overall strategy for the Proposed Development is the implementation, maintenance and monitoring of Travel Plans for all the main elements of the Proposed Development. These Travel Plans in conjunction with the Transport Assessment are geared towards encouraging sustainable travel.

Design

10.74 In Paragraph: 042 Reference ID: 26-042-20140306, the NPPG notes that *“Successful streets are those where traffic and other activities have been integrated successfully, and where buildings and spaces, and the needs of people, not just of their vehicles, shape the area”*. It goes on to state that *“Every element of the street scene contributes to the identity of the place...”* and that *“Public transport, and in particular interchanges, should be designed as an integral part of the street layout.”*

10.75 It also notes that *“The likelihood of people choosing to walk somewhere is influenced not only by distance but also by the quality of the walking experience. When considering pedestrians plan for wheelchair users and people with sensory or cognitive impairments. Legible design, which makes it easier for people to work out where they are and where they are going, is especially helpful for disabled people”*.

10.76 The design of the Proposed Development very much responds to this part of the NPPG in that it aims to address the needs of people and to encourage all occupiers of the development to use sustainable modes for travel both within and to and from the development.

A Transport Vision and Strategy for Milton Keynes: Local Transport Plan 3 - 2011 to 2031

- 10.77 LTP3 acknowledges that Milton Keynes is expected to grow rapidly over the next twenty years and therefore it is essential that as the City grows, so does the transport choice available to residents and visitors alike. LTP3 states that *“making better use of existing infrastructure, improving highway and Redway connectivity and providing an attractive public transport network are the key.”*
- 10.78 The Transport Vision for Milton Keynes expects that *“Transport networks, including the unique grid road and Redway networks, will be expanded and fully integrated into new developments and regeneration areas to support more sustainable communities.”* To support this vision, seven objectives have been developed including one for the provision of real and attractive transport choices to encourage more sustainable travel behaviour as Milton Keynes grows.
- 10.79 A strategy has been developed to deliver the vision and meet the objectives. The strategy contains seven strands; public transport, cycling and walking, smarter choices, highways and traffic management, technology, infrastructure management and development planning (the integration of transport and land use planning).
- 10.80 It is clear that MKC’s Vision and Strategy is very much focussed on sustainable travel rather than increasing highway capacity for general vehicular traffic. The complementary strategies on Public Transport and Travel Demand Management that will be implemented as part of the Proposed Development will therefore assist the Council in delivering its Vision.

Buckinghamshire’s Local Transport Plan 2011-2016

- 10.81 Buckinghamshire’s third Local Transport Plan sets out Buckinghamshire County Council’s (BCC) transport policies and strategies for the next five years (2011/12-2015/16). Buckinghamshire is divided into nine Local Transport Areas each with its own local area strategy and linked action plan. The Proposed Development is located within the Buckingham and Winslow area. The headline of the local area strategy for the Buckingham and Winslow area is:

“In 2026 the Buckingham and Winslow area will have accommodated a significant amount of residential and employment growth, whilst at the same time retaining its local character. The walking and cycling environment in local centres will be improved, in addition to the public realm, and access by all modes will be enhanced to local and regional centres. The impact of transport on the built environment will be reduced, and the roads in the area will be well maintained and safer than they are today.”

Assessment Methodology

- 10.82 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’, 1993, and in accordance with the Government’s planning policies for England as set out in the National Planning Policy Framework.
- 10.83 The assessment recognises that an increase in traffic during the construction and operational phases has the potential to result in the following knock-on 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 i.e. severance. HGV traffic can reduce the amenity of pedestrian routes to the extent that pedestrians feel 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.
- 10.84 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 the NPPF and NPPG.
- 10.85 The TA considers the transport impact of the Proposed Development in detail and reference should be made to this document for full details of the transport impact and transport proposals associated with the development.
- 10.86 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.
- 10.87 An assessment of the traffic-related air quality and noise impacts associated with the proposed Development are considered separately in chapters 11 and 12 respectively.

Significance Criteria

- 10.88 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)
- 10.89 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.”*
- 10.90 The Guidelines identify that the most discernible environmental impacts of traffic are noise, severance, pedestrian delay and intimidation and they provide additional information on determining the impacts of pedestrian delay, severance and intimidation:

“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.”

- 10.91 In order to undertake a relative assessment of the increase in road traffic, the criteria outlined in Tables 10.1 and 10.2 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 10.1 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 10.2 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

- 10.92 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 10.3.

Table 10.3 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

- 10.93 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

- 10.94 Halcrow Group Limited (a CH2M HILL company), in association with RAND Europe, Stirling Maynard Transportation (SMT) and Count on Us, was appointed by MKC in 2009 to develop a comprehensive transport modelling capability for the Milton Keynes area. This involved the development of spatially detailed highway and public transport models and their interaction to demand models to enable the assessment of planning and infrastructure schemes planned for the Milton Keynes area.
- 10.95 The model is a behaviourally based four stage model developed in line with the current WebTAG guidance on model form and procedures. The model determines the travel demand from the underlying characteristics of the transport supply and the characteristics of travellers in the area. The demand models take population and employment data as an input and use trip rates to generate the travel demand across all modes of travel to all destinations based on the respective change in cost of travel by the different modes. A demand model is required as a result of the major changes in travel demand expected in and around Milton Keynes as a result of major land use and infrastructure changes over the next twenty years or so.
- 10.96 The Base Year 2009 Milton Keynes Transport Model was approved by the Highway Agency as providing a robust representation of base year traffic flows for the strategic and local highway network. As a result the Base Year 2009 model has provided a suitable platform for the development of a 2026 forecast model capable of assessing proposed future development and infrastructure in Milton Keynes to 2026. The 2026 Annual Average Daily Traffic (AADT) flows on roads in the vicinity of the application site are provided in Table 10.4 below.
- 10.97 These 2026 flows (Scenario S1) take account of committed development and infrastructure but do not take into account the Proposed Development. The committed development is that which is envisaged by Milton Keynes Revised Core Strategy and the committed infrastructure is changes to strategic road and rail as well as local road network infrastructure changes.

- 10.98 Strategic road schemes include existing Highways Agency schemes M1 Junction 10-13 and A421 Bedford to M1 with the strategic rail schemes being High Speed Two (HS2) and East – West Rail. Local road network infrastructure schemes include a series of roundabout signalisation schemes both signalisation of the existing roundabouts and conversion to a traffic signal junctions as well as signalisation of certain priority junctions.

Table 10.4 2026 AADT Scenario S1

Road	2 Way AADT
	2026 Forecast + Committed Development and Infrastructure
A421 (between Whaddon Crossroads and Bottle Dump Roundabouts)	32771
Whaddon Road through Newton Longville	7199
A421 Standing Way (between Bottle Dump and Tattenhoe Roundabouts)	31118
Buckingham Road	12485
A421 Standing Way (between Tattenhoe and Windmill Hill Roundabouts)	27747
V1 Snelshall Street	8736

Personal Injury Accident Data

- 10.99 Personal injury accident data to cover the last five years has 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.
- 10.100 The personal injury accident data obtained from Milton Keynes Council covers an 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 accidents that have occurred within both areas of interest in the 5 year period, 1st July 2009 to 30th June 2014, are fully assessed within the Transport Assessment and Table 10.5 provides an overview for the roads in the immediate vicinity of the Proposed Development as this is where the greatest impact of traffic is likely to be.

Table 10.5 Personal Injury Accident Data

Location	Number of PIAs		
	Slight	Severe	Fatal
Whaddon Crossroads	10	1	0
Whaddon Road/Stoke Road through Newton Longville	16	2	0
Bottle Dump and Tattenhoe Roundabouts	14	0	0
H8 to Windmill Hill Roundabout	6	3	0
V1 to Kingsmead Roundabout	7	2	0

Likely Significant Effects

During Construction

- 10.101 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 2016 with house building beginning in 2018 for a period of 7 years until 2024. 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.
- 10.102 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. 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 3750 vehicle movements a day on Buckingham Road and 2160 on Whaddon Road.
- 10.103 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.
- 10.104 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. Currently Buckingham Road carries around 900 HGVs per day and Whaddon Road around 800. A 30% increase in these levels relates to 300 HGV movements per day on Buckingham Road and 240 on Whaddon Road which is not likely to occur given the timescales over which the development will be constructed.
- 10.105 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

- 10.106 Halcrow has been commissioned to use the Milton Keynes Transport Model to assess the impact of the Proposed Development on the local and strategic road network. In order to inform this assessment Halcrow was provided information about the proposals in terms of land use and access.
- 10.107 Halcrow provided SATURN model output for 2026 forecast traffic flows, taking into account committed development and infrastructure and the Proposed Development (Scenario S2).

Evaluation of Significance of Traffic Flow Changes

- 10.108 The percentage change in traffic over and above the 2026 S1 flows has been determined and is shown in Table 10.6 below.

Table 10.6 Percentage Differences between 2026 AADT Scenarios S1 and S2

Road	% Change
A421 (between Whaddon Crossroads and Bottle Dump Roundabouts)	3%
Whaddon Road through Newton Longville	28%
A421 Standing Way (between Bottle Dump and Tattenhoe Roundabouts)	1%
Buckingham Road	93%
A421 Standing Way (between Tattenhoe and Windmill Hill Roundabouts)	34%
V1 Snelshall Street	6%

10.109 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 which is considered to have moderate sensitivity due to it running through where there is limited footway provision in places. The significance of changes in traffic flows is shown in Table 10.7.

Table 10.7 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	Minor	Major	Moderate
A421 Standing Way (between Tattenhoe and Windmill Hill Roundabouts)	Minor	Minor	Negligible
V1 Snelshall Street	Minor	Negligible	Negligible

10.110 As already noted, the IEMA Guidelines state that the magnitude of effect is considered significant if the effect is either moderate or major. Apart from on Buckingham Road in the

vicinity of the primary development access, the impact on the surrounding highway network is not significant in EIA terms.

Mitigation Measures

During Construction

- 10.111 In order to minimise construction traffic impacts, the key mitigation measure will be the implementation of a Construction Phase 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.
- 10.112 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

- 10.113 The South West Milton 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 by the Milton Keynes Transport Model.
- 10.114 The Framework Travel Plan submitted 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.
- 10.115 As part of the implementation of the Buckingham Road development access there will be a minor improvement to the Tattenhoe Roundabout where it is proposed that the two lane entry on the Buckingham Road arm at the roundabout is extended to two full lanes through the traffic signals. This will therefore increase the capacity of this arm and mitigate the impact of the traffic from the Proposed Development. As a result of this mitigation the magnitude of the residual traffic impact will be minor.
- 10.116 While the capacity of Bottle Dump Roundabout is not an issue, there is substandard visibility to the proposed equestrian / cycle / pedestrian crossing facility on Whaddon Road, particularly for traffic turning left from A421 Standing Way. Improvements to the alignment and to visibility by removing vegetation are proposed to the Whaddon Road arm.

Residual Effects

- 10.117 It is considered that there will be no major or moderate adverse effects following the implementation of the mitigation measures. There will be an increase in traffic generation as a result of the Proposed Development however it will be mitigated by the provision of the Travel Demand Management Strategy including the implementation, monitoring and maintenance of Travel Plans at the Proposed Development and will not be significant in EIA terms.

Summary

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

11. AIR QUALITY

Introduction

- 11.1 This section describes the potential air quality impacts associated with the Proposed Development. The Proposed Development is described in Chapter 2. The 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 (PM₁₀ and PM_{2.5}).
- 11.2 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 2009 (Ref 11.1) outlines an approach to assessing the potential for exceedence of the nitrogen dioxide objective as a result of emissions from diesel and steam locomotives. The distance criterion for stationary 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 developed part of the scheme, thus the development site falls outside these criteria. Emissions from railway locomotives will, therefore, not be considered further.
- 11.3 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 PM₁₀.
- 11.4 This report describes existing local air quality conditions (2011), 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 2017, 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.
- 11.5 This report has been prepared taking into account all relevant local and national guidance and regulations, and follows a methodology agreed with Aylesbury Vale District Council (AVDC).

Planning Policy

Development Plan Documents

Aylesbury Vale District Local Plan

- 11.6 The Vale of Aylesbury Plan was withdrawn in February 2014, and Aylesbury Vale District Council is currently working on a new Vale of Aylesbury Local Plan. Until this is adopted the saved policies of the Aylesbury Vale District Local Plan (Ref 11.2) will remain the relevant planning policy in the area. This Plan contains relatively little in terms of air quality. Paragraph 4.61 does comment on the consequence of increased traffic, however, the policy that this text supports is not saved and so we give it limited weight. Paragraph 4.61 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

- 11.7 The Milton Keynes Core Strategy (Ref 11.3) 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

- 11.8 The National Planning Policy Framework (NPPF) (Ref 11.4) 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 of pollution on health and the sensitivity of the area and the development should be taken into account.
- 11.9 More specifically at Paragraph 124 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 Practice Guidance

- 11.10 The NPPF is now supported by National Planning Practice Guidance (PPG) (Ref 11.5), which includes guiding principles on how planning can take account of the impacts of new development on air quality. At ID 32-001-20140306 the NPPG 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 NPPG stating at ID 32-001-20140306 that local authority Air Quality Action Plans *“identify measures that will be introduced in pursuit of the objectives”*. In addition, the NPPG (at ID 32-001-20140306) makes clear that *“Odour and dust can also be a planning concern, for example, because of the effect on local amenity”*.

- 11.11 At ID 32-005-20140306 the NPPG 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)”*.
- 11.12 At ID 32-007-20140306 the NPPG 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 at ID 32-008-20140306 that *“Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact”*.

Air Quality Strategy

- 11.13 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 11.6). 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.

Non-Statutory Policy Documents

Buckinghamshire and Milton Keynes Regional Air Quality Strategy

- 11.14 The Bucks Air Quality Management Group has produced a Regional Air Quality Strategy (Ref 11.7) which sets out the plans and actions drawn up to improve air quality in Buckinghamshire and Milton Keynes.
- 11.15 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

- 11.16 within its Performance Management Plan under objectives on Safety, Security and Health and Quality of Life.

Aylesbury Vale Air Quality Action Plan

- 11.18 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 11.10). 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

- 11.19 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 11.11) and the Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043 (Ref 11.12).
- 11.20 The objectives for nitrogen dioxide and PM₁₀ 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 µg/m³ (Ref 11.1). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level.
- 11.21 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 11.1). The annual mean objectives for nitrogen dioxide and PM₁₀ are considered to apply at the façades of residential properties, schools, hospitals etc. The 24-hour objective for PM₁₀ 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.
- 11.22 The European Union has also set limit values for nitrogen dioxide, PM₁₀ and PM_{2.5}. Achievement of these values is a national obligation rather than a local one (Ref 11.13). The limit values for nitrogen dioxide are the same levels as the UK objectives, but applied from 2010 (Ref 11.14). The limit values for PM₁₀ and PM_{2.5} are also the same level as the UK statutory objectives, but applied from 2005 for PM₁₀ and will apply from 2015 for PM_{2.5}. As the latter is more stringent than the UK objective (as it applies from 2015 rather than 2020) it is used as the relevant assessment criterion in this assessment.

- 11.23 The relevant air quality criteria for this assessment are provided in Table 11.1. Buckinghamshire's Local Transport Plan 2011-2016 (Ref 11.8) 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.
- 11.24 MKC's A Transport Vision and Strategy for Milton Keynes (Ref 11.9) also recognises that transport planning can help improve air quality, and includes air quality as an indicator

Table 11.11: Air Quality Criteria for Nitrogen Dioxide, PM₁₀ 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
Fine Particles (PM _{2.5}) ^a	Annual mean	25 µg/m ³

^a 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. The EU limit value is the same, but is to be met by 2015.

Construction Dust Criteria

- 11.25 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)³ (Ref 11.15) has therefore been used. Full details of this approach are provided in **Appendix 11.1**.

Descriptors for Air Quality Impacts and Assessment of Significance

Operational Significance

- 11.26 There is no official guidance in the UK on how to describe air quality impacts, nor to assess their significance. The approach developed by the IAQM (Ref 11.16), and incorporated in Environmental Protection UK's (EPUK) guidance document on planning and air quality (Ref 11.17), has therefore been used. This approach includes elements of professional judgement. Full details of this approach are provided in **Appendix 11.2**, with the professional experience of the consultants preparing the report set out in **Appendix 11.3**.

Construction Dust Significance

- 11.27 In the absence of official guidance, the approach developed by the IAQM (Ref 11.15) to assess the significance of construction dust has been used. This approach includes elements of professional judgement. Full details of this approach are provided in **Appendix 11.1**, with

³ The IAQM is the professional body for air quality practitioners in the UK.

the professional experience of the consultants preparing the report set out in **Appendix 11.3**.

Assessment Methodology

Consultation

- 11.28 The assessment follows a methodology agreed with AVDC via emails exchanged between Bill Pegram (Land and Air Quality Manager at AVDC) and Bob Thomas (Air Quality Consultants) between the 27th and 28th February 2013.

Study Area

- 11.29 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

- 11.30 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 11.18) and the Environment Agency's website 'what's in your backyard' (Ref 11.19). Local sources have also been identified through examination of the Council's Air Quality Review and Assessment reports.
- 11.31 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 11.20). These cover the whole country on a 1x1 km grid. Current exceedences of the annual mean EU limit value for nitrogen dioxide have been identified using the maps of roadside concentrations published by Defra (2014e)⁴. These are the maps, currently based on 2012 data, 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.

Road Traffic Impacts

Sensitive Locations

- 11.32 Concentrations of nitrogen dioxide, PM₁₀ 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

⁴ There are no exceedences of the PM₁₀ limit values.

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.

- 11.33 Twenty-three existing residential properties have been identified as receptors for the assessment. Five additional receptor locations have also been identified within the new development, which represents exposure to existing sources. These locations are described in Table 11.12 and shown in Figure 11.1. In addition, concentrations have been modelled at the diffusion tube monitoring site located at Wheatcroft Close (D1 in Table 11.2 and Figure 11.2, in order to verify the modelled results (see **Appendix 11.4** for verification method)).

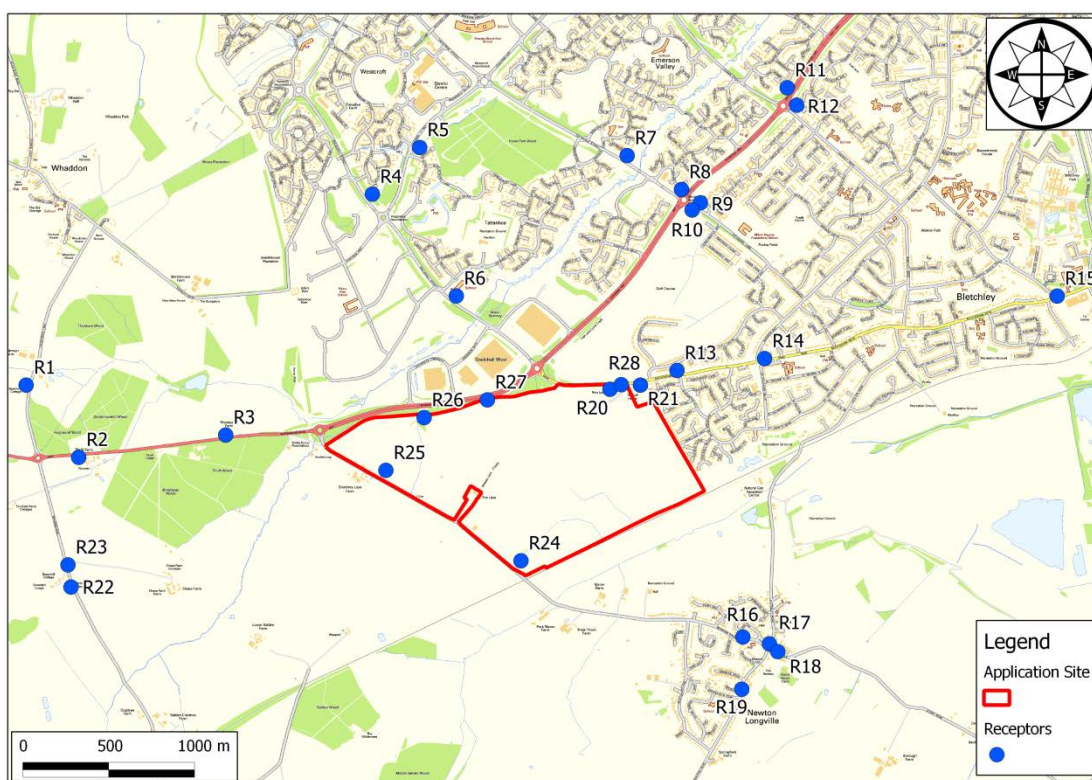
Table 11.12: Description of Receptor Locations

Receptor	Description ^a
Existing properties	
R1	Residential property at Beech Tree Cottage
R2	Residential property at Thrift Farm
R3	Residential property at Woodpond Farm
R4	Residential property at 46 Babylon Grove
R5	Residential property at 4 Walney Place
R6	Giles Brook School
R7	Residential property at 16 Greenside Hill
R8	Residential property at 29 Cropwell Bishop
R9	Residential property at 4 Porthmarnock Close
R10	Residential property at Dwelling Golf Club
R11	Residential property at 35 Challacombe
R12	Residential property at 67 Normandy Way
R13	Residential property at 89 Windmill Hill Dri
R14	Residential property at 19-24 Knaresborough
R15	Residential property at 22 Buckingham Road
R16	Residential property at 10 Whaddon Road
R17	Residential property at 1 Church End
R18	Residential property at 1 The Slade
R19	Residential property at 19 Bletchley Road
R20	Residential property at New Leys
R21	Residential property at Dagnall House
R22	Residential property at The Granary
R23	Residential property at Chase Farm

Receptor	Description ^a
New properties	
R24	Property within the Proposed Development.
R25	Property within the Proposed Development.
R26	Property within the Proposed Development.
R27	Property within the Proposed Development.
R28	Property within the Proposed Development.

^a Receptors modelled at a height of 1.5 m

Figure 11.1: Receptor Locations



Contains Ordnance Survey data © Crown copyright and database right 2014

Assessment Scenarios

- 11.33 Predictions of nitrogen dioxide, PM₁₀ and PM_{2.5} concentrations have been carried out for a base year (2011), and a future year (2017). For 2017, predictions have been made assuming both that the development does proceed (With Scheme), and does not proceed (Without Scheme). A further 2017 sensitivity test has been carried out for nitrogen dioxide that involves assuming no reduction in emission factors for road traffic from the baseline year. This is to address the issue recently identified by Defra (Ref 11.21) that road traffic emissions have not been declining as expected (see later section on uncertainty). Nitrogen dioxide concentrations in 2017 with and without the scheme are thus presented for two scenarios: 'With Emissions Reduction' and 'Without Emissions Reduction'.

Modelling Methodology

- 11.34 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 11.4**, together with the method used to derive current and future year background nitrogen dioxide concentrations.

Construction Impacts

Sensitive Locations

- 11.35 Locations sensitive to dust emitted during construction will be places where members of the public are regularly present. Residential properties and commercial operations close to the site will be most sensitive to construction dust. Any areas of sensitive vegetation or ecology that are very close to dust sources may also be susceptible to some negative effects.

Assessment Approach

- 11.36 It is very difficult to quantify emissions of dust from construction activities. It is thus common practice to provide a qualitative assessment of potential impacts, making reference to the assessment criteria set out in **Appendix 11.1**.

Baseline Conditions

Industrial Sources

- 11.37 A search of the UK Pollutant Release and Transfer Register (Ref 11.18) and Environment Agency's 'what's in your backyard' (Ref 11.19) 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.
- 11.38 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.

Air Quality Review and Assessment

- 11.39 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. Further areas of exceedence of the annual mean nitrogen dioxide objective have been identified in Aylesbury, along with Buckingham and Winslow; however AQMAs have not been formally declared for these areas (Ref 11.22). The existing AQMAs are approximately 18 km south of the application site, and will not be affected by development traffic.

- 11.40 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.
- 11.41 In terms of PM₁₀, AVDC and MKC concluded that there are no exceedences of the objectives. It is therefore highly unlikely that existing PM₁₀ levels will exceed the objectives within the study area.

Local Air Quality Monitoring

- 11.42 AVDC operates two automatic monitoring stations within its area. The monitoring stations are located in two of the AQMAs in Aylesbury, and thus are not in close proximity to the application site. AVDC also operates a number of nitrogen dioxide monitoring sites; however, none of these are in close proximity to the application site. MKC operates three automatic monitoring stations; none of these sites are in close proximity to the application site. Historic data from a mobile automatic monitoring station that measured background concentrations in Bletchley in 2003 and 2004 recorded annual mean nitrogen dioxide concentrations of 18.4 µg/m³ and 17.3 µg/m³ respectively. The location of the monitor is shown in Figure 11.2. None of MKC's diffusion tube monitoring sites are located in close proximity to the application site; however, data from sites located in urban gardens are presented. MKC's diffusion tubes are prepared and analysed 'in-house' (using the 20% TEA in water method). Results for the years 2009 to 2011 are summarised in Table 11.2 and the monitoring locations are shown in Figure 11.2.

Table 11.13: Summary of Nitrogen Dioxide (NO₂) Diffusion Tube Monitoring (2009-2011)^a

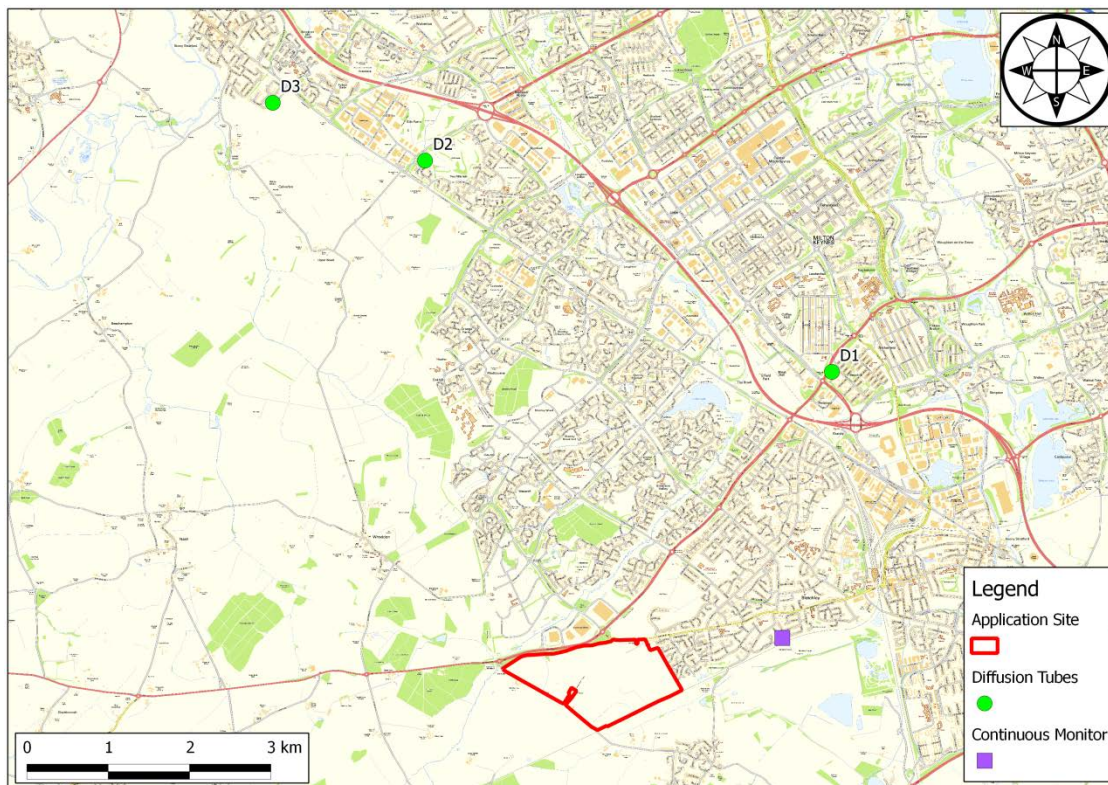
Site No. in Figure 11.2	Site Type	Location	Annual Mean (µg/m ³)		
			2009	2010	2011
D1	Urban Garden	18 Wheatcroft Close, Beanhill	22.3	23.4	21.9
D2	Urban Garden	6 Atherstone Court, Two Mile Ash	13.2	13.8	12.6
D3	Urban Garden	1 Tudor Gardens, Stony Stratford	11.6	13.0	12.3
Objective			40		

^a Data taken from MKC 2012 Updating and Screening Assessment (Ref 11.23).

- 11.43 The monitoring results show that background nitrogen dioxide concentrations in Milton Keynes are low, and ranged from 11.6 µg/m³ to 23.4 µg/m³ between 2009 and 2011. Concentrations are higher at Wheatcroft Close (D1) as the monitoring site is within 40 m of Standing Way (A421). There are no clear trends in monitoring results for the past three

years. This contrasts with the expected decline due to the progressive introduction of new vehicles operating to more stringent standards. The implications of this are discussed later in this report.

Figure 11.2: Monitoring Locations



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11.44 The mobile automatic monitoring station located in Bletchley in 2003 and 2004 also measured PM₁₀ concentrations. Annual mean PM₁₀ concentrations measured in 2003 and 2004 were 22.7 µg/m³ and 16.4 µg/m³ respectively, well below the annual mean objective (Ref 11.24). The number of days when the 24-hour mean PM₁₀ concentration was greater than 50 µg/m³ in 2003 and 2004 was 5 days and 7 days respectively, well below the 35 days of the objective.

11.45 No PM_{2.5} monitoring has been carried out in the area.

Background Concentrations

National Background Pollution Maps

11.46 In addition to these locally measured concentrations, estimated background concentrations in the study area have been determined for 2011 and the opening year 2017 (Table 11.3). In the case of nitrogen dioxide, two sets of future-year backgrounds are presented to take into account uncertainty in future year vehicle emission factors. The derivation of background concentrations is described in **Appendix 11.4**. The background concentrations are all well below the objectives.

Table 11.14: Estimated Annual Mean Background Pollutant Concentrations in 2011 and 2017 ($\mu\text{g}/\text{m}^3$)

Year	NO ₂	PM ₁₀	PM _{2.5}
2011^a	11.2-19.1	15.2-17.0	10.4-11.4
2017 – Without Reductions in Traffic Emissions^b	10.0-18.0	n/a	n/a
2017 – With Reductions in Traffic Emissions^c	9.4-16.3	14.4-16.1	9.6-10.5
Objectives	40	40	25^d

n/a = not applicable

^a This assumes vehicle emission factors in 2011 remain the same as 2010 (See **Appendix 11.4**).

^b This assumes vehicle emission factors in 2017 remain the same as in 2011.

^c This assumes vehicle emission factors reduce into the future at the current 'official' rates.

^d There are no objectives for PM_{2.5} that apply during these years, however the European Union limit value of 25 $\mu\text{g}/\text{m}^3$ is to be met by 2015.

Exceedences of EU Limit Value

- 11.47 There are no AURN monitoring sites within the study area with which to identify exceedences of the annual mean nitrogen dioxide limit value. The national map of roadside annual mean nitrogen dioxide concentrations, used to report exceedences of the limit value to the EU (Ref 11.25), does not identify any exceedences within the study area. This map shows 2012 exceedences. Detailed maps of predicted future year exceedences are not available.

Baseline Dispersion Model Results

- 11.48 Baseline concentrations of nitrogen dioxide, PM10 and PM2.5 have been modelled at each of the existing receptor locations (see Figure 11.1 and Table 11.12). The results, which cover both the existing (2011) and future year (2017) baselines (Without Scheme in 2017), are set out in Table 11.4 and Table 11.5. The future baseline for nitrogen dioxide covers the two scenarios: with the official reductions in vehicle emission factors and without these reductions. As a verification factor of less than 1.0 has been calculated, no adjustment factor has been applied (see **Appendix 11.4** for details of the model verification).

Table 11.15: Modelled Annual Mean Baseline Concentrations of Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$) at Existing Receptors

Receptor	2011 ^a	2017 Without Scheme	
		With 'Official' Emissions Reduction ^b	Without Emissions Reduction ^c
R1	14.0	11.8	13.6
R2	18.2	14.9	19.3
R3	20.6	16.8	22.3
R4	15.9	13.6	15.5
R5	16.2	13.8	15.9
R6	15.8	13.5	15.4
R7	18.8	15.9	18.2
R8	23.2	20.6	25.2
R9	19.6	16.9	20.1
R10	19.7	16.9	20.2
R11	22.8	20.0	24.5
R12	24.8	22.4	27.0
R13	18.0	15.6	18.2
R14	19.4	17.2	20.7
R15	26.0	24.4	29.8
R16	16.1	14.5	17.4
R17	17.8	17.5	21.2
R18	16.5	14.6	16.8
R19	14.6	12.7	14.1
R20	16.3	13.9	15.7
R21	15.7	13.9	15.9
R22	12.5	10.7	11.8
R23	13.4	11.6	13.1
Objective	40		

^a This assumes vehicle emission factors in 2011 remain the same as 2010 (See **Appendix 11.4**).

^b This assumes vehicle emission factors reduce into the future at the current 'official' rates.

^c This assumes vehicle emission factors in 2017 remain the same as in 2011.

Table 11.16: Modelled Baseline Concentrations of PM₁₀ and PM_{2.5} at Existing Receptors

Receptor	PM ₁₀ ^a				PM _{2.5}	
	Annual Mean (µg/m ³)		No. Days >50 µg/m ³		Annual Mean (µg/m ³)	
	2011	2017 Without Scheme	2011	2017 Without Scheme	2011	2017
R1	16.2	15.4	0	0	10.9	10.1
R2	16.7	15.9	1	0	11.2	10.5
R3	17.2	16.4	1	0	11.5	10.7
R4	16.3	15.4	0	0	11.1	10.3
R5	16.3	15.5	0	0	11.1	10.3
R6	17.2	16.3	1	0	11.3	10.5
R7	16.3	15.4	0	0	11.5	10.6
R8	16.8	15.9	1	0	11.8	10.9
R9	17.0	16.2	1	0	11.5	10.7
R10	17.0	16.2	1	0	11.5	10.7
R11	16.8	16.0	1	0	11.9	11.0
R12	16.9	16.0	1	0	12.0	11.1
R13	16.8	16.0	1	0	11.4	10.6
R14	17.1	16.3	1	0	11.6	10.8
R15	17.6	16.9	1	1	12.3	11.5
R16	16.7	15.9	1	0	11.1	10.3
R17	16.9	16.2	1	0	11.2	10.5
R18	16.8	16.0	1	0	11.1	10.3
R19	16.5	15.7	1	0	10.9	10.2
R20	16.7	15.8	1	0	11.1	10.3
R21	16.2	15.4	0	0	11.0	10.2
R22	15.4	14.6	0	0	10.5	9.8
R23	15.5	14.7	0	0	10.6	9.9
Objective	40	40	35	35	25 ^b	25 ^b

^a The numbers of days with PM₁₀ concentrations greater than 50 µg/m³ have been estimated from the relationship with the annual mean concentration described in LAQM.TG(09) (Ref 11.1).

- ^b There are no objectives for PM_{2.5} that apply during these years, however the European Union limit value of 25 µg/m³ is to be met by 2015.

- 11.49 The predicted baseline concentrations of all three pollutants are well below the objectives in 2011 and 2017 at all receptor locations.
- 11.50 These results are consistent with the conclusions of AVDC and MKC in the outcomes of their air quality review and assessment work.

Likely Significant Effects

Construction Impacts

- 11.51 The construction works will give rise to a risk of dust impacts during earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway.

Potential Dust Emission Magnitude

Demolition

- 11.52 There is no requirement for demolition on site.

Earthworks

- 11.53 Using the National Environment Research Council's Soil Portal website (Ref 11.26), the characteristics of the soil at the development site have been defined. These are detailed in Table 11.17. Overall it is considered that, when dry, this soil has the potential to be moderately dusty.

Table 11.17: 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.

- 11.54 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 0, 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 11.1**), the dust emission class for the earthworks is considered to be large.

Construction

- 11.55 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, space 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. Construction will take place close to the eastern and western boundary of the application site, and is therefore likely to affect all the receptors identified. The construction will take place over a ten-year period. Based on the example definitions set out in Table A11.1.1 (**Appendix 11.1**), the dust emission class for construction is considered to be large.

Trackout

- 11.56 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; however it is likely to be towards the north of the application site, away from any receptors, and vehicles will leave the site to join the A421, along which there are no receptors within 200 m of the application site which may be affected by dust. Based on the example definitions set out in Table A11.1.1 (**Appendix 11.1**), the dust emission class for trackout is considered to be medium.
- 11.57 Table 11.6 summarises the dust emission magnitude for the Proposed Development.

Table 11.18: Summary of Dust Emission Magnitude

Source	Dust Emission Magnitude
Earthworks	Large
Construction	Large
Trackout	Medium

Sensitivity of the Area

- 11.58 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 PM₁₀ concentrations.

Sensitivity of the Area to Effects from Dust Soiling

- 11.59 The IAQM guidance explains that residential properties are 'high' sensitivity receptors to dust soiling (see Table A11.1.2 in **Appendix 11.1**). 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. Using the matrix set out in Table 11.1.3 (**Appendix 11.1**), the area surrounding the onsite works is of ‘high’ sensitivity to dust soiling. Table 11.6 shows that dust emission magnitude for trackout is ‘medium’ and Table 11.1.3 (**Appendix 11.1**) thus explains that there is a risk of material being tracked 200 m from the site exit. Most construction vehicles will almost certainly use the A421, along which there are no residential properties within 200 m of the site boundary. There are some industrial units here, but these would be classed as being of ‘low’ sensitivity. Table 11.1.3 (**Appendix 11.1**) thus indicates that the area is of ‘low’ sensitivity to dust soiling due to trackout.

- 11.60 In summary, it is judged that the area surrounding the onsite works is of ‘high’ sensitivity to dust soiling, while the area surrounding roads along which material may be tracked from the Site is of ‘low’ sensitivity (Table 11.19).

Sensitivity of the Area to any Human Health Effects

- 11.61 Residential properties are also classified as being of ‘high’ sensitivity to human health effects. The IAQM matrix in Table 11.1.4 (**Appendix 11.1**) requires information on the baseline annual mean PM₁₀ concentration in the area. Receptor 20 in Table 11.12 and Figure 11.1 is the closest existing receptor to the site. The maximum predicted baseline PM₁₀ concentration at this receptor is 16.7 µg/m³ (Table 11.5), and this value has been used. Using the matrix in Table 11.1.4 (**Appendix 11.1**), the area surrounding the onsite works is of ‘medium’ sensitivity to human health effects, while the area surrounding roads along which material may be tracked from the site is of ‘low’ sensitivity (Table 11.19).

Sensitivity of the Area to any Ecological Effects

- 11.62 There are no designated ecological sites within 350 m of the Site boundary. Ecological impacts will not, therefore, be considered further.

Table 11.19: Summary of the Area Sensitivity

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

Risk and Significance

- 11.63 The dust emission magnitudes in Table 11.6 have been combined with the sensitivities of the area in Table 11.19 using the matrix in Table 11.1.6 (**Appendix 11.1**), 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 11.20. These risk categories have been used to determine the appropriate level of mitigation as set out later in this chapter.

Table 11.20: Summary of Risk of Impacts Without Mitigation

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

- 11.64 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 11.15).
- 11.65 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

- 11.66 Predicted annual mean concentrations of nitrogen dioxide, PM₁₀ and PM_{2.5}, as well as days with PM₁₀ >50 µg/m³, are set out in Table 11.7 and Table 11.8 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 11.2**. For nitrogen dioxide, results are presented for two scenarios to reflect current uncertainty in Defra’s future-year vehicle emission factors.

Table 11.21: Predicted Impacts on Annual Mean Nitrogen Dioxide Concentrations in 2017 ($\mu\text{g}/\text{m}^3$)

Receptor	With 'Official' Emission Reduction ^a			Without Emissions Reduction ^b		
	Without Scheme	With Scheme	Impact Descriptor	Without Scheme	With Scheme	Impact Descriptor
R1	11.8	11.9	Negligible	13.6	13.6	Negligible
R2	14.9	14.9	Negligible	19.3	19.3	Negligible
R3	16.8	17.0	Negligible	22.3	22.6	Negligible
R4	13.6	13.6	Negligible	15.5	15.5	Negligible
R5	13.8	13.8	Negligible	15.9	15.9	Negligible
R6	13.5	13.6	Negligible	15.4	15.5	Negligible
R7	15.9	16.2	Negligible	18.2	18.5	Negligible
R8	20.6	21.5	Negligible	25.2	26.4	Negligible
R9	16.9	17.5	Negligible	20.1	20.8	Negligible
R10	16.9	17.5	Negligible	20.2	21.0	Negligible
R11	20.0	20.1	Negligible	24.5	24.6	Negligible
R12	22.4	22.5	Negligible	27.0	27.0	Negligible
R13	15.6	16.8	Negligible	18.2	19.8	Negligible
R14	17.2	19.5	Negligible	20.7	23.7	Negligible
R15	24.4	25.0	Negligible	29.8	30.7	Negligible
R16	14.5	14.7	Negligible	17.4	17.4	Negligible
R17	17.5	18.9	Negligible	21.2	23.0	Negligible
R18	14.6	15.4	Negligible	16.8	17.9	Negligible
R19	12.7	13.0	Negligible	14.1	14.5	Negligible
R20	13.9	14.5	Negligible	15.7	16.5	Negligible
R21	13.9	14.9	Negligible	15.9	17.2	Negligible
R22	10.7	10.7	Negligible	11.8	11.9	Negligible
R23	11.6	11.7	Negligible	13.1	13.3	Negligible
Objective	40		-	40		-

^a This assumes vehicle emission factors reduce into the future at the current 'official' rates.

^b This assumes vehicle emission factors in 2017 remain the same as in 2011.

Table 11.22: Predicted PM₁₀ Impacts in 2017 (µg/m³)

Receptor	Annual Mean (µg/m ³)			Days with PM ₁₀ > 50 µg/m ³ ^a		
	Without Scheme	With Scheme	Impact Descriptor	Without Scheme	With Scheme	Impact Descriptor
R1	15.4	15.4	Negligible	0	0	Negligible
R2	15.9	15.9	Negligible	0	0	Negligible
R3	16.4	16.4	Negligible	0	0	Negligible
R4	15.4	15.4	Negligible	0	0	Negligible
R5	15.5	15.5	Negligible	0	0	Negligible
R6	16.3	16.4	Negligible	0	0	Negligible
R7	15.4	15.5	Negligible	0	0	Negligible
R8	15.9	16.1	Negligible	0	0	Negligible
R9	16.2	16.3	Negligible	0	0	Negligible
R10	16.2	16.3	Negligible	0	0	Negligible
R11	16.0	16.1	Negligible	0	0	Negligible
R12	16.0	16.1	Negligible	0	0	Negligible
R13	16.0	16.3	Negligible	0	0	Negligible
R14	16.3	16.9	Negligible	0	1	Negligible
R15	16.9	17.0	Negligible	1	1	Negligible
R16	15.9	16.0	Negligible	0	0	Negligible
R17	16.2	16.3	Negligible	0	0	Negligible
R18	16.0	16.1	Negligible	0	0	Negligible
R19	15.7	15.7	Negligible	0	0	Negligible
R20	15.8	16.0	Negligible	0	0	Negligible
R21	15.4	15.6	Negligible	0	0	Negligible
R22	14.6	14.6	Negligible	0	0	Negligible
R23	14.7	14.8	Negligible	0	0	Negligible
Objective	40		-	35		-

^a The numbers of days with PM₁₀ concentrations greater than 50 µg/m³ have been estimated from the relationship with the annual mean concentration described in LAQM.TG(09) (Ref 11.1).

Table 11.23: Predicted PM_{2.5} Impacts in 2017 (µg/m³)

Receptor	Annual Mean (µg/m ³)		
	Without Scheme	With Scheme	Impact Descriptor
R1	10.1	10.1	Negligible
R2	10.5	10.5	Negligible
R3	10.7	10.7	Negligible
R4	10.3	10.3	Negligible
R5	10.3	10.3	Negligible
R6	10.5	10.5	Negligible
R7	10.6	10.6	Negligible
R8	10.9	11.1	Negligible
R9	10.7	10.8	Negligible
R10	10.7	10.8	Negligible
R11	11.0	11.0	Negligible
R12	11.1	11.1	Negligible
R13	10.6	10.8	Negligible
R14	10.8	11.1	Negligible
R15	11.5	11.6	Negligible
R16	10.3	10.4	Negligible
R17	10.5	10.6	Negligible
R18	10.3	10.4	Negligible
R19	10.2	10.2	Negligible
R20	10.3	10.4	Negligible
R21	10.2	10.4	Negligible
R22	9.8	9.8	Negligible
R23	9.9	9.9	Negligible
Objective	25 ^a		-

^a There are no objectives for PM_{2.5} that apply during these years, however the European Union limit value of 25 µg/m³ is to be met by 2015.

- 11.67 The annual mean nitrogen dioxide concentrations are well below the objective at all receptors. The magnitudes of change range from imperceptible to medium, and with the low overall concentrations, the impacts are negligible at all receptors.
- 11.68 In terms of PM₁₀ and PM_{2.5}, no exceedences of the objectives are predicted, the magnitudes of change are all imperceptible or small, and all of the impacts are negligible.
- 11.69 Predicted concentrations of all three pollutants remain well below the objectives in 2017, whether or not the proposed scheme proceeds.

Impacts on the Development

- 11.70 The modelled impacts of the existing and development generated traffic sources on air quality conditions for residents occupying the new residential units in the Proposed Development are set out in Table 11.10 for Receptors 24 to 28 (see Table 11.12 and Figure 11.1 for receptor locations). All of the values are below the objectives. Air quality for future residents within the development will thus be acceptable.

Table 11.24: Predicted Concentrations of Nitrogen Dioxide (NO₂), PM₁₀ and PM_{2.5} in 2017 for New Receptors in the Development Site

Receptor	Annual Mean NO ₂ (µg/m ³)		PM ₁₀ (µg/m ³) ^a		PM _{2.5} (µg/m ³)
	With 'Official' Emission Reduction ^b	Without Emissions Reduction ^c	Annual Mean	No. Days >50 µg/m ³	Annual Mean
R24	11.2	12.4	14.9	0	9.9
R25	11.9	13.5	15.6	0	10.2
R26	12.3	14.3	15.7	0	10.2
R27	16.0	19.4	16.2	0	10.6
R28	16.8	20.1	16.1	0	10.6
Objectives	40		40	35	25^d

^a The numbers of days with PM₁₀ concentrations greater than 50 µg/m³ have been estimated from the relationship with the annual mean concentration described in LAQM.TG (09) (Ref 11.1).

^b This assumes vehicle emission factors reduce into the future at the current 'official' rates.

^c This assumes vehicle emission factors in 2017 will remain the same as in 2011.

^d There are no objectives for PM_{2.5} that apply during these years, however the European Union limit value of 25 µg/m³ is to be met by 2015.

Uncertainty in Road Traffic Modelling Predictions

- 11.71 There are many components that contribute to the uncertainty of modelling predictions. The 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 the model is required to simplify real-world conditions into a series of algorithms. An important stage in the process is model verification, which involves comparing the model output with measured concentrations (see **Appendix 11.4**). However, as the verification site used is located further back from the road than would be considered ideal, the model may have over-predicted concentrations at the monitoring location, resulting in a verification factor of less than one. Professional experience suggests that the use of a verification factor of less than 1.0 could lead to under-prediction at other locations. For this reason, the model output has not been adjusted.
- 11.72 Predicting pollutant concentrations in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and 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. Recently, a disparity between the road transport emission projections and measured annual mean concentrations of nitrogen oxides and nitrogen dioxide has been identified by Defra (Ref 11.21). This is evident across the UK, although the effect appears to be greatest in inner London; there is also considerable inter-site variation. Whilst the emission projections suggested that both annual mean nitrogen oxides and nitrogen dioxide concentrations should have fallen by around 15-25% over the past 6 to 8 years, at many monitoring sites levels have remained relatively stable, or have even shown a slight increase. This pattern is mirrored in the monitoring data assembled for this study, as set out in paragraph 0.
- 11.73 This disparity led to a detailed review of the emission factors and fleet mix for UK conditions, and in July 2012, Defra issued a revised Emissions Factors Toolkit (ETFv5.1.3). This has since been updated to version ETFv5.2c, which has undergone some further, more minor, revisions. The new EFT utilises revised nitrogen oxides emissions factors and also incorporates revised vehicle fleet composition data (Ref 11.27). The new EFT goes some way to addressing the disparity between air quality measurements and emissions, but does not fully address it, and it is recognised that the forecast reductions may still be optimistic in the near-term (i.e. the next five years or so).
- 11.74 The reason for the disparity is thought to relate to the on-road performance of modern diesel vehicles. New vehicles registered in the UK have 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 is often no better than that of earlier models (Ref 11.21). The best current evidence is that, where previous standards have had limited on-road success, the 'Euro VI' and 'Euro 6' standards that new vehicles will have to comply with from 2013/15⁵ will achieve the expected on-road improvements, as, for the first time, they will require compliance with the World

⁵ 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.

Harmonized Test Cycle, which better represents real-world driving conditions and includes a separate slow-speed cycle for heavy duty vehicles.

- 11.75 As noted above, the new forecast reductions in nitrogen oxides emissions may still be optimistic in the near-term. To account for this uncertainty, a sensitivity test has been conducted assuming that the future (2017) road traffic emissions per vehicle are unchanged from 2011 values. The predictions within this sensitivity test are likely to be over-pessimistic, as new, lower-emission Euro VI and Euro 6 vehicles will be on the road from 2013/15; by 2017 it is forecast that there will be a roughly 50-60% penetration of Euro VI HDVs and a roughly 15-20% penetration of Euro 6 LDVs. These new vehicles are expected to deliver real on-road reductions in nitrogen oxides emissions.
- 11.76 It must also be borne in mind that the predictions in 2017 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, which will, in part, offset any potential underestimation in future concentrations using the official emission factors as described above.

Significance of Operational Air Quality Impacts

- 11.77 The operational air quality impacts are judged to be insignificant. This professional judgement is made in accordance with the methodology set out in **Appendix 11.2**, taking into account the factors set out in Table 11.25, and also taking into account the uncertainty over future projections of traffic-related nitrogen dioxide concentrations, which may not decline as rapidly as expected. The latter has been addressed by giving consideration to both sets of modelled results for nitrogen dioxide; those with and without reductions in traffic emissions. It is to be expected that concentrations will fall in the range between the two sets of results.
- 11.78 More specifically, the judgement that the air quality impacts will be insignificant takes account of the assessment that concentrations of all pollutants will be well below the air quality objectives for all receptors and all of the impacts are predicted to be negligible.

Table 11.25: Factors Taken into Account in Determining the Overall Significance of the Scheme on Local Air Quality

Factors	Outcome of Assessment
Number of people affected by increases and/or decreases in concentrations and a judgement on the overall balance.	A small number of people are predicted to be exposed to a <i>small or medium</i> increase in concentrations. For most people the increase will be <i>imperceptible</i> .
The number of people exposed to levels above the objective or limit value.	There will be no exceedences of the objectives.
The magnitude of the changes and the descriptions of the impacts at the receptors	The impacts at the receptors are all <i>negligible</i> .

Factors	Outcome of Assessment
Whether or not an exceedence of an objective or limit value is predicted to arise in the study area where none existed before or an exceedence area is substantially increased.	No new areas of exceedence of the objectives are predicted.
Uncertainty, including the extent to which worst-case assumptions have been made	The inclusion of the two scenarios for nitrogen dioxide covers the uncertainty over vehicle emission factors.
The extent to which an objective or limit value is exceeded	None of the objectives are exceeded.
Whether or not the study area exceeds an objective or limit value and this exceedence is removed or the exceedence area is reduced.	There are no exceedences of any of the objectives in the study area.

Mitigation Measures

Construction Impacts

- 11.79 Measures to mitigate dust emissions will be required during the construction phase of the development in order to reduce impacts upon nearby sensitive receptors.
- 11.80 The site has been identified as a High Risk site as set out in Table 11.20. Comprehensive guidance has been published by IAQM (Ref 11.15) detailing measures that should be employed, as appropriate, to reduce the impact of a high risk site, and on monitoring during demolition and construction (Ref 11.28). This reflects best practice experience and has been used, together with the professional experience of the consultant and the findings of the dust impact assessment, to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in **Appendix 11.5**.
- 11.81 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

- 11.82 The assessment has demonstrated that there will be no exceedences of any of the objectives in the study area, 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

- 11.83 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 11.5** are based on the IAQM guidance. With these measures in place and effectively implemented the residual effects are judged to be insignificant.

Road Traffic Impacts

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

Cumulative Effects

- 11.85 The approach to the assessment of cumulative air quality effects is to include 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 11.2**).
- 11.86 In terms of the committed developments considered in the air quality assessment, this includes predicted traffic generation from 45 allocated sites and land parcels which are proposed within Milton Keynes Council’s housing forecast up to 2026.
- 11.87 No other committed developments in the area were identified as having potential for significant emissions to air.

Summary

Construction Impacts

- 11.88 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

- 11.89 The air quality impacts associated with the construction and operation of the Proposed Development have been assessed. Existing conditions within the study area show good air quality, with concentrations all below the air quality objectives.
- 11.90 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 twenty-three 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 five worst-case locations within the new development itself. In the case of nitrogen dioxide, the modelling has been carried out

assuming both that vehicle emissions decrease (using ‘official’ emission factors), and that they do not decrease in future years. This is to allow for current uncertainty over emission factors for nitrogen oxides that has been identified by Defra (Ref 11.21).

- 11.91 It is concluded that concentrations of PM₁₀ and PM_{2.5} will remain below the objectives at all existing receptors in 2026, whether the scheme is developed or not. This conclusion is consistent with the outcomes of the reviews and assessments prepared by AVDC and MKC, which show that exceedences of the PM₁₀ objective are unlikely at any location.
- 11.92 In the case of nitrogen dioxide, the annual mean concentrations remain below the objective at all existing receptors in 2017, whether the scheme is developed or not, and whether or not a reduction in vehicle emissions of nitrogen oxides is assumed.
- 11.93 The Proposed Development will increase traffic volumes on some local roads. These changes will lead to an imperceptible or small increase in concentrations of PM₁₀ and PM_{2.5} at all existing receptors, and the impacts will all be negligible. In the case of nitrogen dioxide, there will be imperceptible increases at most receptors, with small or medium increases at some receptors. The impacts will be negligible at all receptors.
- 11.94 The impacts of local traffic 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 being well below the air quality objectives.
- 11.95 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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12. NOISE & VIBRATION

Introduction

- 12.1 This section assesses the noise and vibration impact of the proposed development. 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.
- 12.2 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

- 12.3 This assessment takes into account saved Aylesbury Vale District Council Local Plan (AVDLP) Policies GP.8 (Ref 12.1) and GP.95 (Ref 12.2) and saved Milton Keynes Council (MKC) Policies D1 Impact of Development Proposals on Locality (Ref 12.3), T10 Traffic (Ref 12.4), E4 Employment Development in the Town, District, and Local Centres (Ref 12.5) and E9 Controlling the Risk of Pollution (Ref 12.6).

- 12.4 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.”

- 12.5 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.”

- 12.6 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.”

12.7 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.”

12.8 MKC Policy E4 states:

“Planning permission will be granted for employment uses within Town, District, and Local Centres provided that there is no significant detrimental effect on the surrounding area by means of scale, siting, noise, air emissions, or hours of operation.”

12.9 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”

National Planning Policy

Planning Practice Guidance for Noise

12.10 The guidance provided in the Planning Practice Guidance for Noise (NPPG) (March 2014) (Ref 12.7) will form the basis for the assessment of the potential effects of noise from the site upon nearby sensitive receptors. NPPG 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; an*
- *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

12.11 The Noise Policy Statement for England (NPSE) (2010) (Ref 12.8) 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.”

12.12 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 NPPF is met:

- British Standard 4142:1997 *Method for Rating industrial noise affecting mixed residential and industrial areas*; (Ref 12.9)
- British Standard 5228:2009 *Code of practice for noise and vibration control on construction and open sites*, Part 1: Noise and Part 2: Vibration; (Ref 12.10)
- Draft IOA/IEMA *Guidelines for Noise Impact Assessment*; (Ref 12.11)
- Technical Memorandum, Calculation of Road Traffic Noise; (Ref 12.12) and
- Design Manual for Roads and Bridges (Ref 12.13).
- British Standard 8233:2014 *Guidance on sound insulation and noise reduction for buildings* (Ref 12.14)

Assessment Methodology

12.13 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 noise and vibration impacts at local potentially sensitive receptors during the construction phase of the development;
- Assessment of noise and vibration impacts from road traffic at local potentially sensitive receptors during the operational phase of the development;
- 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;
- Provision of mitigation measures, as considered appropriate, in order to minimise any potential impacts arising from the development;

Relevant Standards for Assessment and Measurement

BS4142:1997

- 12.15 British Standard 4142:1997 *Method for rating industrial noise affecting mixed residential and industrial areas* (Ref 12.1) is intended to be used to assess whether noise from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises is likely to give rise to complaints from people residing in nearby dwellings.
- 12.16 The procedure contained in BS4142 for assessing the likelihood of complaint, is to compare the measured or predicted noise level from the source in question immediately outside the dwelling, the 'specific noise level', with the background noise level.
- 12.17 The standard is not suitable for the assessment of complaint when the background and rating noise levels are both very low; very low background noise levels are defined as those below 30dB L_{A90} , very low rating noise levels are defined as those below 35dB $L_{Ar,T}$.
- 12.18 The specific noise level is measured in terms of a $L_{Aeq,T}$ value and the background noise level is measured in terms of an L_{A90} value.
- 12.19 Where the specific noise contains a '*distinguishable discrete continuous note (whine, hiss, screech, hum etc.) or if there are distinct impulses in the noise (bangs, clicks, clatters or thumps), or if the noise is irregular enough to attract attention*' then a correction of +5dB is added to the specific noise level to obtain the 'rating level', or $L_{Ar,T}$.
- 12.20 The likelihood of noise provoking complaints is assessed by subtracting the background noise level from the rating noise level. BS4142 states:
- "A difference of around 10dB or higher indicates that complaints are likely. A difference of around 5dB is of marginal significance. A difference of -10dB is a positive indication that complaints are unlikely."*

BS5228-1:2009

- 12.21 BS5228:2009 *Noise and vibration control on construction and open sites*, Part 1: *Noise* and Part 2: *Vibration* refers 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.
- 12.22 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.

Draft Guidelines for Noise Impact Assessment

- 12.23 The aim of the draft Guidelines for Noise Impact Assessment produced by the Institute of Acoustics/Institute of Environmental Management and Assessment Working Party, published in 2002 is to set good practice standards for the scope, content and methodology of noise impact assessments in order to facilitate greater consistency and transparency between assessments. The guidelines address the basic principles of environmental noise impact assessment, in particular; the issues to be considered when defining the baseline noise environment, predicting changes in noise levels as a result of implementing development proposals and defining the significance of the effect of changes in noise levels. The guidelines define methods and techniques, where appropriate, and highlight their limitations.
- 12.24 The findings of the Working Party are draft at present although they are of some assistance in this assessment. The draft guidelines state that for any assessment, the noise level threshold and significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise.

Calculation of Road Traffic Noise (CRTN)

- 12.25 This memorandum describes the procedures for calculating noise from road traffic. These procedures are necessary to enable entitlement under the Noise Insulation Regulations 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.

Design Manual for Roads and Bridges (DMRB)

- 12.26 Volume 11, Section 3 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 looks at both temporary and permanent impacts and provides a methodology for assessing the magnitude of impacts.
- 12.27 DMRB presents an impact scale for changes in road traffic noise levels which has been referenced in relation to the potential changes in road traffic noise levels as a result of the operational use of the site. The impact scale adopted in this assessment is shown in Table 12.1 below. As traffic data for the development was only provided for the opening year (2026) the impact scale for short term noise level changes has been utilised.

Table 12-1 Classification of Magnitude of Road Traffic Noise Impacts in the Short Term

Noise Change $L_{A10,18hr}$ dB	Magnitude of Impact
0	No change
0.1 – 0.9	Negligible
1 – 2.9	Minor
3 – 4.9	Moderate
5+	Major

Assessment Methodology

- 12.28 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 Assessment Methodology

- 12.29 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.

Operational Impact Assessment Methodology

- 12.30 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).
- 12.31 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.
- 12.32 For these reasons a qualitative rather than quantitative assessment of the potential impacts of operational noise has been undertaken.
- 12.33 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.

Road Traffic Noise

- 12.34 Any development has the potential to increase noise levels locally by increasing the amount of traffic on local roads. An assessment was carried out using the Design Manual for Roads and Bridges (DMRB) methodology to determine the likely impact of the development upon traffic levels on the local road network and therefore its impact upon noise levels due to road traffic. Data on traffic levels has been derived from the Milton Keynes Transport Model, giving AADT data both with and without the development for the opening year (2026). DMRB guidance suggests that to increase noise levels by 1 dB a 25% increase in traffic levels is necessary.
- 12.35 CRTN specifies a method for predicting future noise levels from traffic by using existing and forecast traffic level data to calculate future 18 hour L_{10} . The traffic data required for the calculation is predicted 18 hour AAWT or AADT, percentage of HGV and speed of vehicles for the Do Minimum and Do Something scenarios in the opening year. Future year data has not been modelled within the traffic assessment.

Noise Effects Upon the Development

- 12.36 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 NPPG, NPSE and other appropriate guidance.
- 12.3 In addition, guidance provided in BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* (ref 12.6) has been used in order to recommend levels of insulation required by the building façades of the proposed residential properties.
- 12.38 The scope of BS8233:2014 Guidance on sound insulation and noise reduction for buildings is the provision of recommendations for the control of noise in and around buildings. It 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 12.1 below;

Table 12-2
Indoor Ambient Noise Levels – Unoccupied Spaces

Criterion	Typical Situation	Guideline Value $L_{Aeq,T}$ dB
Reasonable resting/sleeping conditions	Living rooms (daytime 07:00 – 23:00)	35
	Bedrooms (night-time 23:00 – 07:00)	30

- 12.39 The previous version of BS8233 (1999) gave guidance that noise levels in bedrooms during the night should not regularly exceed 45 dB L_{Amax} . The updated BS8233 does not give a specific limit for L_{Amax} noise levels within bedrooms but it is considered prudent to adhere to the guideline level from the previous BS8233.

12.40 The recommendations made in this report will be based on achieving a daytime (07.00 – 23.00 hours) indoor ambient noise level of 35 dB $L_{Aeq,T}$ and night-time levels of 30 dB L_{Aeq} and 45 dB L_{Amax} .

12.41 BS8233:2014 also states, in relation to noise in external amenity areas:

“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 $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ 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.”

Significance Criteria

12.42 The impact of the development on noise levels has been assessed with reference to the baseline environment. In terms of general perception of sound, the noise level changes in Table 12.1 can be referenced.

12.43 It is recognised that environmental impacts can operate over a range of geographical areas. However, the geographical scale should be taken into account in the scale/magnitude of the impact, as well as the receptor.

12.44 Receptors such as individual properties and communities are generally considered to have Local importance and therefore low sensitivity. It is rare for noise impacts to be experienced on a wider scale and impacts on receptors of more than local importance are generally only due to developments such as large scale road and rail schemes and large airports.

12.45 The interaction of the scale and the importance produces the impact significance. Table 12.3 below shows the significance of impacts upon receptors which have Local importance:

Table 12-3 Impact Significance Matrix

Resource Value (Sensitivity)	Scale of Impact Upon Receptor			
	Major	Moderate	Minor	Negligible
Low (Local)	Moderate-Minor	Minor	Minor	Neutral

12.46 The significance of an impact is generally scaled as follows:

Major beneficial (positive) effect;
Moderate beneficial (positive) effect;
Minor beneficial (positive) effect;
Neutral effect;
Minor adverse (negative) effect;
Moderate adverse (negative) effect; and
Major adverse (negative) effect.

12.47 The significance of noise impacts upon local receptors is nearly always deemed to be minor whenever the resource is valued as being of local importance, as shown in Table 12-3. This could be unrealistic on some occasions because impacts occur on a continuous scale. The above matrix simplifies reality and places impacts in a discontinuous scale. Therefore, impact significance scores should always be qualified. For example, it is noted that in certain cases an impact of minor significance, whether adverse or beneficial, can be very important for local residents, and deserves attention in the assessment, i.e. through mitigation.

12.48 The impact prediction confidence is scaled in accordance with Table 12.4 below:

Table 12-4 Impact Prediction Confidence

Confidence Level	Description
High	The predicted impact is either certain, i.e. a direct impact, or believed to be very likely to occur, based on reliable information or previous experience.
Low	The predicted impact and its levels are best estimates, generally derived from first principles of relevant theory and the experience of the assessor. More information may be needed to improve the level of confidence.

12.49 Potential vibration impacts from the construction phase of the development have been assessed on a qualitative basis only. No specific significance criteria have therefore been used.

12.50 As precise details of construction methods, plant to be used and timescales are currently unknown the assessment is necessarily limited to providing what is considered to be a worst case scenario. Due to these factors confidence in the predicted impacts is low.

Sensitive Receptors

12.51 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.

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

Importance and Sensitivity of Affected Receptors

- 12.53 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

- 12.54 Based upon a desktop study of the potentially most affected properties 8 No. noise measurement locations, within the site and close to the site, were selected to monitor existing noise levels (as shown on Figure 12.1 and described in the Baseline Conditions section of this report).

Measurement Equipment and Conditions

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

- 12.56 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

- 12.57 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.

Baseline Conditions

Existing Noise Sources and Sensitive Receptors

- 12.58 Ambient noise in the area is generally dominated by traffic on the surrounding roads (Standing Way, Buckingham Road and Whaddon Road).
- 12.59 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.
- 12.60 These receptors will experience both operational and construction phase noise impacts from the development.
- 12.61 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.
- 12.62 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; and
 - Location 8 at Hammond Park, Newton Longville.
- 12.63 Day and night time noise measurements were undertaken at locations 1 – 4 and daytime only measurements were undertaken at locations 5 – 8.
- 12.64 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

12.65 The results of the baseline noise surveys are summarised in Table 12.5 below:

Table 12.5 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

12.66 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.

12.67 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.

- 12.68 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.
- 12.69 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.
- 12.70 Therefore a qualitative approach has been considered within this assessment.
- 12.71 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 is likely to be substantial, adverse direct and short to medium term.

Vehicle Movements

- 12.72 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.
- 12.73 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. more than a minor impact magnitude) 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 adverse direct, short term and reversible.

Construction Vibration

- 12.74 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

Fixed Noise Sources

- 12.75 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 Adverse, Direct and Long-term.
- 12.76 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 Adverse, Direct and Long-term.

Changes in Traffic Noise on Adjacent Roads

- 12.77 Based on the methodology outlined above, for each link in the road traffic model for the local road network, within 1km of the proposed new roads/junctions within the development, Basic Noise Levels (BNLs) for the opening year (2026) both with and without development traffic flows were calculated using CadnaA noise modelling software which incorporates the methodologies contained within CRTN and DMRB. The BNLs are compared in Table 12.6 below:

Table 12.6 Predicted Noise Levels from Vehicle Movements in and out of the development

Road	BNL DM 2026, L _{A10,18hr} , dB	BNL DS 2026, L _{A10,18hr} , dB	Change
Standing way west LILO	78.2	78.1	-0.1
Standing way east LILO	78.3	77.4	-0.9
Standing Way west of Bottle Dump	78.7	78.8	0.1
Whaddon Road north of access	71.4	70.8	-0.6
Whaddon Road south of access	73.2	74.3	1.1
Standing Way north/east of	79.9	81.1	1.2
Buckingham Road north of access	75.2	78.1	2.9
Buckingham Road south and east of	77.0	77.4	0.4
Bletchley Road	73.9	75.0	1.1
Snelshall Street	72.9	73.6	0.7

- 12.78 From Table 12.6 it can be seen that the changes in road traffic noise due to the proposed development will at most result in a change in BNL that represents a Minor, Direct, long-term impact.

Road Traffic Vibration

- 12.79 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.

Noise effects upon the development

12.80 The noise levels measured at Locations 1 to 5 indicate that the site is generally suitable for residential development subject to reasonable mitigation measures being adopted.

12.81 Mitigation measures to reduce the noise impacts on the proposed properties are outlined below:

- Arranging the layout of the site such that the separation between the facades of the proposed dwellings and the main noise sources is maximised;
- Arranging the development layout so that, where practicable, habitable rooms, i.e. bedrooms, living rooms and dining rooms, do not face the main noise sources;
- Arranging the development layout such that the dwellings provide screening to their gardens and outdoor amenity areas; and
- Ensuring the facades of the dwellings, including glazing elements, provide adequate attenuation to the passage of sound.

Building Facades

12.82 The sound reduction performance required of the external building fabric has been calculated to ensure that the internal noise levels specified in BS8233:2014 are achieved. The overall sound reduction performance of a building façade is normally determined by the glazing or ventilation components as these are typically the acoustically weakest links. Therefore glazing elements will be provided that afford appropriate sound insulation performance.

12.83 Table 12.7 below sets out the sound reduction performance requirements for the residential accommodation on the first floor to ensure that the internal noise levels specified in the planning permission and BS8233:2014 are achieved. Noise levels are either measured levels or have been calculated to include any landscape buffers and have been rounded up to the nearest dB.

Table 12-5 Required Sound Insulation Performances First Floor Facades, dB

Location	Period	Calculated Noise Level	Specified Limit	Required Sound Insulation Performance
Location 1	Daytime $L_{Aeq,16hrs}$	55	35	20
	Night-time $L_{Aeq,8hrs}$	50	30	20
	Night-time L_{AFmax}	64	45	19
Location 2	Daytime $L_{Aeq,16hrs}$	61	35	26
	Night-time $L_{Aeq,8hrs}$	41	30	17
	Night-time L_{AFmax}	68	45	23
Location 3	Daytime $L_{Aeq,16hrs}$	59	35	24
	Night-time $L_{Aeq,8hrs}$	55	30	25

Location	Period	Calculated Noise Level	Specified Limit	Required Sound Insulation Performance
Location 4	Night-time L_{AFmax}	69	45	24
	Daytime $L_{Aeq,16hrs}$	50	35	15
	Night-time $L_{Aeq,8hrs}$	46	30	16
	Night-time L_{AFmax}	62	45	17
Location 5	Daytime $L_{Aeq,16hrs}$	55	35	20

12.84 The maximum required sound insulation performance from the table above is 26 dB.

12.85 Windows do not reduce noise equally across the entire frequency spectrum, so the frequency content of the sound will influence the overall sound reduction performance of a given window and by extension, the resulting noise levels within the receiving room.

12.86 However, many glazing manufacturers test their products under laboratory conditions using a typical road traffic noise frequency spectrum source. The resultant measured noise attenuation, in dB, gives a very useful guide to in-situ sound reduction performance of the window for situations where road traffic noise dominates. This performance index is known as the R_{TRA} .

12.87 As an example of a glazing unit that could achieve a 26dB R_{TRA} performance requirement, the glazing manufacturer Saint Gobain states that its 4/12/6 double glazed unit has a R_{TRA} of 29dB. The 4/12/6 notation refers to a two panes of glass one 4mm thick the other 6mm thick separated by 12mm air gap.

12.88 Other units may be suitable and it is the responsibility of the glazing manufacturer to recommend and provide appropriate systems. The above analysis is provided to demonstrate that a design solution is feasible at the site for the purposes of a planning application and not for the purposes of detailed design or glazing procurement.

12.89 The detailed design of the proposed properties will affect both the required sound reduction performance and the appropriate selection of glazing units. The aspects of the detailed design that are important are the room dimensions, room finishes, window dimensions and the sound reduction performance of non-glazing elements. Further detailed consideration of the glazing components will be required by the eventual developer of the site once the detailed design is confirmed.

12.90 Internal noise levels should be considered in the context of room ventilation requirements. The target internal noise levels will only be achieved when windows are closed. An alternative means of ventilation will therefore be required to comply with the requirements of the Building Regulations Approved Document F.

12.91 The Building Research Establishment (BRE) has published an Information Paper on the acoustic performance of such passive ventilation systems. IP4/99: *Ventilators: Ventilation and Acoustic Effectiveness* (October 1999) details a study into the sound reduction performance of fourteen different window mounted trickle ventilators and seven

different through-wall passive ventilators. The measured sound reduction performance, after taking into account flanking sound paths (i.e. sound paths that do not travel directly through the vent) and the effective area of the ventilator, ranged from 14 to 46dB. Passive vents are available that meet or exceed the sound reduction required by the glazing elements.

Railway Line

- 12.92 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.
- 12.93 It is likely, therefore, that noise from rail traffic will impact upon proposed dwellings within the development at the southern boundary. The imposition of stand-off distances between the rail line and any proposed dwellings is considered the most appropriate method of mitigation at this time.
- 12.94 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 movements of 216 trains in the daytime, 65 in the evening and 5 at night. Freight movements are assumed at 40 trains in the daytime, 5 in the evening and up to 40 during the night.
- 12.95 Calculations have been performed using CadnaA noise modelling software which implements the Calculation of Railway Noise (CRN) methodology. The calculations show that the stand-off distance required from the rail line to achieve acceptable levels of noise at the proposed dwellings is 70m. Should the number of freight train movements be less than that assumed then this stand-off distance could be reduced but further calculations and accurate train movement data would be required.

Grid Road

- 12.96 It is understood that the scheme design is such that a new road will be built, running north-south through the eastern part of the proposed development. Traffic flows, vehicle speeds and percentage HGV have been predicted for this road and calculations undertaken using CadnaA noise modelling software which utilises the CRTN methodology for calculating road traffic noise.
- 12.97 The calculations show that at a distance of 23m from the carriageway of the road noise levels due to road traffic will be below 55dB $L_{Aeq,16hr}$.

Mitigation

Construction

- 12.98 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.

12.99 Given the absence of detailed information regarding construction methods and programmes, Best Practicable Means will 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; and

- any problems concerning noise from construction works can sometimes be avoided by taking a considerate and neighbourly approach to relations with local residents.

12.100 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.

Training

12.101 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.

12.102 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.

Maintenance

12.103 A 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.

Public Relations

12.104 It is essential to maintain good public relations with local residents in nearby noise-sensitive receptors and therefore the following will be undertaken:

- Endeavour to be good neighbours, i.e.:
- 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,

- Ensure lines of communication, e.g.:
- 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

Action Plan

12.105 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.

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

Operation

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

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

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

General Mitigation Considerations

12.110 In general, the following will 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; and
- Agreement with the local authority on opening hours of premises within the development.

Particular Mitigation Considerations

12.111 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.

Residual Effects

12.112 Mitigation and enhancement measures are proposed, for both the construction and operational phases of the developments. The residual environmental effects, after mitigation, are considered to be moderate adverse to neutral during construction, and minor adverse to neutral during operation.

12.113 Table 12.8 summarises the significant environmental noise and vibration impacts of the South West Milton Keynes development, both for the construction and the operational phases.

Table 12.8 – Significant Environmental Effects

Environmental Effect	Sensitivity	Magnitude	Nature	Duration	Mitigation	Residual Significance	Level of Certainty	Rationale
Construction noise		Major	Adverse Direct	Short to medium term	Restriction of working hours, use of correct working practices	Moderate – minor	High	Noise levels are high and difficult to effectively mitigate when in close proximity to noise-sensitive receptors; however, construction works are short term, restricted to typical working hours and Best Practicable Means will be applied.
Road traffic noise during construction		Minor	Adverse Direct	Short term	Not applicable	Minor	High	Calculations using estimated construction traffic flows indicate a maximum impact of minor adverse.
Construction vibration		Negligible			Not applicable	Neutral	High	Piling is considered unlikely within the development.
Operational Noise	Local	Major to Negligible	Adverse Direct	Long term	Design of site and planning conditions at reserved matters stage	Neutral	High	Limited information is available specifying noise levels generated by the development but mitigation measures will be very effective in reducing impact.
Operational road traffic noise		Minor – negligible	Adverse Direct	Long term	Not applicable	Minor or Neutral	High	The increase in road traffic due to the development will give only a negligible increase in noise levels on the majority of local roads with some roads experiencing an increase of minor magnitude.
Vibration during operation		Negligible			Not applicable	Neutral	High	It is considered that no vibration will be caused from the development.

Cumulative Effects

Cumulative Impacts of the Proposed Scheme

12.113 In relation to the noise impacts of changes in road traffic levels on local roads there will likely be cumulative effects due to the effects on air quality that increases in road traffic will

produce. The cumulative impacts will be in the same locations as the impacts from increased noise.

Cumulative Impacts of the Proposed Scheme with other Schemes

12.114 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.

12.115 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

12.116 Noise and vibration impacts in relation to the scheme will occur during both the construction and operation.

12.117 During construction there will be short to medium term, temporary periods where noise levels are significantly elevated above existing noise levels, whilst for certain periods noise from the construction works will be less. The most critical periods with respect to adverse noise levels will be during construction in close proximity to the identified noise-sensitive receptors to the east and to the north and north-west of the site.

12.118 Committed adherence to the specified mitigation measures should ensure that any disruption to nearby sensitive receptors is minimized. These measures will be implemented as part of the Construction Environmental Management Plan.

12.119 During operation of the development there will be minor, long term impacts due to the increased levels of road traffic due to the development. Impacts will be minimised by the use of low-noise road surfacing for new roads and where existing roads have been improved as part of the scheme.

12.120 Impacts due to other operational aspects of the development are effectively dealt with during detailed design either by careful siting of noise sources or by the use of planning conditions.

References

Ref 12.1: Aylesbury Vale District Council Local Plan Policy GP.8

Ref 12.2: Aylesbury Vale District Council Local Plan Policy GP.95

Ref 12.3: Milton Keynes Council, Policy D1: Impact of Development Proposals. Ref 12.4:

Milton Keynes Council, Policy T10: Traffic.

Ref 12.5: Milton Keynes Council, Policy E4: Employment Development in the Town, District, and Local Centres.

Ref 12.6: Milton Keynes Council, Policy E9: Controlling the Risk of Pollution. Ref 12.7:

Planning Practice Guidance for Noise (NPPG), 2014

Ref 12.8: Noise Policy Statement for England (NPSE), 2010

Ref 12.9: British Standard BS4142 Method for rating industrial noise affecting mixed residential and industrial areas, 1997;

Ref 12.10: British Standard BS5228 Noise and vibration control on construction and open sites, 2009;

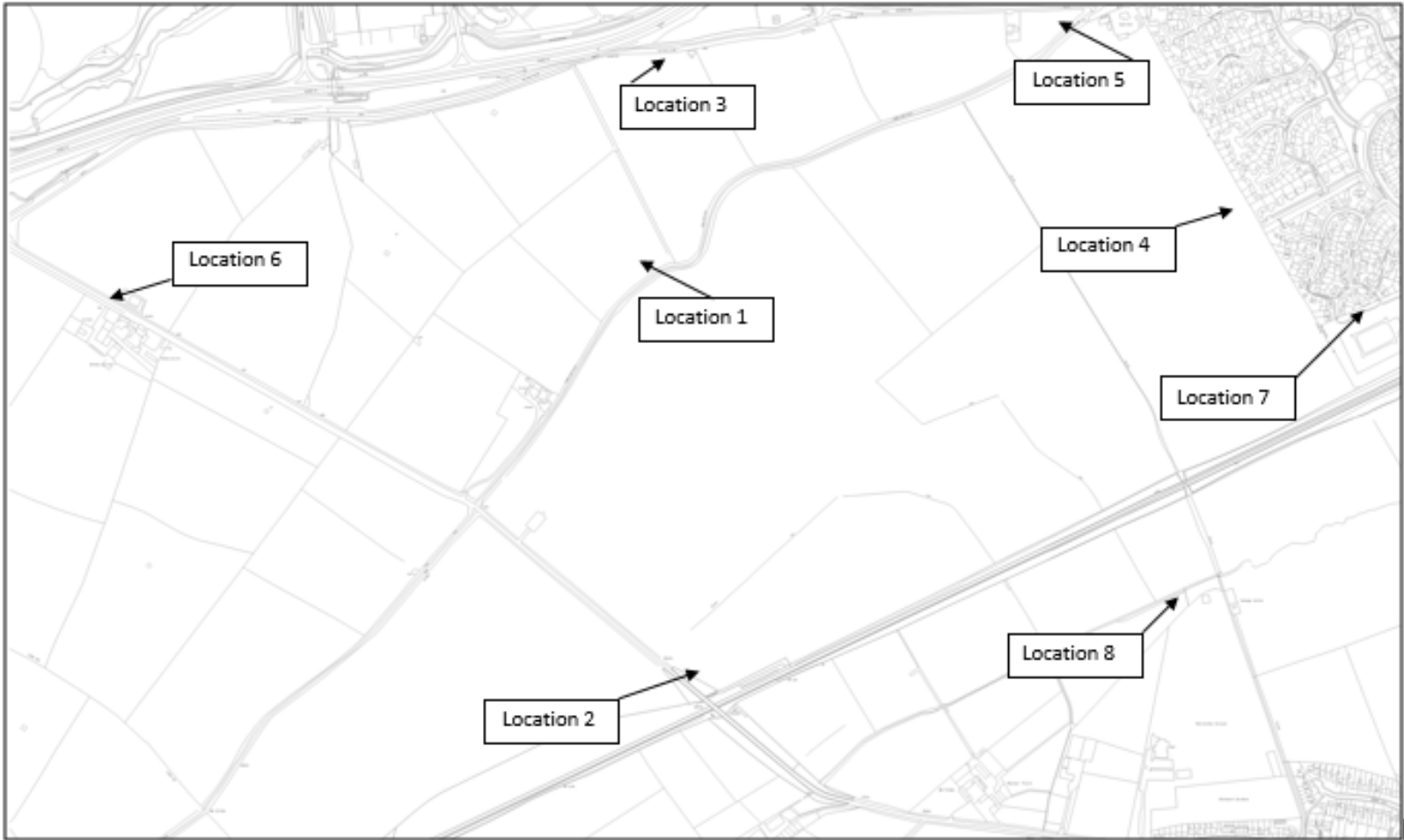
Ref 12.11: Guidelines for Noise Impact Assessment (Draft) – Institute of Acoustics & Institute of Environmental Management & Assessment, 2002;

Ref 12.12: Calculation of Road Traffic Noise (CRTN) – Department of Transport, 1988;

Ref 12.13 Design Manual for Roads and Bridges (DMRB), 2011;

Ref 12.14 British Standard BS8233 Guidance on sound insulation and noise reduction for buildings, 2014.

Figure 12.1 – Measurement Locations



13. SOCIO-ECONOMIC ISSUES

Introduction

- 13.1 This chapter of the Environmental Statement considers the way in which the Proposed Development has the potential to affect local socio-economic issues. The assessment takes into consideration the context of the policy framework as well as the socio-economic profile of the areas that are most relevant to the Proposed Development. The findings of the baseline and strategic context set out the framework within which the cumulative impacts of the development proposals are examined.

Planning Policy Context

Development Plan Documents

- 13.2 There are no saved policies of the Aylesbury Vale Local Plan (2004) or the Milton Keynes Local Plan that are relevant to socio-economic issues. The Milton Keynes Local Plan sought to maintain the balance between jobs and homes, avoid the need for commuting out of the borough, and maintain the regional strength of the City.

Milton Keynes Core Strategy (2013)

- 13.3 The Spatial Vision of the Milton Keynes Core Strategy expects Milton Keynes to continue to grow during the plan period to 2026, which is attractive to residents and which supports economic growth. Table 4.1 sets out the objectives of the Core Strategy. Objective 3 states:

“To allocate and manage the development of employment land and pursue a vigorous economic development strategy sufficient to deliver a minimum of 1.5 jobs for every house build in Milton Keynes so that the business sector and local economy are supported, existing firms can expand, new firms are attracted, the level of working skills among the local population is enhanced and the area's resident population can find work locally”.

- 13.4 Section 13 of the Core Strategy contains specific priorities to deliver the economic prosperity of Milton Keynes. These priorities include creating a diverse economy, delivering economic regeneration, developing skills and learning, supporting business, creating enabling infrastructure and promoting Milton Keynes as a premier location for inward investment. These priorities are supported in Policy CS15.

- 13.5 Section 13 also notes the contribution that leisure and culture make to the economy, in addition to the benefits these facilities have for local residents. Paragraph 13.16 states:

“The cultural sector has a key role to play in creating sustainable communities by improving the quality of life, health and well-being of the city but also contributing to a strong and innovative economy...”

National Guidance

National Planning Policy Framework (2012)

- 13.6 The need for planning policies to support sustainable economic growth appears throughout the NPPF. Paragraph 7 identifies the three strands of sustainable development; economic, social and environmental. The economic role involves building a strong, responsive and competitive economy by ensuring that sufficient land is available. The social role involves creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being. Paragraph 8 notes that *"economic growth can secure higher social standards, and well-designed buildings and places can improve the lives of people and communities"*.

- 13.7 Paragraph 17 identifies the twelve core land-use planning principles. The relevant socio-economic principles are as follows:

"proactively drive and support sustainable economic development to deliver the homes, business and industrial units, infrastructure and thriving local places that the country needs... (3rd bp);

always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings (4th bp);

take account of and support local strategies to improve health, social and cultural wellbeing for all, and deliver sufficient community and cultural facilities and services to meet local needs. (12th bp)"

Screening and Scoping Opinion

- 13.8 Following a lengthy period of pre-application discussion with both Aylesbury Vale District Council and Milton Keynes Council in January 2013 a Scoping Report was prepared. The findings of this early liaison with statutory and non-statutory consultees on this issue resulted in a number of technical issues being highlighted. However, despite the NPPF and Central Government regularly encouraging economic development and the much-needed provision of new mixed tenure homes, no comments were raised in relation to the social or economic impact of the proposal.

Assumptions, Deficiencies and Uncertainties

- 13.9 The empirical data used in the assessment is limited by the quality of the data that has been published or is available from independent and reliable sources.
- 13.10 Recently, published data is likely to reflect the current global economic downturn. This is reflected in the market conditions that exist towards the end of a prolonged double dip recession. Consequently, how the European Union, the Bank of England, Central and Local Government and the wider market will react in the short, medium or longer term is still unknown.
- 13.11 The Vale of Aylesbury Plan was withdrawn in February 2014 on the recommendation of the independent Inspector who had opened the examination in public. The rationale for this

recommendation was that the empirical evidence put forward by the local planning authority did not sufficiently demonstrate compliance with the duty to co-operate with adjacent boroughs and districts. It is unclear how the local planning authority will address the fact that its saved local plan is now out of date, or the deficit in the provision of allocated land for social and economic growth.

13.12 HS2 is currently planned to go through the District. It is uncertain how this will relate to the medium and long-term patterns of growth in the District.

13.13 A general election is scheduled to occur in 2015. The outcome of this is unknown and as such, attitudes to growth and the fiscal stimuli provided for recovery after this political event are unknown.

13.14 The site abuts land reserved for the opening of the East / West railway line. This is scheduled to be reopened for both passenger and freight traffic in the period 2014 –2017 and subsequently electrified. Preparatory work has already started on the alignment of the route with the commencement of scrub clearance and engineering work.

13.15 To the immediate west of the proposed Application Site are the former Salden Sidings. In the Consultation Draft of the Salden Chase Master Plan and Delivery (North East Aylesbury Vale) Supplementary Planning Document, January 2010 the sidings were proposed as the future location of a new East West rail station. Whilst this document was never formally adopted as part of the Local Development Framework and Aylesbury Vale District Council withdrew the Core Strategy to which it related and then withdrew the then emerging Vale of Aylesbury Local Plan, the future use of the sidings and their possible influence on the long-term connectivity of the proposal to Oxford, Milton Keynes, Bedford, Birmingham and London is unknown. Accordingly, until further announcements are made on the delivery of the East / West railway, the possible future use of this adjacent land as a station has been excluded from this assessment.

13.16 This chapter will comprise the following sections:

- Scope and Method of Assessment – an overview into the nature of the assessment and the approach adopted.
- Baseline Conditions – an assessment of the prevailing socio-economic conditions in the District (and where possible for the development site's immediate context area) in terms of the demographic profile, economic activity, unemployment, employment deprivation, skills and occupational structure, business base, housing stock and affordability, quality of living environment and aggregate deprivation. The section also presents a synopsis of business activity within and immediately around the development site.

- Assessment of Existing Social Infrastructure – assessment of the current supply of social infrastructure, in terms of health facilities, education facilities, sports and leisure services, emergency services and open space within the Application Site context area.
- Impact Assessment – this will comprise a statement of impacts in relation to the Proposed Development arising during both construction and operations, including:
 - construction stage employment impacts;
 - construction stage impact on existing economic activity on the site;
 - operational stage employment impacts;
 - operational stage demographic impacts;
 - operational stage appropriateness of social infrastructure; and
 - operational stage wider regeneration impacts.
- Mitigation Measures – proposed mitigation measures to address potential negative socio-economic impacts of the Proposed Development.
- Residual Effects – an outline of the residual effects of the Proposed Development once appropriate mitigation measures have been implemented.
- Conclusions – this section will provide a summary of the socio-economic impacts of the development.

Scope and Method of Assessment

13.17 The issues, which are addressed as part of this chapter, comprise:

- any impacts on the characteristics of the local population as a result of the Proposed Development that will be created;
- any impacts arising from the employment provision within the Application Sites and the number of jobs likely to be created as a result of the Proposed Development;
- any impacts arising from the proposed use of the site on the existing centres in the surrounding area;
- any impacts on the education provision as a result of the Proposed Development;
- any impacts on the provision of open space for play, sport and recreation as a result of the Proposed Development; and
- how facilities and services will be phased as part of the delivery.

- 13.18 The above criteria were considered through undertaking an initial desktop analysis of local information including the 2011 Census results to examine initial baseline conditions.
- 13.19 There are inherent difficulties associated with determining the significance of socio-economic impacts. Therefore, it is inevitable that there will be a degree of subjectivity in assessing the nature of the impacts described. Notwithstanding this factor, the chapter does describe the principal effects in terms of whether the impact and any residual effects are beneficial or adverse; permanent or temporary; and major, moderate, minor or insignificant.

Reference Material and Assessment Method

- 13.20 The baseline information provided in this chapter has been sourced from the Office of National statistics, regional and local records, and relevant studies undertaken on behalf of Buckinghamshire County Council, the Aylesbury Vale District Council and Milton Keynes Council. This includes empirical evidence from the recently adopted Milton Keynes Core Strategy 2010-2026 -that includes the areas to the immediate north and east of the Application Site. Reference has also been made to the recently discredited evidence behind the Vale of Aylesbury Plan (VAP). The rationale for this, is that it is the only locally collected database that was available following the failure of the local planning authority to update its previously adopted Local Plan of 2004. In addition, reference is made to the Council's own published Annual Monitor Reports and factsheets.

Assumptions and Limitations

- 13.21 In the context of the analysis below, it is important to note that the application is for outline planning permission with all matters reserved, except for access for a mixed- use sustainable urban extension on 143.32 Ha of land to the south west of Milton Keynes. Consequently, nothing outside the scope of this proposal has been assessed.

Baseline Conditions

Demographics

- 13.22 The total population of the Aylesbury Vale was estimated at 174,100 in 2011 (2011Census), compared to a total population of 8,634,750 in the South East region in the same year. Table 13.1 below illustrates the changes between the last two Censuses.
- 13.23 Around 40% of the population live in the main town of Aylesbury; that is the focus for employment and social services in the district. Documents, such as the previously published VAP Employment Topic Paper of April 2013, unfortunately disregarded the huge economic influence of London to the south (Aylesbury to Marylebone in an hour), Milton Keynes immediately to the north, and to a lesser extent Leighton Buzzard and Luton to the east and Bicester and Oxford to the west.
- 13.24 The Aylesbury Vale District's population has grown by some 5% between 2001 and 2011, which represents a comparatively low growth rate compared to that of Milton Keynes (17%), Buckinghamshire (6%) and South East (8%). In addition to this, the number of residents aged 60 to 65 have registered a proportionally high increase, with an increase of 48%. In

contrast, Buckinghamshire’s comparative increase was 32% and the South East of England was 38%.

13.25 For those aged 80 - 84 there has been a 29% increase between the 2001 and the 2011 Census figures for Aylesbury Vale. In contrast, the increase for the South East over the same timeframe has only been 14%.

13.26 Over the same time period, it was recorded that just 11.1% of the population of Milton Keynes was over 65 compared with 16.3% in England.

13.27 In contrast to this, the 25 – 34 years age group has experienced a relatively large decrease in population of 6%. This is higher than for Buckinghamshire and the South East region at 5% but can perhaps be partially explained by the close proximity of London and to a lesser extent Milton Keynes.

13.28 This largely indicates that the district of Aylesbury Vale has become increasingly attractive to those people over 65 years of age, while residents in younger age groups seem to look for opportunities elsewhere, such as in neighbouring Milton Keynes, and hence the decrease in that age group population. Of residents in working age in general, Aylesbury Vale’s largest age group at working age are the 45 to 49 year olds with 27% growth.

Table 13.1 Demographic Characteristics of the Area

Age Bands	Aylesbury	MK	Bucks	South East	England
0-19 year olds	1%	26.9%	3%	35%	33%
20 - 24 year olds	4%	5.6%	4%	15%	20%
25 - 29 year olds	-6%	7.9%	-5%	5%	10%
30 - 34 year olds	-18%	8.4%	-14%	-10%	-8%
35 - 39 year olds	-17%	7.8%	-13%	-10%	-10%
40 - 44 year olds	6%	7.7%	6%	11%	11%
45 – 49 year olds	27%	7.2%	23%	26%	24%
50 – 54 year olds	5%	6.4%	1%	1%	2%
55 – 59 year olds	8%	5.7%	2%	4%	6%
60 – 64 year olds	48%	5.3%	32%	38%	32%
65 – 69 year olds	25%	3.6%	21%	73%	18%
70 – 74 year olds	22%	2.7%	16%	6%	4%
75 - 79 year olds	14%	2.0%	20%	4%	2%
80 - 84 year olds	29%	1.5%	29%	14%	13%

85 and above	31%	1.5%	30%	25%	24%
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- 13.29 With regard to Aylesbury Vale’s housing market, the analysis shows that there is a comparatively high proportion of detached and semi-detached housing and a low proportion of flats, maisonettes or apartments. The analysis of the type of tenure indicates that most dwellings are owner occupied (72%) and privately rented (13%) and that Aylesbury Vale has a relatively low proportion of social housing provision (shared ownership 1%, social rented 13%). In particular, the provision of social housing in the district is below the national average, and the Vale of Aylesbury Annual Monitoring Report 2012 (AMR) states that the district continues to face major housing challenges, not least in terms of affordable housing, as the average house price is more than 8 times the average income.
- 13.30 The Aylesbury Vale currently faces a significant identified shortfall of affordable housing. In order to address this, the former South East Plan required Aylesbury Vale District Council to ensure that 35% of all new housing delivered in the District is affordable. Through the previously emerging work to support the Vale of Aylesbury Plan in August 2012, the Council published documents showing the need for affordable housing. This was highlighted in the April 2013 Housing Topic Paper which indicated that 588 new affordable homes are needed each year. However, in recent years the average actually built and then occupied, according to the Council’s own figures, is up to 334. This equates to a 43% shortfall.
- 13.31 With regard to housing need and affordable housing, the analysis revealed that Aylesbury Vale continues to face major challenges. The number of households on the housing register and the ratio of average house prices have both increased. Consequently, these trends suggest that in order for Aylesbury Vale to keep its generally low level of deprivation, these factors will need to be addressed, by promoting significant areas of new development.
- 13.32 In contrast, in the Centre for Cities publication ‘Cities Outlook, 2014’, Milton Keynes is identified as the second fastest growing population in the whole of the UK. Between 2002 and 2012, it annually grew by 1.6% to increase its population from 215,100 to 252,400. Of this growth a high percentage were young people, many of whom had been attracted to the area by the low rate of house price inflation.

Employment

- 13.33 Labour supply data suggests that the number of people in Aylesbury Vale who are economically active is similar to that of the South East region. Aylesbury Vale has an economic activity rate of 78.3%, compared to the South East, which has an economic activity rate of 79.4%. In addition to this, whilst unemployment and claimant count levels in Aylesbury Vale have risen slightly it is lower than many of its comparators.
- 13.34 In terms of job density, the published data in table 13.2 below suggests that Aylesbury Vale has a comparatively low job density rate of 0.74. This is further supported by the decrease in residents aged between 25 and 34, suggesting that the population is increasingly tending to look for work elsewhere: notably London, Oxford, Hertfordshire and Milton Keynes. This suggests that any employment- creating initiatives in Aylesbury Vale are likely to reduce this adverse trend.

Table 13.2 Job Density Per Resident

Area	Job Density Per Resident
Aylesbury Vale	0.74
Milton Keynes	1.01
Buckinghamshire	0.86
South East of England	0.89
England	0.88

- 13.35 With regards to employment, Aylesbury Vale has witnessed a decline of 4.7% between 2008 and 2012. This is up to 0.9% higher than Milton Keynes but is better than the average registered increase for England 7.8%.
- 13.36 Within the district's employment sectors, health (14%), education (10%), business administration (9%) and professional / scientific (generally linked to Silverstone) (6%) are the most dominant. Nevertheless, in the current climate, developments in these sectors are likely to remain sluggish for as long as the regional and national economy's recovery is slow.
- 13.37 Again, in contrast, in the Centre for Cities publication 'Cities Outlook, 2014', indicates that Milton Keynes has a public to private ratio of jobs at 3:8. This factor is heightened by the fact that Milton Keynes has the seventh highest earnings per week of any city in the study, despite there having been a drop of some 6% in the real value of earnings during 2012 to 2013.

Assessment of Existing Social Infrastructure

- 13.38 As part of the establishment of the baseline provision of social infrastructure, a review of the current health and educational facilities was undertaken, along with an assessment of what open space facilities and local facilities are available for the proposed community at South West Milton Keynes. In addition to existing facilities, committed developments were also investigated to determine their location in relation to the proposal and evaluate their proposals and status.

Education Facilities

- 13.39 Buckinghamshire County Council is the Local Education Authority for Aylesbury Vale and as such the Application Site. Milton Keynes Council is a unitary authority and as such is responsible for the education of all children to the immediate north and east of the Application Site. Education in Aylesbury Vale is currently provided on a 5-8 year old pupil age for first schools, an 8-11 year old pupil age for middle schools and an 11-18 year old range for secondary schools. In Milton Keynes, the majority of schools now either cater for the under 11s or 11 - 18 year old range.

Early Years Provision

- 13.40 There are two junior schools located in the area surrounding the site in Aylesbury Vale; these are Newton Longville Church of England School, which has a nursery facility and Drayton Parslow Village School.

Primary Education

- 13.41 There are seven primary schools located within the catchment area of the site: Chestnuts Primary School in Bletchley, St. Thomas Aquinas Catholic Primary School in Bletchley, Holne Chase Primary School in Bletchley, Tattenhoe Park Primary School, Gilesbrook Primary School in Tattenhoe, Newton Longville Church of England School and Mursley Church of England School. In addition, in Bletchley, adjacent to Windmill Golf Club, there is the independent MK Preparatory School.

Secondary Education

- 13.42 Pupils from the assessment area can apply for admission to any of the district's schools which are in the catchment area of the Application Site, subject to the individual school's entrance requirements. The three closest secondary schools in the Aylesbury Vale catchment area are the Cottesloe School in Wing, the Royal Latin Grammar School and the Buckingham School in Buckingham.
- 13.43 Alternatively, slightly further away from the Application Site are the Sir Harry Floyd Grammar School, the Grammar School, the High School and the newly built Aylesbury Vale Academy in Aylesbury.
- 13.44 Post 11-year-old education in Milton Keynes is provided in neighbouring Shenley Brook End Secondary School, The Lord Grey School and the Leon Academy. Sixth form provision is additionally provided at Milton Keynes College, Bletchley.

Post 18 Education

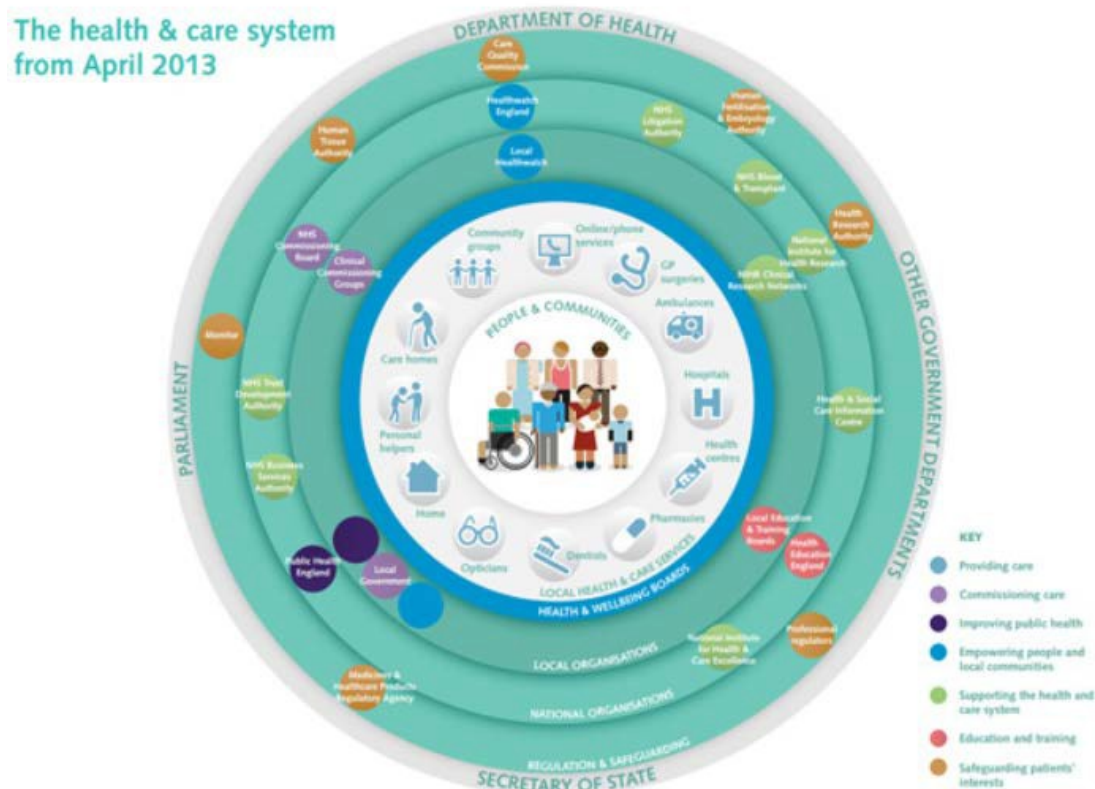
- 13.45 In Aylesbury Vale, Post 18 educational provision is provided for in the privately funded Buckingham University. In contrast, Milton Keynes offers educational opportunities at University Campus Milton Keynes, which has links to Bedfordshire University; some five miles to the north west of Milton Keynes is Cranfield University, which specialises in post degree education and at the Open University, which is the country's largest university.

Special Educational Needs Schools

- 13.46 Within Aylesbury Vale there are eleven dedicated schools within the public sector for the provision of special educational needs. Local schools to the Application Site include Brooker Park School in Aylesbury and Furze Down School in Winslow. In addition, locally there is The Puzzle Centre specialist pre-school in Middle Clayton which is run by a charitable trust. For older children bursaries are available at Akley Wood independent school.
- 13.47 Within Milton Keynes, special educational needs facilities are provided by Walnuts School in Hazeley, White Spire and Roman's Field in Bletchley. In addition, local schools such as Rickley have a special needs unit within them

Health Facilities

- 13.48 Until recently health care was provided by Primary Care Trusts. However, in April 2013 radical changes were introduced by the Coalition Government that saw the abolition of Primary Care Trusts and Strategic Health Authorities. The structure of the new system is shown in the NHS organisational diagram below.



- 13.49 These changes have an effect on who makes decisions about NHS services, how these services are commissioned, the way money is spent and how decisions about future provision are undertaken. Part of this change in the delivery of services has been the introduction of the private sector.
- 13.50 In addition, local authorities have been given a bigger role, assuming responsibility for budgets for public health. Health and wellbeing boards now have duties to encourage integrated working between commissioners of services across health, social care, public health and children's services, involving democratically elected representatives of local people. Local authorities are expected to work more closely with other health and care providers, community groups and agencies, using their knowledge of local communities to tackle challenges such as smoking, alcohol and drug misuse and obesity.
- 13.51 Hospitals are now managed by acute trusts. The Acute trusts provide a wide range of medical services, such as nurses, doctors, physiotherapists, radiographers, podiatrists, speech and language therapists, counsellors, occupational therapists, psychologists and healthcare scientists. Some acute trusts are regional or national centers for more specialised care;

such as Stoke Mandeville which has a specialist spinal unit. There are four hospital bodies in the Aylesbury Vale area:

- Buckinghamshire Healthcare Trust (BHT)
- Milton Keynes Hospital
- Oxford University Hospitals
- Luton and Dunstable University Hospital

13.52 The Oxford Health NHS Foundation Trust provides mental health services to people of all ages in Oxfordshire, Buckinghamshire and the surrounding counties, which includes the Aylesbury Vale area. Mental illness affects one in four people in their lifetime, and the shared vision is to support people's recovery from mental illness and to promote wellbeing whilst allowing them to stay in the community.

13.53 There is one hospital located in Aylesbury Vale: the Stoke Mandeville Hospital. In addition, in central Milton Keynes is the MK General Hospital. Both are undergoing a series of comprehensive reviews, the hospitals are operating close to capacity, and that their future needs will be met through plans set out in their own emerging development plans – which are subject to on-going high-level fiscal reviews. For example at Stoke Mandeville a new Acute Medical Care unit was opened in December 2013 in order to upgrade its A+E facilities and at Milton Keynes consideration is being given to improving maternity care and the faster provision of cancer care.

13.54 Since April 2012 Clinical Commissioning Groups have become responsible for commissioning health and adult social care for local people and delivering local community health and adult social care services (including GPs, dentists, pharmacies, opticians etc.). The annual reports of both the Aylesbury Vale Clinical Commissioning Group and the Milton Keynes Clinical Commissioning Group state that key concerns are delays in the provision of cancer care, cancelled operations, infection rates in hospitals and a lack of feedback from past patients. Action has been taken by both CCGs and their joint providers to address these concerns. Both reports considered that GPs were operating within their capacity and, at this point in time, there are no plans to increase supply. Private dental surgeries and pharmacies are delivered under open market conditions and are based on the strength of local demand. Therefore, it is concluded that where demand exceeds supply, the gap will be met by an individual pharmacist or dentist opening a shop/clinic in the area.

Community Facilities

13.55 AVDC publishes a guide to explain the wide variety of venues that are appropriate for activities and social events. These may include wedding receptions, a family or child's party, a club or social meeting or a sports activity. This demonstrates that there is currently an adequate supply of youth, leisure and community centres in the wider area to meet current demand.

13.56 The main provider of the existing local facilities, some 500m to the south of the

Application Site, is the Longueville Hall in Newton Longville. This was opened in 2000, has a hall, lounge, commercial kitchen and a bar and as such can cater for a wide variety of events with space for a 150-person banquet or a 200-seat theatrical production. The building has a separate sports facility with showers available for hire in conjunction with the adjoining sports field. The entire facility is served by a 70-space car park.

- 13.57 To the north of the Application Site, the primary location for community facilities within 2km of the Application Site are the facilities at Westcroft in Milton Keynes. In this district centre, 1.5Km to the north of the Application Site, there is additionally a day nursery, a health care centre, a library, a dental practice and an optician.
- 13.58 Further east in Bletchley additional community facilities are provided in the form of a doctor's surgery, veterinary clinic, a community centre, a nursing home, a range of public houses, and a fire and police station.
- 13.59 Further afield to the north east of the site in Furzton there are a range of community facilities that include a meeting place and community centre, a church and a further doctor's surgery. These facilities are listed in the following Table:

Table 13.3 Existing Facilities within 2km of the Application Site

Location	Facility
Bletchley/ Far Bletchley	
Shenley Road/ Buckingham Road	The Three Trees Public House
Shenley Road	The Swann Public House
Off Blaydon Close - Chepstow Park	Allotments Playing Fields Local Parks (2 play areas).
Whiteley Crescent / Newton Road	Recreation Ground and Play area
Newton Road Local Centre	Tesco Express shop Co-op shop Hair Salon (across road)
St Marys Avenue Local Centre	Off-Licence Newsagents Fish and Chip shop Chemist Bridal Wear Chinese Takeaway Dog Grooming Hair Salon Electronic Repairs Payphone
Wincanton Hill	Post box
St Catherine's Avenue	Post box Payphone
Whiteley Crescent	Post box
St Clements Drive	Play Area
Chepstow Centre	Premier shop Community Centre
St Georges Road	The Chestnuts School Day Nursery

St Marys Avenue	St Thomas Aquinas RC Combined School
St Andrews Road	Place of Worship
Conway Crescent	Place of Worship
Shenley Road	Phone box
Windmill Hill Golf Course	Golf Course Associated facilities
Warwick Road	Activity Centre Post box
Porchester Close Local Centre	Fish and Chip Shop Petrol Station Costcutters West Bletchley Council Offices Royal Oak Club Post Office Martins Shop Barbers Shop Betting Shop Veterinary Clinic Pharmacy Chicken Takeaway Car Wash Premier shop Cash Point Phone booth Post box Small play area West Bletchley Community Centre Place of worship
Windmill Hill Golf Course	Golf Course Associated facilities
Mersey Way	Post box
Severn Way	Premier shop Bletchley Youth Centre Playing Fields
Knaresborough Court	Play Area
Tattenhoe Lane	Post box Wishing Well Public House
The Don	Open space
Hunstanton Way	Post box
Sunningdale Way	Play Area
Kenilworth Drive	Post box
Whaddon Way	Place of Worship
Tweed Drive / Muirfield Drive	Place of Worship
Avon Grove	Play Area Post box Payphone
Tweed Drive	Whaddon House Medical Centre Place of worship
Trent Road	River's Adult Continuing Education (ACE) Centre
Tattenhoe Lane	Tattenhoe Lane Playing Fields Post box Milton Keynes Preparatory School

Tattenhoe Lane	Royal Air Force Association Skate Park
Shenley Road	Roman Fields School
Muirfield Drive	Post box
Windmill Hill Drive	Post box Mobile Library
Otter Close	Play Area
Newton Longville	
Berry Road/Greenway	Berry Road Shops: Village shop Chinese takeaway Hair Salon Post box
Westbrook End	Crooked Billet Public House and Country Restaurant Post box
Church End	Village Hall Post box
Whaddon Road	Place of Worship Payphone
Bletchley Road	Place of Worship
Church End	The Newton Bar and Bistro
School Drive	Newton Longville Church of England Primary School
Greenway	Mobile Library
Emerson Valley / Tattenhoe	
River Valley Centre	Hair and Beauty Salon Fish and Chip Shop/Chinese Takeaway Standing Way Meeting Place – Community Centre Indian Restaurant Pharmacy One Stop shop The Clocktower Public House (Hungry Horse Restaurant) Post box Payphone
Bowland Drive	Emerson Valley Local Centre: Co-op Community Centre Chinese Takeaway Post box Emerson Valley Sports Pavilion - Milton Keynes RUFC; sports pitches District Park Play Area
Standing Way H8	BP Petrol Station and M&S Store
Quantock Crescent	Play Area
Taunton Deane	Play Area
Sutton Court	Play Area

Sykes Croft	Play Area
Chipping Vale	Post box
Bowland Drive/ Roeburn Crescent	Howe Park School
Chaffron Way H7/ Tattenhoe Street V2	Howe Park Wood
Bowland Drive	District Park Play Area
Rosemullion Avenue	Allotments Play Area
East Chapel	Play Area
Holbourn Crescent	Giles Brook Combined School Post box Local Park
Portishead Drive	Place of Worship Prince George Public House Open space
Langerstone Lane	Play Area
East Chapel	Play Area
Rhoscolyn Drive	Post box
Off Holbourn Crescent	Tattenhoe Pavillion Sports Centre Sports Pitches District Park, Playing Fields and Play Area
Various	Tattenhoe Linear Park/ Tattenhoe Valley Park - open space and play facilities
Walbank Grove	Shenley Brook End Secondary School
Westcroft / Tattenhoe Park	
District Centre	Morrisons Supermarket Morrisons's Petrol Station Boots the Chemist Next Pet Store Instore QS McDonalds Pizza Hut Westcroft Library Westcroft Health Centre
Various	National Cycle Route 51
Barnsdale Drive	Nut and Squirrel Public House/ Restaurant
Exbury Lane	Play Area
Tattenhoe Park	Priory Rise Primary School
Other	
Buckingham Road	Thrift Farm; Adult Learning Centre

Cultural and Leisure Facilities

13.60 Aylesbury Vale's most recent published audit of cultural and leisure facilities was undertaken in 2003 by Torkildsen Barclay Leisure Consultants. This qualitative and quantitative assessment included:

- community and village halls;
- parks and open space;
- playgrounds;
- playing pitches and pavilions;
- other outdoor facilities;
- indoor sports centres and swimming pools;
- arts and entertainment facilities; and
- facilities for young people.

13.61 This led to the promotion by the Council of a tariff to pay for new facilities for schemes of more than four dwellings and the provision of a recommended standard in the Sport and Leisure Facilities Supplementary Planning Guidance: Companion Document Ready Reckoner (2005) of 2.47 hectares of outdoor play space per 1,000 residents.

13.62 Within Milton Keynes 20 percent of the overall land use budget has been allocated as outdoor leisure facilities, linear parks, district parks or water bodies in order to provide a generous provision of green infrastructure. Milton Keynes Council's Open Space Strategy, 2007 seeks to carry forward the 20 percent minimum to perpetuate open space as one of the area's defining characteristics.

Potential Impacts

13.63 The Proposed Development will affect the existing local socio-economic environment both during construction and once the site is occupied and the planned facilities are in full operation. This section provides an evaluation of the impacts and focuses on the following key aspects:

- construction stage employment impacts – an assessment of temporary construction jobs created on the local economy as a result of the expenditure incurred on the Proposed Development;
- construction stage on existing economic activity on the site – an assessment of the impacts on the existing businesses and employment uses currently based on the site or immediately adjacent to the site as a result of the construction;
- operational stage employment impacts – an assessment of the employment impacts of the development once the employment and other commercial floorspace is delivered as part of the development;

- operational stage demographic impacts – an assessment of the likely scale and age structure of the population who are likely to live in the new development once it is completed;
- operational stage appropriateness of social infrastructure – an assessment of current (or increased) pre-defined elements of social infrastructure in light of the projected increase in demand as a result of the population generated from the Proposed Development; and
- operational stage of wider regeneration impacts – an assessment of the development's impacts on the identified socio-economic priorities for the local area and contribution towards socio-economic policies and strategies reviewed as part of this assessment.

Construction Stage Employment Impacts

13.64 One of the key economic impacts is evaluated in terms of the additional employment directly generated by construction activity. Given the scale of the proposals, the development of the site will lead to the creation of both full and part time construction jobs on site over a significant timeframe. The precise period of time it takes to complete the Proposed Development, which may exceed seven years, will depend on a number of inter related factors, these include:

- the rate at which infrastructure upgrades are provided by statutory providers;
- the number of phases and developers which ultimately build-out the site;
- the availability of finance to fund the delivery of and off site infrastructure;
- the rate at which homes are built by the house builders;
- the rate at which on site educational, cultural and leisure facilities are provided;
- the rate at which other homes are constructed in the area's housing market;
- the buoyancy of the regional economy;
- the fluidity of the regional housing market; and
- the availability of mortgages to house buyers.

Construction Stage on Existing Economic Activity on the Site

13.65 The Application Site includes land currently used by three separate farming businesses. These businesses take the form of:

- Dagnall Farm;
- a small part of the Cook family farm land holding; and

- part of Hurdlesgrove Farm.
- 13.66 In these circumstances, the Application Site provides agricultural work for less than five full time and tenant farmers.
- 13.67 In relation to Dagnall Farm, a farmer who has another 260ha in the local area is a short-term tenant of the entire 20ha field. Consequently, this loss of productive land is likely to have a low impact on the economic support of local households.
- 13.68 A hobby / part time farmer currently occupies the land owned by the Cooks under a short-term tenancy. As this part time farmer also has access to other land, it is unlikely that the loss of these 16ha will have a significant economic impact on this individual household.
- 13.69 Hurdlesgrove Farm extends to some 485ha in total. Only a small percentage of this total landholding is therefore likely to be lost when this proposal is delivered. Lessening the economic impact further is the fact that it is farmed as a satellite to another farm at Whitchurch. As stated in the section of this document, which details the impact of the proposal on the loss of farming land, this loss of land, whilst sizable in area, is unlikely to materially impact on the economic viability of the entire land holding and the households that rely upon it as a source of income.
- 13.70 Furthermore, the Proposed Development will not be built as a single phase. Consequently, land will only be removed from economic agricultural production as the site progresses over time. This is likely to lessen the impact of the loss of land, as the available area to farm is likely to decrease slowly over time rather than all of it being lost at one specific point in time.
- 13.71 The precise phasing of delivery is unknown, accordingly, the pattern of delivery of similar sized sites in the Milton Keynes area has been assessed in order to assess the most likely scenario. The sites considered were Broughton Gate (1,500 new homes) and Brooklands (2,501 new homes and community, cultural and leisure facilities). In each instance development commenced with a phase of on and off-site advanced infrastructure. This was then followed by a number of house builders who constructed dwellings at different entrances to the site from the established public highway. As subsequent on-site infrastructure triggers were reached, separate contracts commenced which in turn allowed other parcels of development to commence.
- 13.72 Assuming that this pattern of delivery is adopted on this site, then it is likely that both infrastructure and housing contractors will provide in excess of 150 construction jobs at any one point in time, for the majority of the duration of the delivery of the project. This would more than safeguard the existing economic activity, but also support its significant expansion on the site and contribute significantly towards local economic priorities. Therefore, the construction stage impact on existing economic activity can be classified as moderate positive and long term.

Operational Stage Employment Impacts

- 13.73 An Employment Land Assessment has been undertaken that provides an assessment on the

quantity and quality of employment land proposed to serve the development. This document highlights some of the key employment impacts of the Proposed Development and should be referred to for detailed information on this aspect of the proposal.

13.74 The Aylesbury Vale Economic Development Strategy, 2009 sought for the period 2008 – 2026 a ratio of one new home per one new job. More recently, work on the withdrawn Vale of Aylesbury Plan has distanced the Council's position from such a direct relationship due to inward migration to the area. However, it is still expected that some 6,000 new jobs be created over the same timeframe as 6,000 new homes are built and occupied. Consequently, in Aylesbury Vale there is no longer an explicit policy link between homes and job creation.

13.75 The empirical evidence behind the Milton Keynes Core Strategy was assessed by both the Council and its consultants. Both parties noted that the formerly adopted South East Plan had an intention to seek a ratio of 1:1 jobs for housing to secure no net change in the overall net out-commuting but that this was not intended as a tool to constrain development. Building upon this base, the up dated Employment Land Study, 2007, resulted in a long-term policy desire for there to be 1.5 new jobs for each new home. In considering this evidence at the Milton Keynes Core Strategy Inquiry, the Inspector accepted this aspiration with the understanding that it should:

- be rephrased to include references to the need to support employment objectives and comply with the NPPF;
- include all forms of employment, e.g.: the service sector, education, health and employment sector not just those jobs created in office, industrial or distribution schemes;
- again, not be a constraint on development; and
- be revised at an early stage if the Council adhere to their objective of encouraging the up skilling of the regional employment market and the encouragement of new executive housing to the area.

13.76 It is self evident from the Inspector's assessment of local employment policies that there is no direct adopted policy requirement for a certain number of jobs to be provided per new house, in order to encourage a more sustainable and self- contained employment market. Instead, in line with aspirations of the NPPF whilst sustainable patterns of living and working are an imperative neither should act as a brake on the delivery of future homes or jobs.

Operational Stage Demographic Impacts

13.77 The Proposed Development seeks to deliver up to 1,855 new mixed tenure homes. Application of the ONS's most recent September 2012 figures indicates that the median national annual household income is £18,668. The Vale of Aylesbury Plan Annual Monitoring Report, 2012 indicated that, for those that were economically active and in work, the median gross income is £26,000 and that Aylesbury Vale is on a par with this figure. The Milton Keynes Council's Planning and Economic Development Annual Monitoring

Report 2011-12, indicated that the median income for the area is slightly higher than that of both the South East and Aylesbury Vale. In these circumstances, using the Council own published data it is considered robust to use the figure of £26,000 as a multiplier of the potential of the new homes in the site. This equates to the development injecting some £48,230,000 per annum into supporting the local economy.

13.78 The 2011 Census states that the average household in the UK is 2.3 people. The Vale of Aylesbury Annual Monitoring Report, 2012 indicates that the average household size in the district is 2.47 people per house (2011) and it is projected that by 2026 this may fall to 2.32. The Milton Keynes 2011 Census Profile, 2011 indicates that in Milton Keynes, with its slightly younger population, the average household is 2.5 people which contrasts with the published figure for 2001 which was only 2.46. A jointly commissioned report by Aylesbury Vale District Council, Bedfordshire County Council, Buckinghamshire County Council, Mid Bedfordshire District Council, Milton Keynes Council and Milton Keynes Partnerships in April 2008 into the likely number of residents of Milton Keynes and its hinterland in 2026 indicated that the average household size may decline to 2.29.

13.79 More recently, the DCLG has released its Household interim Projections for England in the period 2011 to 2021. This shows that:

- the number of households in England is set to increase by 2.2 million (an average of 10% per annum);
- the projections represent a decrease in average household size from 2.36 to 2.33 in ten years;
- collectively, couple households are likely to grow by 87,000 per year between 2011 and 2021;
- 66% of the increase in households will not have dependant children;
- less households are likely to be headed by younger adults as this age group are forced to share or continue living with their parents as they can not afford to purchase their own home;
- in the next ten years, the number of households is projected to grow by between 5 and 10% in 46% of all local planning authority areas. In contrast, 281 out of 326 local authorities have predicted a decrease in average household size over the same period;
- changes in local demographics are likely to account for some 98% of the household formation in the period 2011 to 2021; and
- the national 2011 projections show a lower growth in households compared with 2008 projections. This potentially equates to 24,900 fewer households per year being created, as first time buyers are unlikely to be able to afford to purchase a home in the period 2011 to 2021.

13.80 With these published figures in mind, it is evident that the initial phases of the project are likely to deliver higher household sizes than the latter phases.

13.81 In order for adequate facilities to be provided the officers at Aylesbury Vale District Council have requested during the working up of the master plan that 2.56 people are assumed to be the average household size for the master planning of the entire development. Whilst this figure is precautionary and is clearly far higher than that published in national, regional or local figures, it has been adopted by the applicant in order to provide a robust proposal. Consequently, using the figures suggested by the local planning authority it is likely that the 1,855 new mixed tenure homes will accommodate circa 4,825 residents.

13.82 The predicted 4,825 new residents will inevitably affect the demand for key community services (e.g. education and health) within the immediate vicinity of the development proposals. As the new residents are likely to use facilities in both Aylesbury Vale and Milton Keynes, the subsequent section of this assessment disregards the administrative boundary, as this is an arbitrary parameter on the movement of people wishing to use local services.

Operational Stage Appropriateness of Social Infrastructure

13.83 This section of the chapter investigates what impact the new residents are likely to have on the existing provision of health facilities, education facilities and other community infrastructure. The assessment adopts a three-tier approach, the three elements examined are:

- baseline conditions;
- new social infrastructure planned or under construction; and
- assessment of development framework plan.

13.84 To assist the pre-applications discussions with the local authority, an initial audit of the facilities that were available within in five kilometres of the centre of the Application Site was undertaken in March 2013. To ensure the facilities were still available at the time this section of the Environmental Statement was written, the audit was repeated in March 2014. The facilities illustrated on Figure 13.1 include:

- district and local centres;
- places of education (university, colleges, schools and libraries);
- village halls / meeting places;
- medical facilities (General Hospitals, General Practitioners, dentists, pharmacies and vets);
- leisure facilities (National Bowl, leisure centres, public golf courses, district and linear parks and woodland);

- major transport nodes and routes (trunk roads, railways stations and canals); and
- the administrative boundary between Aylesbury Vale District Council/Buckinghamshire and the Unitary Authority of Milton Keynes.

13.85 It is self-evident from this repeated baseline assessment of the facilities within 5 km of the Application Site, that this part of Aylesbury Vale is a rural area with most villages having a church / meeting place / village hall and very few additional community facilities. In complete contrast, Milton Keynes is an urban area with a wide range of community facilities to serve its residents and those that wish to travel from the rural hinterland to use them. Indeed, Milton Keynes has the appearance and level of services available of a fully functioning, economically highly successful, regional centre.

Appropriateness of Education Provision

Baseline Conditions

13.86 Responsibility for provision of education facilities rests with Buckinghamshire County Council, as the Local Education Authority. However, as the site directly abuts Milton Keynes and new residents are likely to look towards Milton Keynes instead of Aylesbury or its rural villages for services, the impact on their level of educational provision has also been considered as part of the master planning of the proposal.

13.87 Outside mainstream education, people with special needs are frequently assessed by the relevant Local Education Authority, so the best possible support can be provided for them initially in the local community and, as a last resort, in a specialised school. Consequently, a tiered approach is frequently provided in both Buckinghamshire and Milton Keynes. This is likely to take the following form:

- allocation of a teaching assistant to an individual who is taught in a mainstream school;
- creation of a specialised unit with teacher and support staff at a mainstream school;
- educating the person in a specialised school which caters for the individuals needs; and
- bursaries to private educational facilities with particularly specialised teachers.

13.88 There is already a wide range of special needs provision. However, if this is suitable for a person with special needs who lives at the Proposed Development or not, will largely depend on the nature of their personal circumstances.

Assessment of Development Framework Plan

13.89 The development framework plan makes provision for 3.0Ha of land in order to provide a serviced site for a primary school with ancillary early year's provision, and a 5.2Ha serviced site for a satellite secondary school with a facility for students post 16 years of age. This level of provision has been master planned, in line with the requirements of the local education authority, to meet the majority of the mainstream educational needs that

are likely to be generated by the new residents of the Proposed Development.

13.90 As with the provision of local retail facilities, provision for local education facilities is a key element for the encouragement of sustainable patterns of activity for developments of this scale and nature.

13.91 Whilst educational self-containment in order to minimise travelling to and from nursery / school is the developer's intention, a number of other factors will influence this movement pattern. These factors, which are largely outside the control of the developer and are indefinable at this stage in the development include:

- The birth rate of new children from the residents who live in the development;
- Parental Choice: This is particularly the case when different forms of education are available in the form of comprehensive, grammar school and private school provision;
- The availability of places: It is therefore important that the timing of the school provision is carefully considered to encourage and facilitate as many local children to attend on site facilities as possible;
- The size of schools varies: Some parents will be attracted to a new modern school whilst others will seek to support the more small-scale rural schools in the outlying villages. This may go some way to reverse the generally declining number of children going to rural schools there by strengthening those local, sometimes rather isolated and under resourced communities;
- As Milton Keynes continues to grow some of its existing population will undoubtedly move into the development. For these families, who already have links with their existing communities and schools, they may retain their existing school places in preference for taking the planned educational places in the new development; and
- The changing demographics of the UK indicate that with more partnerships / marriages ending in separation / divorce on occasions this results in children having a bedroom with each parent and as such this can skew the factors previously identified; and
- Frequently, if Local Authority transport is not available to collect children from home and take them to and from school, then children are taken to school as part of the daily commute to work. In these circumstances ease of movement and the direction of both part time and full time employment can influence educational choices.

Summary

13.92 The analysis shows that the Proposed Development will inevitably have an impact on existing and planned educational facilities. Some of these impacts may be positive (for example

the support of local village schools and the provision of new improved facilities in new schools). A lesser number may be negative in that established local schools may be overwhelmed with new children, or schools further afield, where residents currently live, may lose children and thereby the viability of the existing schools may suffer.

- 13.93 However, with the provision of a suitable level of educational provision onsite and the provision of financial contributions in the form of planning obligations, it is considered that overall educational choice will be improved and, as such, the impact of the development is likely to be relatively minor but positive.

Appropriateness of Health Provision

Baseline Conditions

- 13.94 Modern day health provision is provided by an evolving blend of public and private facilities. This situation is complicated further by the on going changes to the National Health Service (NHS) at both a local and national level. In addition, private facilities are established, expanded or closed at an unpredictable rate.
- 13.95 Nationally, the NHS is split into ten regions that are overseen by strategic health authorities. Strategic health authorities are in charge of all NHS health services in their area, making sure they are run well and improving. South Central Strategic Health Authority is responsible for Buckinghamshire and also covers the counties of Berkshire, Oxfordshire, Hampshire and the Isle of Wight.
- 13.96 Buckinghamshire Healthcare NHS Trust is part of the NHS and a service provider organisation. Since April 2010 it has been responsible for both the Buckingham's acute hospital and community health services. Community health services include:
- district nursing;
 - health visiting;
 - intermediate care;
 - occupational and physiotherapy;
 - community dental services;
 - speech and language therapy; and
 - palliative care.
- 13.97 As well as being a major provider of community and general hospital care, the Trust is renowned for its specialist services. Stoke Mandeville Hospital is home to the internationally recognised National Spinal Injuries Centre, one of only eleven such centres of expertise in the UK. It is also a regional centre for burn care, plastic surgery and dermatology, and recognised nationally for its urology and skin cancer services.
- 13.98 There is a strong working partnership between the NHS and the local authority Buckinghamshire County Council, which is responsible for providing social care. A good example of this relationship is within children, young people and families' services which are linked via an over-arching Local Safeguarding Children's Board.

- 13.99 Community health professionals seek to support Buckinghamshire families, children, people with special needs and older people in their homes or from local health centres, GP surgeries, the Florence Nightingale Hospice, Rayners Hedge Rehabilitation Unit and the community hospitals - Buckingham, Marlow, Thame, Waterside and the Chalfont and Gerrards Cross Community Hospital.
- 13.100 Whilst the Application Site is in Buckinghamshire, it directly abuts Milton Keynes and, as such, for any baseline assessment to be robust, the services offered by this closer, more centralised provider should be taken into account.
- 13.101 Milton Keynes Community Health Services (MKCHS) is responsible for providing NHS community and mental health services across Milton Keynes and specialist dental services across Buckinghamshire. They provide a wide-range of community and mental health services. These are currently managed in four service directorates:
- adults and older people's services;
 - joint mental health services;
 - children's and secure settings services; and
 - patients safety and standards services.
- 13.102 Until November 2011 MKCHS worked as an arm-length independent body to Milton Keynes Primary Care Trust. In line with Department of Health policy to create commissioning only PCT's, MKCHS then transferred under the legal umbrella of Bedford Hospital NHS Trust. This was a temporary arrangement whilst a longer-term organisational arrangement was made for MKCHS.
- 13.103 Following the period of transition Milton Keynes Community Health Services became part of the Central and North West London NHS Foundation Trust (CNWL), a similar organisation with a long history of providing high quality care for people with a wide range of physical and mental health needs. CNWL provides mental and community health services across London and the South East.
- 13.104 MKCHS has a ten-year history of integration with Milton Keynes Council and has been working closely with Milton Keynes Hospital to create joint services. Mental health, intermediate care, community equipment and learning disability services are integrated across health and social care, are provided through pooled budgets, and integrated teams. Over this time, they have built a strong working partnership with the commissioners and this is continuing as the local Clinical Commissioning Group becomes more established.
- 13.105 Emerging trends in care are that whilst some 40 different community healthcare services are delivered from 25 sites across Milton Keynes and Buckinghamshire, increasingly services are provided within people's own homes. This trend is set to continue with more targeted health care provision and increased pressures on budgets.
- 13.106 Notwithstanding this state of flux access has been obtained to the UK health database at NHS Choices. This provides a register of all health practitioners who wholly or partly undertake services for the NHS. Data collection has then been supplemented by both
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site visits to existing local centres and an assessment of both the internet and the local phone books.

13.107 This baseline assessment has established the following existing level of provision:

Table 13.4 Proximity to Health Facilities

	Number Within 5km of the Site	Number Within 5 to 10km of the Site	Distance and Travelling Time from the Site
Hospital	0	Milton Keynes General Hospital	6.8km 10 minutes
General Practitioners	10	16	N/A
Dentists	13	22	N/A
Pharmacy	15	26	N/A

13.108 Residents living on the Application Site could alternatively access three other hospitals with accident and emergency facilities. The closest in the district is Stoke Mandeville Hospital. This is 34km from the site with a journey time of some 38 minutes. Two alternatives, at similar travel distances are the Luton and Dunstable Hospital and the Northampton General Hospital. Consequently, whilst Stoke Mandeville is the closest facility in the Application Site's administrative boundary, as it takes four times longer to get there it is unlikely to be used for emergency treatment. Instead, patients are likely to be taken to Milton Keynes General Hospital with its new Walk in Centre and accident and emergency facilities.

13.109 Whilst health self-containment in order to minimise the carbon footprint of each resident travelling to and from facilities is the developer's intention, a number of other factors will influence this movement pattern. These factors, which are largely outside the control of the developer and are indefinable at this stage in the development include:

- patient choice. In non urgent cases, frequently residents will prefer to stay with their existing service provider so there is continuity in care;
- some facilities need a critical mass of people in order to be financially and operationally viable. Levels of viability change over time; and

- the availability of specialist care. With centres of excellence continually changing to meet the evolving needs of the wider population, on occasions patients may wish to, or may travel from the site to Oxford or London.

13.110 The resulting disposition of services within 1 and 5km of the Application Site are shown in Figure 13.1 (in **Appendix 13.1**)

13.111 Consequently, the provision of health care is very complex. However, for adequate services to be provided for the new residents, and those in the area who wish to use them, the developer has agreed to provide land in the new local centre to be used for the delivery of a medical facility. At this point in time, the precise capacity, design, function and timing of this facility is unknown. Consequently, during the determination of the application and subsequent phases of infrastructure, further discussions will take place with service providers so the new facility meets the projected requirements for the area.

Assessment of Development Framework Plan

13.112 The local centre will provide highly accessible space for (D1) health facilities,

Summary

13.113 There is limited information on current or future capacity of health infrastructure of the various service providers and the degree to which, in the future, services may be shared. Health care constantly evolves. However, as space is being provided to address identifiable requirements, and reasonable financial contributions by way of a Planning Obligation, it is likely that the health demands from the new residents will be satisfied.

Appropriateness of Community and Leisure Provision

Baseline Conditions

13.114 Community and formal leisure facilities are provided in the area by a combination of providers. These include local Councils, Town and Parish Councils, Trusts, amenity groups and commercial operators.

13.115 In December 2012, Aylesbury Vale District Council published an audit of its leisure and cultural facilities. This document was prepared, as part of the Vale of Aylesbury Plan's empirical evidence base and, as such, did not assume that the development site would be brought forward.

13.116 Within Aylesbury Vale the audit confirmed that there are nine swimming pools which have a length of 20m and a minimum width of 8m. The closest facilities are in Aylesbury and Buckingham. The Sport England FPM states that for facilities to be appropriately accessible they should be within a 20-minute travel time. On this basis, the facilities at Buckingham satisfy this level of accessibility. Reinforcing this level of provision is the recently opened Bletchley Leisure Centre that is some 4km east of the site, in Milton Keynes administrative area, and less than 10 minutes away from the site. Further provision is found within the 20-minute drive time at the Wolverton Leisure Centre, which opened last year, or the more established private facilities provided by both David Lloyd and Living Well in Central Milton Keynes.

- 13.117 Community centres and village halls are an important element in the creation of vibrant and cohesive communities in rural areas. They can frequently provide a focus for a wide spectrum of events such as social events, local hobby groups, indoor sports, amateur dramatics, pre-school groups, bridge clubs, local discos and Parish Council meetings. Consequently, within the majority of villages near the site, community or village halls exist. In relation to Milton Keynes over the last 40 years, the master planning of each residential area has ensured that a community hall is provided.
- 13.118 There is no nationally recognised facility model for entertainment or arts facilities. Consequently, a comparison of best practice in local areas is the only guide as to the suitability of the level of provision. In relation to Aylesbury: St Albans, Watford and High Wycombe were taken by Aylesbury Vale District Council to be acceptable comparators. This highlighted that a settlement the size of Aylesbury should have a performance space and an arts facility. The opening of the Waterside Theatre in 2010 plus subsidiary facilities at the Queens Park Arts Centre and the Limelight Theatre provided an acceptable level of provision.
- 13.119 In relation to Milton Keynes, it has a purpose built £53m theatre and a wide selection of nationally important but smaller performance spaces such as The Stables and the MK Gallery. Consequently, provision is provided for the region's leading live entertainment venues, showcasing the best West End and touring productions from across the UK.
- 13.120 The presence of these facilities within a reasonable travelling distance of the site would broadly suggest that the existing local/community facilities would not be adversely affected as a direct result of the Proposed Development. Indeed, additional patronage of them may assist with their long-term viability and the range of events they could offer. Equally and importantly, higher order leisure and community facilities can be sourced via a 35-minute train ride to Euston, London.
- 13.121 Aylesbury Vale's 2012 audit of leisure facilities addressed the provision of synthetic turf pitches. This noted that Sport England's 'Synthetic Turf Pitch Study', 2006 noted that 70% of the facilities' users travel for up to 22 minutes to reach a facility. It also established that for every 1,000 new residents 0.03 of a pitch may be required. The report concluded that by taking account of the pitches which already existed both in and outside the district (particularly in Milton Keynes), adequate facilities were already provided for this part of the district.
- 13.122 The Aylesbury Vale Playing Pitch Strategy, 2010, established a detailed summary of the supply and demand evaluation for grass pitches within the District. To the north of Aylesbury, the study noted that there were two foci for pitches: Buckingham and Newton Longville. The pitches at Buckingham were considered to be satisfactory in number, but would benefit from a better maintenance regime. More recent discussions have indicated that with the continued growth in the use of these surfaces, a further upgrade in provision is required. Recently, permission has been granted for some 800 new homes to the

immediate south of the A421 in Buckingham and as such, this additional level of provision should be satisfied by the planning obligations of that neighbouring development.

13.123 The other focus for playing pitches in the district of Aylesbury Vale was in Newton Longville, a kilometre to the south of the site to which this assessment relates. Here, the club running mini, youth and adult teams has a deficit of one mini pitch, although there is adequate surplus of adult pitches to cover this shortfall.

3.124 At a higher qualitative level, the study established that in the district there is no facility or a need for a large-scale playing pitch facility. In contrast, 1km to the north of the Application Site at Denbigh North is the home of the MK Dons. This stadium, completed in 2013, has been built to standards that can accommodate European standard football and rugby matches. Indeed, it will be one of the host stadiums for the 2015 Rugby World Cup.

New Social Infrastructure Planned or Under Construction

13.125 The Proposed Development includes provision of land for a community hall at the local centre. Currently, there is little detail on the scale of these proposals or how it will be used. However, a reasonable assumption can be made that the inclusion of space for these facilities – along similar lines to those already provided in Milton Keynes, one community centre per grid square of 1,200 to 2,000 new homes - and the surrounding villages - will increase the new local population's accessibility and availability to local community building facilities.

Assessment of Development Framework Plan

13.126 Setting aside land at the future hub of the new community for a new combined community and leisure facility, with ancillary car parking, will make a significant positive contribution towards ensuring development of a sustainable new community, and is specifically designed to meet the need of the new residents and new businesses. Further, the proposed high quality design of these facilities will assist in creating vibrancy and a sense of community pride for the new development.

Summary

13.127 There are sufficient existing local facilities to cater for future population demand. However, to widen the choice of community and leisure facilities that are available the scheme proposes an additional facility, which will contribute positively to the overall accessibility and availability of local resources in local area.

Appropriateness of the Open Space Provision

Baseline Conditions

13.128 Green infrastructure (GI) is a strategically planned network of high quality multi-functional green spaces and interconnecting links to other environmental features that have been designed to meet the environmental, health, social and economic needs of communities. For the purposes of the Aylesbury Vale assessment and this environmental impact assessment, urban parkland, green public open space used for recreational purposes, commons, woodland, village greens, historic parks, watercourses, lakes, ponds, footpaths,

cycleways and allotments are included as GI.

13.129 The principles for the creation and management of such spaces within the district are defined in the Aylesbury Vale Green Infrastructure Strategy, 2011-2026, which in turn references Accessible Greenspace Standard as prepared by Natural England, 2003 as its benchmark.

13.130 Whilst accepting that various uses can be overlain, the standards promoted include:

- at least 2ha of open space should be within 300m of each property and that there should be at least 2ha of such space per 1,000 new residents;
- there should be one accessible 20ha area within 2km of people's homes;
- there should be one accessible 100ha area within 5km of people's homes;
- there should be one accessible 500ha area within 10km of people's homes;
- there should be 1.4ha per 1,000 population as incidental open space (incorporating amenity, landscaped and planted areas and green corridors); and
- there should be 2.4ha per 1,000 population as major open space (incorporating parks, formal gardens and public open space which in turn is broken down to 1.6ha of outdoor sports space (1.2 pitch sport) and 0.8ha for children and young people playing space).

13.131 The Strategy identified three Priority Areas one of which, despite its rural and largely open character, was the North Aylesbury Vale, in which the Application Site is situated.

13.132 Milton Keynes Council has long established open space standards, which have been carried forward from the New Town's inception by the Milton Keynes Development Corporation. As prescribed by Policy L3 and Appendix L3 of the adopted Local Plan, 2005, and more recently the Planning and Obligations for Leisure, Recreation and Sports Facilities Supplementary Planning Guidance, 2005, the standards promoted include:

- at least 1.5ha of open space should be within 300m of each property and that there should be at least 1.5ha of such space per 1,000 new residents;
- at least 0.35ha of local play area within 300m of each property per 1,000 new residents;
- at least 0.6ha of neighbourhood play area within 600m of each property per 1,000 new residents;
- at least 0.4ha of local parks area within 600m of each property per 1,000 new residents;
- at least 0.8ha of district park area within 1.2km of each property per 1,000 new residents; and
- at least 0.25ha of allotments within 600m of each property per 1,000 new residents.

- 13.133 In addition to these standards, in Milton Keynes informal provision is based on the need to retain and enhance site-specific features. Grid roads are also identified, as a significant part of these constitute green reserve areas on either side of the carriageway. Over the last 40 years of delivery, this has resulted in a town where 20% of its land use budget is either formal or informal public open space and as such, this has become a critical component defining the character of the area.

New Green Infrastructure Planned or Under Construction

- 13.134 Outside the Application Site no new green infrastructure is formally proposed by Aylesbury Vale District Council in order to meet its current shortfall. Discussions have been held with Parish Council's in relation to the medium to long term desire to reinstate Henry VIII's former Whaddon Chase hunting park. However, as neither the Council nor the Parishes control any land this aspiration has not been progressed.

Assessment of Development Framework Plan

- 13.135 The Proposed Development includes over 55.75Ha of open space and green infrastructure. This represents 38% of the Application Site all of which is for use by both the existing and future residents of the area, thereby significantly contributing to the environmental and landscape value of the wider locality.
- 13.136 This level of provision includes multi-functional green infrastructure including: parkland, sports and recreational facilities, play areas, wildlife areas, a range of strategic open spaces including new landscaping, an ecological area, woodland, allotments, foul and surface water drainage networks (including SuDS and lakes). Hence, the Proposed Development will provide an open space provision of 12.84Ha per 1,000 new residents (using AVDC's multiplier of 2.56 people per dwelling unit and there being 1,855 new mixed tenure homes), which is significantly in excess of the District's target and the requirements of Milton Keynes Council.
- 13.137 Within the master plan, as is the case in both Milton Keynes and the Vale of Aylesbury, green infrastructure is used to define character areas, create areas where communities can interact, delineate and define spaces and provide a matrix of habitat and usage corridors.

Summary

- 13.138 According to the Council's own 2012 audit of leisure and cultural provision, Aylesbury Vale District currently has 710Ha of green infrastructure (if only sites of more than 0.1Ha in size on some 620 individual sites are included). Using the 2011 Census population of 174,100 this equates to an open space density of 4.07Ha for every 1,000 people.
- 13.139 In simplistic mathematical terms the increase in population brought about by the Proposed Development (excluding all other developments in the District) will increase the total population within the District by some 2.7% to 178,925 people. However, the proposal will deliver an additional 63Ha of public open space. This equates to an increase in public open space by 8.8%. The reality, however is, that with Milton Keynes offering over 2,000Ha of

well-kept public open space in the form of linear parks, district parks, playing fields and at a smaller scale both neighbourhood and local play many of the residents from the proposal will enjoy the abutting facilities in Milton Keynes.

13.140 With the increase in open space proposed by the development, the total level of all public open space will increase the District's green infrastructure to 773Ha; this will lead to there being an open space density of 4.33Ha per 1000 people, taking into account the increase in population generated by the development. This will be an increase in the overall provision of open space in the District in line with the aspirations of the Aylesbury Vale Green Infrastructure Strategy, 2011-2026.

Operational Stage of Wider Regeneration Impacts

13.141 The development of the Application Site will allow public sector partners to address the issues affecting the communities' socio economic welfare in the surrounding areas. More particularly, the provision of additional employment floorspace, residential units and community infrastructure has the potential to bring benefits to this rural part of The Vale and Bletchley.

13.142 The Proposed Development will provide up to 1,885 new mixed tenure dwellings on the site. By applying the Council's preferred household size of 2.56, this equates to the proposal supporting a population of approximately 4,825. Furthermore, the analysis of Aylesbury Vale's demographic structure revealed that, over the last five years the population trend has been for there to be a 14% growth in population in the area. In this instance and by using the previously tested empirical evidence that was prepared for the RSS, there is now a significant housing shortfall in the district.

13.143 Furthermore, the provision of on-site community facilities including: new schools, a neighbourhood centre and a significant quantum of open space together with excellent links to leisure activates in CMK will result in the development being a highly attractive location.

13.144 The proposals will result in an increase in the district's economic activity level by providing operational employment opportunities and increasing the job density. The provision of employment opportunities is particularly important when considering the present economic climate, which has led to a sharp increase in claimant counts across all comparators. The Proposed Development will also benefit residents in the more deprived areas in both the northern rural area of Aylesbury Vale and Bletchley.

13.145 The Proposed Development has been designed to accommodate employment for the local market encouraging the growth of small to medium sized occupiers in modern buildings – it being assumed that the long-term market trend will continue for head quarter buildings to gravitate to Aylesbury and CMK. On this basis, and by looking at published employment indicators, it is assumed that a wide range of jobs may be created, including: research, finance, administration, consultancy, management, sales, fitters, drivers, technicians, and production engineers.

13.146 In the most recent Centre for Cities publication 'Cities Outlook 2014', Milton Keynes was

highlighted as being the fourth highest place in the UK for start up businesses. As the proposed site directly abuts Milton Keynes, it is therefore likely that the proposals also have the potential to provide a dynamic entrepreneurial base, by providing start-up facilities for a wide range of sectors including rural businesses and service oriented sectors. This will not only support the regional and local aspirations of wealth creation but also support the local priority of supporting the rural economy.

13.147 Further economic benefits also likely to accrue from the development include:

- planning obligations – in the form of both land, buildings, subsidised services such as public transport, and financial contributions to support other off site facilities and services;
- new homes bonus will be paid to the relevant local authority for the 1,885 new dwellings. Using the figures currently published on the DCLG website for Aylesbury Vale this is likely to equate, at current prices over the six year period, to some £8,000,000 to support local council services;
- business rates will be paid to Aylesbury Vale District Council in perpetuity for the new employment buildings; and,
- the additional income the new residents will inject – if the Council's own figures are used - into the local business and service providers – which using average salary figures could inject as much as £49,000,000 into the economy each year. This is likely to have a further multiplier effect, as the funds invested in local services is then used to pay local people working in those services, who in turn spend the money in the locality on other services.

13.148 The proposal will also provide a significant contribution towards the district's affordable housing target. Consequently, this is a key position in the current market, when very little development has been brought forward over a prolonged period. Indeed, the Council's own housing factsheet of December 2013 shows a continued slow-down in both the delivery of open market homes and affordable units.

Contributions to the Policy Frameworks

13.149 The development proposals for this site will contribute positively to various national, regional, sub-regional and local economic policy frameworks. In a national context, the development will enable partners with the opportunity to address deprivation on multiple levels, as promoted by both the NPPF and Central Government advice. It will further contribute towards the NPPF's aim of providing high quality development in deprived areas as well as addressing the requirements of rural areas in terms of new economic opportunities. This will be facilitated by providing construction and infrastructure jobs, housing, employment space (offices, shops, restaurants, schools, take aways, medical facilities) and community infrastructure.

13.150 With regard to contributions to regional frameworks, the Proposed Development will further positively contribute to the Government's Smart Growth initiatives (which seek to promote more holistic developments where the use of resources is minimised and economic and environmental advantages are maximised) by facilitating local access to Social

Infrastructure, which in turn contributes to the aim of efficient land use. Furthermore, the NPPF's aim of improving the quality of life will also be addressed by increasing the density of green space, in particular through the provision of significant quantum of new high quality green infrastructure.

- 13.151 As defined by the SWOT analysis in the Council's Aylesbury Vale Economic Development Strategy, 2008 – 2026: A Great Place to Grow, (2009), the provision of employment space is especially important for the district as it will enhance its location as part of both the Oxford to Cambridge Arc and the former Milton Keynes and South Midlands Growth Area. In these circumstances, the master planning of the site has been undertaken in order to strike the right balance between economic and housing growth. Market intelligence indicates that this site is not likely to be appropriate for large footprint office or warehousing. Instead, it is more likely to be attractive as a location for small, self-contained two storey offices and perhaps, in the future, small-scale light industrial uses. Such buildings frequently deliver a job density of one employee per 12m² of floorspace. On this basis, the 2.07Ha of employment land is likely to generate some 621 new full time or equivalent jobs. In order to consider the full impact of employment generated on this site, consideration must also be given to the creation of jobs for those that work in the neighbourhood centre, both schools and in the community facilities. Using industry standards these alternative sources are likely to deliver some 1,261 jobs and thereby deliver a site wide ratio of 1:1 job per home – without any consideration being given to the proximity of Milton Keynes or strongly established external commuting patterns from the district.
- 13.152 On a local level, the development will contribute to the emerging local development plan for Aylesbury Vale. More particularly, the proposal has the potential to support the requirement to ensure an adequate housing supply, coupled with the provision of employment land and the required community infrastructure, as prescribed in the NPPF.
- 13.153 As a result, with regard to the impact of the contributions to local, sub-regional, regional and national policies, local economic regeneration will be of high magnitude. The impact on these receptors therefore is of major positive and long-term significance.

Mitigation

- 13.154 Taking into account the long-term positive and neutral nature of impacts on the local economy, it is considered that there is no requirement for mitigation measures in socio economic terms for these receptors.

Residual Impacts

- 13.155 The Proposed Development will bring forward a range of benefits in terms of diversifying the local economy and providing the communities with an increased housing supply as well as improved access to new employment and community facilities. This will be facilitated by providing the capacity for additional employment on a local level and the increased housing offer, including affordable housing. Consequently, providing that the new community is positively embraced by both Aylesbury Vale District Council and Milton Keynes Council and their representative Town and Parish Councils there should be no significant unmet socio or economic needs.

Conclusions

- 13.156 The development, which is the subject of this assessment, will have long-term significant beneficial impacts on the local economy. The proposals will primarily have the capacity to provide 1,855 new mixed tenure dwellings, which will contribute to the reduction of the housing gap identified by the Aylesbury Vale Housing Needs Study Update 2007 and the Annual Monitoring Report 2012. Despite the prevailing market conditions, the development is likely to ensure significant provision of affordable units. This will contribute significantly towards one of the most important local priorities.
- 13.157 Furthermore, this growth in the number of residents will be supported by creating (and safeguarding) a significant number of full time and part time employment opportunities during the operational phase for the local economy. In a wider socio economic context, the development clearly has the potential to raise the local area's economic profile with regards to economic activity, employment and income as well as access to social infrastructure. The latter will particularly be supported through the provision of 55.75 Ha of multi-functional green infrastructure.

14. SERVICES & UTILITIES

Introduction

- 14.1 This chapter assesses the impact of the Proposed Development on services and utilities in relation to:

- Water
- Gas
- Electricity
- Telecommunications
- Oil pipelines

Planning Policy Context

Aylesbury Vale

- 14.2 There are no relevant specific policies.

Milton Keynes

- 14.3 There are no relevant specific policies in the Milton Keynes Core Strategy (2013). The following saved policy is relevant from the Milton Keynes Local Plan 2001-2011 (December 2005):

Policy D6: Mains and Telecommunications Services

Electricity and telecommunications services to new developments within the boundary of Milton Keynes City should be provided underground. Overhead services will only be acceptable if there are proven technical reasons why underground services cannot be provided.

National Planning Policy

- 14.4 The National Planning Policy Framework (NPPF) states that Local Planning Authorities should work with other authorities and providers to assess the quality and capacity of infrastructure for water supply, wastewater and its treatment, energy (including heat), telecommunications and utilities and take account of the need for strategic infrastructure including nationally significant infrastructure within their areas.

Methodology

- 14.5 The format of this chapter follows a standard process, by setting out an appraisal of the baseline conditions at the Application Site and surroundings; the nature of the environmental impacts of the Proposed Development; and the mitigation measures required to prevent, reduce or offset any significant adverse impacts.
- 14.6 The nature of the impacts has been categorised through the criteria set out in Tables 14.1, 14.2 and 14.3 below.

Table 14.1 Magnitude of Effect

Magnitude	Criteria
Major	Loss of asset
Moderate	Loss of integrity or partial loss of asset
Minor	Minor impact / loss of asset
Negligible	Insignificant loss of asset that does not affect use or integrity

Table 14.2 Sensitivity

Sensitivity	Description
High	<p>Utility New Supplies: development located in an area with a general lack of local utility capacity (electricity, gas, potable water, foul sewerage and telecoms), therefore requiring significant offsite network reinforcements to deliver a complete, coordinated and integrated infrastructure arrangement for the site.</p> <p>Utility Diversions: development located in an area that requires significant utility diversions to strategic infrastructure (e.g. strategic water mains, high pressure gas mains, or oil pipelines) to facilitate its construction.</p>
Medium	<p>Utility New Supplies: development located in an area where currently there are capacity issues on the existing utility networks to supply at least one of the utility services (electricity, gas, potable water, foul sewerage and telecoms), therefore considerable offsite network reinforcement works would be required to deliver one of the utility services.</p> <p>Utility Diversions: development located in an area requiring major utility diversions to local utility providers' infrastructure to facilitate the development.</p>
Low	<p>Utility New Supplies: development located in an area where currently there are minor capacity issues on the existing utility networks to supply the utility services, therefore minor reinforcement works would be required to deliver the utility services.</p> <p>Utility Diversions: development located in an area requiring small scale utility diversions to local utility providers' infrastructure to facilitate the development.</p>
Negligible	<p>Utility New Supplies: development located in an area where the local utility providers' network has enough capacity to supply the development.</p> <p>Utility Diversions: development located in an area requiring minimal utility diversions to local utility providers' infrastructure to facilitate the development.</p>

Table 14.3 Significance

Magnitude	Sensitivity			
	High	Medium	Low	Negligible
Major	Very significant	Highly significant	Significant	Low significance
Moderate	Highly significant	Significant	Low significance	Insignificant
Minor	Significant	Low significance	Insignificant	Insignificant
Negligible	Low significance	Insignificant	Insignificant	Insignificant

14.7 In the preparation of this document, the following statutory bodies and interested parties have been consulted regarding the development proposals:

- Anglian Water (AW)
- Western Power Distribution (WPD)
- Southern Gas Networks (SGN)
- British Telecommunications (BT)
- British Pipeline Agency (BPA)

Baseline Conditions

14.8 The site is generally in agricultural use and has no utility supply provision. There are a number of services that pass through the site, as follows:

- Water: an 18 inch potable water supply pipe that follows the route of Weasel Lane;
- Water: a 450mm potable water supply pipe that runs roughly north to south, adjacent to a hedge line between Buckingham Road and Weasel Lane;
- Foul water drainage: a foul water rising main, believed to be 225mm diameter, runs roughly south west to north east from the southern boundary to Hamilton Lane to the east of the site;
- Electricity: 132kV overhead power lines running north east to south west, transferring to underground cables that run along the northern boundary of the site adjacent to the old Buckingham Road carriageway;
- Electricity: 11kV high voltage and low voltage cables bisecting the north western corner of the site, running north east to south west, supplying Bletchley Leys Farm and Lower Salden Farm;
- Gas: a 600mm Intermediate Pressure gas main running roughly north to south from Buckingham Road to the southern site boundary, and then east within the site along the toe of the embankment of the disused railway line;
- BT: cables running along the alignment of the old Buckingham Road carriageway and adjacent to Whaddon Road; and
- Oil: 10 inch and 12 inch high pressure fuel pipelines bisecting the site running north to south.

14.9 A plan showing existing services is included in Figure 14.1 (in **Appendix 14.1**)

14.10 There are a number of existing utility supplies present in adjacent residential areas supplying water, electricity, gas and telecommunications.

Proposed Development

Water Supply

14.11 AW has advised that the development would be served from the Wing strategic water main. All developments that are served by this strategic scheme are required to make a contribution to it based on the flow demand. The site connection will be from the 18 inch main that runs along Weasel Lane.

14.12 There is insufficient capacity in the local network to supply the site and therefore upgrades are necessary. These works are relatively minor and involve approximately 65m of 355mm HPPE reinforcement on the Mursley Reservoir outlet.

14.13 Localised protection and lowering works are likely to be required for the existing 18 inch and 450mm diameter water supply pipes where proposed roads cross the infrastructure.

Foul Water Drainage

14.14 AW has proposed an offsite foul water connection at existing manhole number SP83330300 to the north of the site in Snelshall. Connection to this manhole will require a length of onsite and offsite rising main, which would be routed along V1 Snelshall Street.

14.15 Connection to the manhole proposed by AW would result in no downstream detriment to the network.

Electricity Supply

14.16 WPD has advised that the development would be served by a new primary substation that is being constructed in Tattenhoe, to the north of the site. The new primary substation is initially being funded by the Homes and Communities Agency, but subsequent developments are expected to pay a contribution based on the electrical demand.

14.17 The 132kV overhead lines bisecting the site are to be undergrounded through the development. Localised diversions are also likely to be required where new roads are proposed that clash with existing cable routes.

Gas Supply

14.18 SGN has advised that the proposed development may be supplied from the existing Intermediate Pressure (IP) gas main within the site. The pressure will be reduced with a governor for on-site medium and low pressure distribution.

14.19 SGN has advised that minor reinforcement works will be required to facilitate the development. Further detailed modelling will be required to fully inform the scheme as the design of each phase progresses.

14.20 Localised lowering / protection or diversion works will be required to the IP gas main where it is affected by road crossings or other development features.

Telecommunications

14.21 Telephone connections can be made via the adjacent network facilities in and around the Application Site.

- 14.22 Localised lowering / protection or diversion works will be required to the existing BT infrastructure that is located in Whaddon Road and Buckingham Road.

Oil Pipelines

- 14.23 BPA has confirmed that the oil pipelines have an easement of 3m from either side of the outer wall of the pipes.
- 14.24 The Health and Safety Executive (HSE) has confirmed that the pipelines are not major accident hazard pipelines and therefore do not have any HSE consultation distances.

Potential Effects Service Supply

- 14.25 The potential service supply environmental effects relate to both the operation and construction phases of the development. The mechanisms are as follows:
- Operational Effects: direct and indirect shortages of service supplies, potentially locally and in the wider network, due to constraints on the supply network.
 - Construction Effects: direct short term loss of supply due to works to connect to the supply network.

Assessment and Mitigation of Effects

Operational Effects

- 14.26 Inadequate provision of service supplies to a development can result in local and, potentially, more widespread reductions in network robustness and supply continuity. Therefore when assessing the supply requirements for a development it is essential that the appropriate supply operators are involved in assessing their own existing network and given the opportunity to form strategies for dealing with demand and supply growth.
- 14.27 In mitigation of the potential effect, all service companies have been involved in developing preliminary supply strategies for the planned development. Overall supply capacity and phases load increase assessments have been prepared, from which the utility supply companies are able to assess the necessary reinforcement provision.
- 14.28 The regulatory regimes applicable to public service supply companies dictate that any network expansion should result in no loss or reduction of service. The proposals developed by the supply companies, which are outlined in the above paragraphs, will ensure that the minimum regulatory standards are maintained and that no environmental effect will result from supplying the site.
- 14.29 The potential operational impact is assessed as nil and not significant.

Construction Effects

- 14.30 Network outage may occur whilst new connections are made to the supply network or through accidental damage to existing infrastructure.

- 14.31 In mitigation of the need to shut down supplies whilst making new connections, network operators have developed methodologies to permit live jointing whereby the existing network remains fully operational during connection works. During certain very occasional operations it remains necessary to temporarily shut down the local network. In such circumstances the area to be shut down is localised and planned for periods that cause the least disruption. The supplying company is obliged to give adequate notice to the affected users and ensure that appropriate provision is made for essential supplies.
- 14.32 Potential loss of supply through network damage is mitigated through careful planning of the construction phases of the development and good construction practice. The existing and planned networks will be located on construction drawings and manually traced on the ground for all contractors to use during construction. Control measures will be put in place at a site level, such as the 'license to dig' process, to substantially reduce the risk of damage to the supplying networks.
- 14.33 Accordingly, this potential operational effect is assessed as minor and is insignificant.

Summary of Service Supply Effects

- 14.34 The Proposed Development, during operation, will not impact on the baseline conditions. Short term potential effects during the construction phases are considered to be minor.
- 14.35 It is considered that no significant environmental effects will result in relation to service supply from the development proposals.

15. WASTE

Introduction

15.1 This chapter of the ES assesses the likely significant effects of the Proposed Development in terms of waste management.

15.2 For the purpose of this assessment, 'waste' is defined as:

'any substance or object the owner discards, intends or is required to discard.'

This definition is as specified under the Waste Framework Directive (European Directive (WFD) 2006/12/EC), as amended by the new WFD (Directive 2008/98/EC, which came into force in December 2010) (Ref. 15.1).

15.3 In the context of the Proposed Development, waste materials are anticipated to comprise the following:

- Construction waste arising from site clearance, excavation and construction activities;
- Household waste generated by residents;
- Commercial waste generated by businesses and people using the local facilities; and
- Organic waste from the maintenance of soft landscaped areas.

15.4 This chapter describes the assessment methodology; the baseline conditions at the Application Site and surroundings; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after the measures have been employed.

Planning Policy Context

15.5 A summary of planning policy, legislation and key guidance documents relevant to waste management for the Proposed Development is provided below.

Development Plan Policies

15.6 None of the local development plan policies contain specific policies that are relevant to waste. This includes the Aylesbury Vale District Local Plan (January, 2004), Milton Keynes Core Strategy (July, 2013) and the Milton Keynes Local Plan 2001-2011 (December, 2005). The Buckinghamshire Minerals and Waste Local Plan 2004-2016 (April, 2006) or the Buckinghamshire Minerals and Waste Core Strategy (adopted November 2012) also do not contain directly relevant policy to this project, as the site is not safeguarded for minerals or waste development, which is the main purpose of both policy documents.

National Guidance

Legislative Framework

15.7 The current national level waste policy has been set out to fulfil the requirements of existing and forthcoming European and national legislation, including:

- The Environmental Protection Act 1990 (Ref. 15.2);
- The Environment Act 1995 (Ref. 15.3);
- Controlled Waste Regulations 1992 (as amended in 2012) (Ref. 15.4);
- Revised Waste Framework Directive (Ref. 15.5);
- The Waste (England and Wales) Regulations (Ref. 15.6);
- Hazardous Waste (England and Wales) Regulations (Ref. 15.7);
- Hazardous Waste Directive, 91/689/EEC (Ref. 15.8);
- Packaging Waste Directive, 94/62/EC (Ref. 15.9);
- Landfill Directive, 99/31/EEC (Ref. 15.10);
- The Environmental Permitting Regulations 2012 (Ref. 15.11);
- Waste Management Regulations 2006 (Ref. 15.12);
- Producer Responsibility Obligations (Packaging Waste) Regulations 2007 (as amended 2012) (Ref. 15.13);
- Site Waste Management Plans Regulations 2008 (Ref. 15.14);
- Waste and Emissions Trading (WET) Act 2003 (Ref. 15.15);
- Clean Neighbours and Environment Act 2005 (Ref. 15.16); and
- Waste Electrical and Electronic Equipment (WEEE) Regulations 2006 (Ref. 15.17).

15.8 All waste storage, transport and disposal must also be undertaken in accordance with current legislation.

National Planning Policy Framework, 2012 (Ref. 15.18)

15.9 The National Planning Policy Framework (NPPF) used to contain Statement 10 (PPS10): Planning for Sustainable Waste Management (July 2005) associated with waste. However, this has been replaced by the National Planning Policy for Waste (2014).

National Planning Policy for Waste (2014). (Ref. 15.19)

15.10 Under the National Planning Policy for Waste (2014), regional planning bodies and Local Authorities are required to progress waste management ‘up the waste hierarchy’ in order to reduce the effects of waste arisings. Put into context, this means the planning bodies and Local Authorities must plan for the management of waste generated by their communities and to comply with ‘proximity principle’, which requires waste to be managed and disposed of as near as possible to where it is generated.

15.11 In relation to any new development, one of the key objectives of the National Planning Policy for Waste (2014) is to ensure “new, non-waste development makes sufficient provision for waste management and promotes good design to secure the integration of waste management facilities with the rest of the development and, in less developed areas, with the local landscape. This includes providing adequate storage facilities at residential premises, for example by ensuring that there is sufficient and discrete provision for bins, to facilitate a high quality, comprehensive and frequent household collection service”.

Waste Management Plan for England (2013) (Ref. 15.20)

15.12 The Waste Management Plan follows the principles of the Waste Hierarchy. The Waste Hierarchy acts as a guide when determining the Best Practicable Environmental Option (BPEO) for waste management.

Site Waste Management Plans Regulations, 2008

- 15.13 Whilst the Site Waste Management Regulations have recently been repealed, the Government's position is that a site waste management plan (SWMP) should be voluntarily produced for all construction projects worth more than £300,000 (excluding VAT). A SWMP is an organic document that must be updated through the course of the construction project. Due to its production at the commencement of the construction project, the designer can consider ways that waste can be reduced and site-won materials can be re-used or recycled as part of the project. Identifying waste materials at an early stage that cannot be re-used on the project will render it easier to find an alternative uses for them.

Non-Statutory Policy Documents

Refuse and Recycling: Advice Note for Developers, September 2011 (Ref. 15.21)

- 15.14 AVDC issued their Refuse and Recycling: Advice Note for Developers in order to assist developers and applicants in understanding and planning waste and recycling facilities for AVDC residents and businesses. This note will be used as the principal source of guidance for waste management associated with the Proposed Development.

Waste Hierarchy

- 15.15 The Waste Hierarchy requires avoidance of waste in the first instance and reducing waste as far as possible the volume requiring disposal once the waste has been generated. It gives an order of preference for waste management options to minimise the volume for disposal.
- 15.16 The main principles of the Waste Hierarchy are:
- Waste should be prevented or reduced at source as far as possible;
 - Where waste cannot be prevented, waste materials or products should be reused directly or refurbished and then reused;
 - Waste materials should be recycled or reprocessed into a form that allows them to be reclaimed as a secondary raw material;
 - Where useful secondary materials cannot be reclaimed, the energy content of the waste should be recovered and used as a substitute for non-renewable energy resources; and
 - Only if waste cannot be prevented, reclaimed or recovered, should it be disposed of into the environment and this should only be undertaken in a controlled manner.

Discussion

- 15.17 The above policy and guidance encourages the reduction of waste, and reuse and recycling of materials. This, supported by legislative measures, will encourage more resource efficient management of materials and will influence the waste management strategies associated with the construction and operational phases of the Proposed Development.

- 15.18 During the design of the Proposed Development, legislation, policy and guidance have been taken into consideration to ensure that it will be compliant with current accepted waste management practices both during the construction and completed development phases.
- 15.19 Planning and policy changes could have a significant impact on the waste and recycling services offered by AVDC. As a consequence, the Proposed Development must enable flexibility in waste storage and handling options to accommodate these, and any future changes.
- 15.20 The mitigation and enhancement measures for the Application Site have been developed in order for the Proposed Development to meet policy objectives set out within national, regional and local planning policy.

Assessment Methodology

Scope of Assessment

- 15.21 In January 2011, correspondence was received from AVDC regarding the potential effects that require further consideration in the Environmental Statement. These include:
- Waste arisings during construction (i.e. demolition, excavation and construction waste);
 - Waste arisings during operation (i.e. waste from households and commercial premises); and
 - Comments regarding the waste management implications associated with the Proposed Development's end of life.
- 15.22 The scope of work for the assessment of waste management effects associated with the Proposed Development comprises the following:
- Consideration of the issues associated with waste delivery and acceptance procedures (including delivery of prohibited wastes) for the chosen disposal methods;
 - Determination of the quantities and trends of waste arisings and their respective waste disposal streams in the District and/or County (current baseline conditions);
 - Assessment of the effects of waste arisings during construction works and following completion of the proposed development;
 - Consideration of the mitigation and waste reduction measures; and
 - Identification of residual effects.

Extent of Study Area

Consultation

- 15.25 With the exception of the Environmental Scoping Report, given the likely lack of waste issues at the Application Site and subsequent lack of comment on waste management, no further consultation with AVDC was undertaken during the preparation of this ES Chapter.

Methodology for Baseline Data Collection

15.26 In order to determine the baseline scenario with regards to current waste arisings in Aylesbury, waste collection schemes, waste management facilities and disposal arrangements, a desk-top study has been undertaken using the following sources of information, in addition to the policy documents discussed in the previous section of this Chapter:

- Building Research Establishment (BRE) 'Waste Benchmarking Data' (2012) (Ref. 15.22);
- Survey of Arisings and Use of Alternatives of Primary Aggregates in England, 2005: (Ref. 15.23)
- Construction, Demolition and Excavation Waste (2005) (Ref. 15.24);
- Defra municipal waste statistics 2012/2013 (Ref. 15.25);
- British Standards Institution 'BS5906:2005 Waste management in buildings - Code of practice' (2005) (Ref. 15.26).

Significance Criteria

15.27 In the absence of standard criteria for the assessment of potential effects that may arise from the generation of waste at the Proposed Development, criteria have been developed from the guidelines in National Planning Policy on Waste and local policy relating waste management.

15.28 The assessment criteria are based in several factors, including:

- The 'treatability' of the waste generated by the Proposed Development (i.e. whether the waste can be easily treated with minimal residual waste, such as recycled waste, or whether the waste requires a specialist treatment with potentially toxic residual waste);
- Whether the Best Practicable Environmental Option for the waste fits within the context of the waste hierarchy, i.e. whether waste can be minimised, recycled etc.; and
- Potential risks to human health and the surrounding ecosystem associated with the waste.

15.29 The significance of effects has been assessed according to the following scale:

- Major Adverse – large increase in the quantity of waste generated compared to existing levels, major constraints on the capacity of waste management infrastructure, the quantity of waste generated does not assist in the achievement of local and regional recycling and composting targets and significantly increases annual waste generation figures for Aylesbury Vale, waste is hazardous and requires incineration or landfilling resulting in environmental effects;
- Moderate Adverse – moderate increase in quantity of waste generated compared to existing levels, moderate constraints anticipated on the capacity of waste management infrastructure, quantity of waste generated does not prevent achievement of local and regional recycling and composting targets, waste is hazardous but can be recovered with pre-treatment resulting in temporary environmental effects;

- Minor Adverse – small increase in the quantity of waste generated compared to existing levels, minor constraints anticipated on the capacity of waste management infrastructure, waste is non-hazardous or inert and can be recycled or composted;
- Negligible – no significant change in quantity of waste generated compared to existing levels;
- Minor Beneficial – small decrease in the quantity of waste generated compared to existing levels, minor alleviation anticipated on the capacity of waste management infrastructure, waste is non-hazardous or inert and can be recycled or composted;
- Moderate Beneficial – moderate decrease in the quantity of waste generated compared to existing infrastructure, the decrease in the quantity of waste contributes to the achievement of local and regional recycling and composting targets; and
- Major Beneficial – large decrease in the quantity of waste generated compared to existing levels, major alleviation anticipated on the capacity of waste management infrastructure, significant decrease in annual in annual waste generation figures for Aylesbury Vale.

Baseline Conditions

Current Site Baseline Conditions

15.30 A site visit was undertaken, comprising an unaccompanied site inspection of key areas.

15.31 It has not been possible to obtain an inventory of waste materials currently generated at the Application Site, however from the site inspection it is evident that currently no waste is produced at the Application Site due to its generally agricultural use.

Current Regional Baseline

Construction & Demolition Waste

15.32 Table 15.1 summarises the methods used for the treatment and disposal of inert Construction, Demolition and Excavation (CD&E) waste across the South East region and England as a whole. This survey provides the most recent nationwide data currently available (2005).

Table 15.1 Disposal of inert CD & E Waste in South East Region

Method of Disposal	South East (million tonnes)	England (million tonnes)
Recycled aggregate and Soil	6.6 (46.5%)	46.4 (51.8%)
Spread on registered exempt sites	2.5 (17.6%)	15.4 (17.2%)
Waste entering licensed landfills (total for engineering, capping and disposal):	5.1 (35.9%)	27.7 (30.9%)

Landfill engineering	0.5 (3.5%)	4.2 (4.7%)
Landfill capping	0.8 (5.6%)	5.4 (6.0%)
Landfill disposal	3.8 (26.8%)	18.1 (20.2%)

Source: Survey of Arisings and Use of Alternatives to Primary Aggregates in England, 2005. Note: Figures have been rounded.

- 15.33 The proportion of inert CD&E waste in the South East being used as recycled aggregate and soil is less than that of the England average. The proportion of inert CD&E waste being utilised on registered exempt sites is slightly greater in the South East. A higher proportion of inert CD&E waste in the South East is entering licensed landfills, with almost three quarters of this material being sent for landfill disposal.
- 15.34 This regional estimate indicates that approximately 46% of inert CD&E waste was reused or recycled in 2005. Therefore considerable opportunity exists during the construction phase of the Proposed Development for the reuse / recycling of these materials. Such an approach will be dependent on the quality and presence of any contamination of the material.
- 15.35 Regarding non-inert CD&E waste, the 2007 Waste & Resources Action Programme (WRAP) report 'Recycling Rates for Non-Inert C&D Waste' (Ref. 15.27), states that
- 'the annual tonnage of non-inert C&D waste arising in Britain probably lies about half way between two contrasting pre-existing estimates (of 7.5 million and 22 million tonnes per year)'.*
- This supports the view that definitive figures to accurately quantify non-inert CD&E waste arisings are not currently known.
- 15.36 Based on current working methods, a significant opportunity exists for segregating non-inert CD&E waste streams for reuse/recycling at the Application Site. It is likely that the key waste streams generated by the construction phase of the development that have the potential to be reused/recycled will predominantly comprise soils, concrete, bricks, metal, glass, plastic and timber.
- 15.37 It is anticipated that waste treatment and recycling facilities, inert, non-hazardous and hazardous landfill sites would be the main sensitive receptors during the site preparation and construction phase of the Proposed Development. These sensitive receptors are collectively referred to as waste management infrastructure within this chapter.

Commercial Waste

- 15.38 The national survey of commercial and industrial (C&I) waste arisings and management methods represents the most comprehensive set of national data on C&I waste for over five years (Ref. 15.28).
- 15.39 According to the survey, the South East region generated 6.25 million tonnes of C&I waste in 2009. The primary waste management methods used for C&I waste were recycling and land disposal.

- 15.40 It is anticipated that waste treatment and recycling facilities, inert, non-hazardous and hazardous landfill sites would be the main sensitive receptors during the operational phase of the Proposed Development. These sensitive receptors are collectively referred to as waste management infrastructure within this chapter.

Household Waste

- 15.41 Table 15.2 outlines the household waste figures and percentage of waste recycled/composted for AVDC, in comparison to England, between 2005/06 and 2012/2013 (Ref. 15.29).

Table 15.2: Household waste figures for Aylesbury Vale District Council, in comparison to England average

Period	Household		
	Total collected in AVDC (tonnes)	Recycled / Composted in AVDC (%)	Average recycled / composted in England (%)
2012/13	53,995	37.78	43.2
2011/12	54,769	21.54	43.0
2010/11	55,537	22.0	41.5
2009/10	56,191	22.2	39.7
2008/09	57,700	23.0	37.6
2007/08	59,202	21.7	34.5
2006/07	60,937	19.9	30.9
2005/06	62,192	17.0	27.0

- 15.42 According to the data, the household waste tonnages generated in Aylesbury since 2005 have shown steady decline in waste arisings.
- 15.43 Aylesbury has consistently recycled/composted a lower proportion of its household waste compared to the average for England as a whole, however, recycling and composting rates have increased significantly between 2011 and 2013. Recycling rates are expected to continue to increase in the future due to policy drivers and waste management provisions at the Proposed Development must therefore cater for this trend.

Household Waste Recycling Centre (HWRC)

- 15.44 The three HWRCs operating within AVDC are managed by Buckinghamshire County Council.
- 15.45 The three sites provide the means for residents to deposit general household waste, cardboard, car batteries, domestic batteries, car tyres, cooking oil, engine filters and waste

engine oil, glass bottles and jars, garden waste, gas bottles, fluorescent tubes, hardcore (e.g. bricks, rubble), household electrical goods, paper, plasterboard or plaster (Aston Clinton and Aylesbury), scrap metal including fridges, foil and drinks cans, soil, textiles and wood. The sites will also accept certain domestic, hazardous wastes.

Future Baseline

Do nothing approach

- 15.46 If the Proposed Development was not to proceed, it would be expected that waste generation levels and management methods would be unlikely to change compared to existing conditions. However, population increases in the region as a whole would contribute to an increase in waste arising.

Proposed Development Constructed

Construction Phase

- 15.47 Subject to obtaining planning permission, it is anticipated that construction of the Proposed Development will take approximately 10-15 years from commencement to completion. Works would commence in 2016 and be completed between 2026 and 2031.
- 15.48 The Building Research Establishment (BRE) has developed indicators to aid in the calculation of construction waste arisings at the design stage of a variety of development types. These indicators do not include demolition, excavation or groundworks waste. The Environmental Performance Indicators (EPIs) measure the volume (in m³) of construction waste per 100m² of Gross Internal Area (GIA) and also tonnes of construction waste per 100m² of floorspace. These are outlined in Table 15.3 below.

Table 15.3: Household waste figures for Aylesbury Vale District Council, in comparison to England average

Project Type	Average m ³ /100m ²	Average Tonnes/100m ²
Residential	18.1	16.8
Public Buildings	20.9	22.4
Leisure	14.4	21.6
Industrial Buildings	13.0	12.6
Healthcare	19.1	12.0
Education	20.7	23.3
Commercial Other	17.4	7.0
Commercial Offices	19.8	23.8
Commercial retail	20.9	27.5

15.49 These indicators have been used to measure construction waste generated from the Proposed Development and relate to waste generation rates where no minimisation, reuse or recycling of materials has taken place. This would provide the baseline figure against which a reduction in waste arisings would be calculated.

15.50 Tables 15.4 and 15.5 show the estimated construction waste arisings for the residential and non-residential elements of the Proposed Development respectively, based on the GFA of the buildings and the relevant EPI from the BRE.

Table 15.4: Estimated Construction Waste Arisings (Residential)

Type	No. of Units	Estimated Total Floor Area (m2)	Tonnes /100m2 of floor area (BRE)	Construction Waste arisings (tonnes)
Residential	1,855	198,339	16.8	33,314

Table 15.5: Estimated Construction Waste Arisings (Non-Residential)

Detail	Use Class	Total Gross floor area (m2)	Waste Benchmark by Project Type (BRE) per 100m2 (tonnes)		Estimated Construction Waste arisings (tonnes)
Light Industry	B1	70,000	Industrial Buildings	12.6	8,820.0
Industrial	B2		Industrial Buildings		
Distribution	B8		Industrial Buildings		
Primary School	D1	25,000	Education	23.3	5,825.0
Mixed Use centre	A1	12,300	Commercial Retail	27.5	3,382.5
Total					18,072.5

- 15.51 On review of the estimated arisings from all stages of the project, approximately 33,314 tonnes of construction waste will be generated from the residential elements. Approximately 18,073 tonnes of construction waste will be generated from the non-residential elements. In total, this equates to approximately 51,387 tonnes of construction waste that will require management over the duration of the construction works (10-15 years). This equates to approximately 3,426-5,139 tonnes per year, although this will vary according to the construction programme and phasing of the Proposed Development.
- 15.52 The information provided in Tables 15.4 and 15.5 above is based on standard waste management practices in the UK and a rough estimate of Gross External Floor Area. The actual GEA of the various uses is not currently known and it is likely that the volumes given in Table 15.5 would be significantly reduced when further details of the actual layout of the site is afforded. It is also thought that the estimated volumes identified have significant potential to be reduced through best practice on-site waste minimisation and management.
- 15.53 The estimated waste arisings data can be used as an indicator for measuring and monitoring waste generated. This will enable the setting of realistic and attainable waste minimisation and management targets.

Operational Phase Household Waste

- 15.54 The calculation of future household waste generation has been estimated using Defra municipal waste statistics and AVDC data.
- 15.55 At this stage in the design process the figures can only be considered indicative as a variety of factors, such as the on-going promotion of waste minimisation and recycling, consumer habits and population changes etc. will impact on waste generation rates in future years.
- 15.56 Table 15.6 outlines how the average household waste generation rate per residential unit was established.

Table 15.6: Average household waste generation for AVDC

Total household waste generated within AVDC in 2012/2013 (tonnes)	53,995
Total number of households within AVDC boundary	73,420
Estimated percentage vacant dwellings (%)	2.2
Estimated occupied dwellings	71,805
Estimated mean waste generation per household per annum (tonnes)	0.75
Aylesbury Vale District Council total population (2013)	173,500
Estimated mean waste generation per person per annum (tonnes)	0.31

- 15.57 This average household waste generation rate was then used to provide an estimate of the waste arisings from the future residents of the Proposed Development. This is outlined in Table 15.7.

Table 15.7: Estimated household waste arisings

Type	No. of proposed Units	Average waste generation per household per annum (tonnes)	Tonnes / annum*	Tonnes / week*
Residential Houses	1,855	0.75	1,391	27

- 15.58 It is estimated that if current waste generation levels remained the same, the Proposed Development could potentially generate approximately 1,391 tonnes of waste per annum (27 tonnes per week) from residential accommodation on site, assuming that the maximum number of units will be constructed and occupied.

Operational Phase: Commercial Waste

- 15.59 Table 15.8 identifies the estimated waste generation from the non-residential elements of the Proposed Development, based on gross floorspace and appropriate benchmarks from British Standard (BS) 5906:2005 Waste management in buildings – Code of practice unless otherwise stated.

Table 15.8: Estimate of Total Non-Residential Waste

Detail	Use Class	Total Gross floor area (m2)	Weekly Operational Waste Arisings (tonnes)
Light Industry	B1	70,000	15.92
Industrial	B2		
Distribution	B8		
Primary School	D1	25000	0.25
Mixed Use centre	A1	12300	4.19
Total Estimated Weekly Waste			20.36
Total Estimated Annual Waste			1,058.72

Arisings			
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- 15.60 At this stage it is estimated that if current waste generation levels remained the same, the Proposed Development could potentially generate up to approximately 1,059 tonnes of commercial waste per annum (up to 21 tonnes per week), assuming that the maximum gross floorspace will be constructed and occupied.

Likely Significant Effects

- 15.61 The following sections outline the likely significant effects associated with the construction and operation of the Proposed Development.

Site Clearance

- 15.62 The volume of excavated material that will require removal from the Application Site is not expected to be significant.
- 15.63 Although there are a larger number of inert landfills in the South East region, there are currently only a small number of suitably licensed facilities accepting hazardous waste in the UK (this is due to the European Landfill Directive in 2004, whereby the number of hazardous waste landfills was reduced from 279 to 17). Of this number, only two facilities in the Southern and South East regions accept hazardous waste (Dartford and Thamesmead), the former is for asbestos-containing material only. This may have an impact on the disposal routes for any contaminated material that is excavated and cannot be remediated on-site.
- 15.64 Due to the site's current use as agricultural land, it is likely that the risk of contamination will be minimal.
- 15.65 Based on the low expected volume of waste arisings generated by the site clearance, it is anticipated that the Proposed Development will have a temporary effect on waste management infrastructure of minor adverse significance prior to the implementation of mitigation measures.

Construction Phase

- 15.66 From the assessment criteria outlined previously, the predominance of treatment (e.g. segregation of recyclable materials) of significant quantities of construction waste on-site (for both environmental and economic reasons), is operated on the vast majority of sites, thus reducing the need to send waste to landfill. Adherence to the waste hierarchy by reusing and/or recycling waste materials will reduce the significance of the effect.
- 15.67 Based on the estimated volume of waste arising, it has been considered that the Proposed Development would have a low magnitude of change/effect on the quantity of construction waste generated within the region. The sensitivity of the waste management infrastructure is anticipated to be minor and the magnitude of change, prior to mitigation, is low.

- 15.68 This is anticipated to introduce a temporary effect on waste management infrastructure of moderate adverse significance prior to the implementation of mitigation measures.

Operational Phase: Household Waste

- 15.69 Based on the above estimation of household waste arisings and the current waste generation rate for Aylesbury Vale as a whole, it has been considered that the Proposed Development would have a noticeable effect on the quantity of waste generated.
- 15.70 There is likely to be a permanent, long-term effect on waste management infrastructure of moderate adverse significance prior to the implementation of mitigation measures.

Operational Phase: Commercial waste

- 15.71 Based on the above estimation of operational commercial waste arisings, it has been considered that the Proposed Development would have an effect on the quantity of waste commercial generated in Aylesbury Vale. There is likely to be a permanent, long-term effect on waste management infrastructure of minor adverse significance prior to the implementation of mitigation measures.

Mitigation Measures

- 15.72 The following sections outline the mitigation measures proposed to reduce the effects associated with the construction and operation of the Proposed Development.

Site Clearance

- 15.73 In order to plan for the minimisation and management of the volume of waste generated during the site clearance, the appointed contractor will prepare voluntary Site Waste Management Plans (SWMPs) which will include measures to minimise waste generation and reduce the amount of waste being sent for disposal where possible.
- 15.74 Material deemed suitable for reuse on the Proposed Development will be retained and stockpiled where possible to incorporate such materials into the subsequent construction process.
- 15.75 If materials cannot be reused on-site, then the feasibility of reusing them off-site will be explored.
- 15.76 The contractor will establish a number of key performance indicators (KPIs) specifically for waste management at the Proposed Development which will be regularly monitored.

Construction Phase

- 15.78 Best practice measures and recommendations for the minimisation and management of waste will be incorporated into a CEMP, and provided to AVDC prior to commencement of works on site.
- 15.79 To ensure that the system of waste minimisation, reuse and recycling is effective, consideration will be given to the setting of on-site waste targets for the Proposed Development and a suitable programme of monitoring at regular intervals to focus upon:

- Quantifying raw material wastage;
 - Quantifying the generation of each waste stream;
 - Any improvements in current working practices;
 - Methods by which the waste streams are being handled and stored; and
 - The available waste disposal routes used, e.g. landfill, waste transfer stations.
- 15.80 The contractor will be responsible for the setting and review of waste targets from the outset to ensure that high standards are maintained with the emphasis being on continual improvement.
- 15.81 Specific waste quantification and monitoring (i.e. through the SWMPs) will assist in determining the success of waste management initiatives employed and progress against these targets should be relayed back to the Project Team.
- 15.82 As for the site clearance works, the waste arisings during construction will be controlled and monitored through the SWMPs which will contain targets for construction phase waste generation.
- 15.83 All construction works on the Application Site will be undertaken in accordance with the Considerate Constructors Scheme. This is a national initiative set up by the construction industry. Sites that register with the Scheme sign up to and are monitored against a Code of Considerate Practice designed to encourage best practice beyond statutory requirements. The Scheme is concerned about any area of construction activity that may have a direct or indirect impact on the image of the industry as a whole. The main areas of concern fall into three main categories: the environment, the workforce and the general public. Waste management is a key area of focus and on-site considerations may include:
- How waste is avoided, reduced, reused, and/or recycled;
 - Whether there is a SWMP and how this is monitored; and
 - What type of feedback is received (if any) as to how much waste on-site is diverted from landfill.
- 15.84 As part of the encouragement of on-site best practice, there will also be a need to ensure that suppliers of raw materials for the projects are committed to reducing surplus packaging associated with the supply of any raw materials. This includes the reduction of plastics (i.e. shrink wrap and bubble wrap), cardboard and wooden pallets. This may involve improved procurement and consultation with selected suppliers regarding commitments to waste minimisation, recycling and the emphasis on continual improvement in environmental performance. Where practicable, the off-site manufacture of building components will be undertaken to help minimise the generation of on-site construction waste.

Operational Phase: Household Waste

- 15.85 The residential elements of the Proposed Development will be designed in accordance with the AVDC Refuse and Recycling: Advice Note for Developers, September 2011 (Ref. 15.21).
- 15.86 Design measures for the Proposed Development will ensure that all residents have access to both internal and external waste and recycling storage facilities. These facilities will be located within the curtilage of each house and in suitably designed enclosures on ground level for flats. These facilities will be easily accessible for residents and collection crews.
- 15.87 Waste segregation and storage facilities will be designed to be convenient and simple to use, to encourage residents to recycle and to maximise recycling rates.
- 15.88 AVDC does not currently provide a kitchen waste kerbside collection service, although this may be introduced under the proposed changes to waste collections announced by AVDC.
- 15.89 The garden waste collection scheme provided by AVDC is chargeable, indicating that home composting will still remain a requirement for some residents. As a result of these issues, sufficient exterior storage space will be provided to enable the installation by residents of a home composting bin/food digester in the gardens of private houses. Where it is not possible to accommodate space for composters at individual households, provision should be made for community composting.
- 15.90 The number of proposed residential units will also necessitate the provision of bring sites which provide additional recycling opportunities for a range of materials, not all of which are collected through existing kerbside recycling services. They are generally located within publicly accessible areas such as supermarkets and public car parks and typically comprise a number of containers allowing separate collection of materials for recycling.

Operational Phase: Commercial Waste

- 15.91 The commercial elements of the Proposed Development will be designed in accordance with the AVDC Refuse and Recycling: Advice Note for Developers, September 2011 (Ref. 15.21).
- 15.92 The commercial elements of the Proposed Development will be provided with dedicated or shared waste storage areas for waste segregation for recycling and non-recyclable refuse for disposal as appropriate.
- 15.93 All waste storage areas will be clearly labelled to ensure that cross contamination of refuse and recycling is minimised.
- 15.94 Retailers and commercial tenants will be encouraged to undertake their own 'waste audit' and set targets for reducing, reusing and recycling their waste streams.
- 15.95 It is assumed that collection of commercial waste will be undertaken via external waste management contractors. It will be the responsibility of the occupiers to arrange for refuse and recycling to be collected from their premises.
- 15.96 The frequency of waste collection will be dependent upon several factors including the volume of waste generated; the storage method (i.e. whether balers and waste compactors are used); and the schedule of the appointed waste contractor.

Residual Effects

- 15.97 The following sections outline the likely residual effects associated with the construction and operation of the Proposed Development.

Site Clearance & Earthworks

- 15.98 Identifying alternative measures for the reuse of earthworks waste will significantly reduce the quantity of such waste requiring disposal. The sensitivity of the waste management infrastructure is medium and the magnitude of change, following mitigation, is low.
- 15.99 Therefore there is likely to be a temporary effect on waste management infrastructure of negligible significance following the implementation of mitigation measures.

Construction Phase

- 15.100 Considering all stages of construction, there is likely to be temporary effect on off-site waste treatment and disposal facilities. Given that it is unlikely that all construction based waste would be reused either on or off-site, there remains the likelihood of a residual effect of minor adverse significance post implementation of the construction related mitigation measures discussed above.

Operational Phase: Household Waste

- 15.101 The mitigation measures outlined above will ensure that a significant proportion of waste can be separated for recycling by residents, thereby maximising recycling opportunities and reducing the waste contributions for disposal. Therefore, there is likely to be a long-term effect on waste infrastructure from household waste of minor adverse significance following the implementation of mitigation measures and on the assumption that waste recycling opportunities are maximised by local residents and enforced by AVDC.

Operational Phase: Commercial Waste

- 15.102 The mitigation measures outlined above will ensure that a significant proportion of waste can be separated for recycling by occupiers and users, thereby maximising recycling opportunities and reducing the waste contributions for disposal. Therefore, there is likely to be a long-term effect on waste infrastructure from commercial waste of negligible significance following the implementation of mitigation measures.

Cumulative Effects

- 15.103 Development schemes which have been identified in the consideration of cumulative effects are included in Chapter 3.
- 15.104 The cumulative impact of the construction programme for the identified committed developments in proximity to the Proposed Development has been qualitatively assessed; due to the lack of details in the accessible planning documents which refer to waste management, during construction or operation.
- 15.105 The Proposed Development will generate excavation and construction waste which will require consideration in relation to existing demands placed on waste management infrastructure by the committed development in the vicinity of the Application Site.

15.106 Discussions with the appointed waste management contractors for the Proposed Development will be required to determine the likely cumulative impacts associated with waste transportation. In terms of waste generation and disposal, the identified cumulative scheme, in addition to the Proposed Development, will be required to implement a Construction Environmental Management Plan (CEMP) and Site Waste Management Plan (SWMP) which incorporate measures for the minimisation and sustainable management of excavation and construction waste.

15.107 As a consequence of these measures, the quantity of material requiring disposal will be minimised as far as practicable. Considering these factors and the scale of the Proposed Development in relation to the existing construction projects in the area, the resulting cumulative impact on existing waste management infrastructure is anticipated to be of minor adverse significance.

Summary

15.108 The most significant effects of the Proposed Development from a waste management perspective include the generation of waste materials during site clearance, construction activities and subsequent operation. The proposed construction approach and strategy has sought to minimise waste generation.

15.109 The Proposed Development is not expected to result in a significant quantity of excavated materials being generated from excavation, as the majority would be re-used on site.

15.110 The Proposed Development will also result in the generation of a considerable quantity of construction and operational waste, even following implementation of measures to minimise the generation of waste.

15.111 It is considered that, if the majority of construction waste is appropriately reused on-site or reused / recycled offsite and the SWMPs are prepared and implemented, the Proposed Development will result in a residual temporary effect of minor adverse significance.

15.112 Following the implementation of mitigation measures the generation of waste during operation of the Proposed Development is likely to comprise a minor adverse effect on off-site waste treatment and disposal facilities in the long-term for household waste and a negligible effect in the long-term for commercial waste.

Limitations and Assumptions

15.113 Estimates of likely volumes and types of waste generation during operation of the Proposed Development have been obtained from published sources where possible and from the most credible sources available, however, the accuracy of the baseline data must be considered when forecasting waste arisings. In addition, information obtained from the BRE is dependent upon the accuracy of existing input data.

REFERENCE LIST

- Ref. 15.1: WFD (Directive 2008/98/EC (December 2010);
- Ref. 15.2: The Environmental Protection Act (1990);
- Ref. 15.3: Environment Act, Section 57, 1995 – Environment Agency;
- Ref. 15.4: Controlled Waste Regulations 1992 (as amended in 2012);
- Ref. 15.5: Revised Waste Framework Directive (2010);
- Ref. 15.6: The Waste (England and Wales) Regulations (2011);
- Ref. 15.7: Hazardous Waste (England and Wales) Regulations (2005);
- Ref. 15.8: Hazardous Waste Directive, 91/689/EEC (1991);
- Ref. 15.9: Packaging Waste Directive, 94/62/EC (1994);
- Ref. 15.10: Landfill Directive, 99/31/EEC (1993);
- Ref. 15.11: The Environmental Permitting Regulations (2012);
- Ref. 15.12: BS10175:2011 – Waste Management Regulations 2006;
- Ref. 15.13: SI2007/320 – Producer Responsibility Obligations (Packaging Waste) Regulations 2007 (as amended 2012);
- Ref. 15.14: SI2002/2677 – Site Waste Management Plans Regulations 2008
- Ref. 15.15: Waste and Emissions Trading (WET) Act 2003;
- Ref. 15.16: Clean Neighbours and Environment Act 2005;
- Ref. 15.17: SI2006/1380 – Waste Electrical and Electronic Equipment (WEEE) Regulations 2006;
- Ref. 15.18: National Planning Policy Framework – Department for Communities and Local Government, March 2012;
- Ref. 15.19: National Planning Policy for Waste (2014).
- Ref. 15.20: Waste Management Plan for England (2013);
- Ref. 15.21: Refuse and Recycling: Advice Note for Developers, September 2011;
- Ref. 15.22: SI2009/3104 - Building Research Establishment (BRE) 'Waste Benchmarking Data' (2012);
- Ref. 15.23: Survey of Arisings and Use of Alternatives of Primary Aggregates in England, 2005;
- Ref. 15.24: Construction, Demolition and Excavation Waste (2005);
- Ref. 15.25: Defra municipal waste statistics 2012/2013;
- Ref. 15.26: British Standards Institution 'BS5906:2005 Waste management in buildings - Code of practice' (2005)
- Ref. 15.27: Waste & Resources Action Programme (WRAP) report 'Recycling Rates for Non-Inert C&D Waste' (2007);

- Ref. 15.28: The national survey of commercial and industrial (C&I) waste arisings and management (2009);
- Ref. 15.29: Household waste figures for Aylesbury Vale District Council, in comparison to England average. Obtained from www.wastedataflow.org {accessed May 2014}.

16. GROUND CONDITIONS AND CONTAMINATION

Introduction

- 16.1 This chapter of the ES assesses the likely significant effects of the Proposed Development in terms of Ground Conditions and Contamination.
- 16.2 This chapter describes that assessment methodology; the baseline conditions at the Application Site and surroundings; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after the measures have been employed.

Planning Policy Context

Development Plan Documents

Aylesbury Vale District Local Plan (AVDLP) 2001 – 2011 (2004)

- 16.3 Policy related to ground conditions and water did exist in the AVDLP (2004) previously. However, after review no relevant saved policies remain within the AVDLP (2004).

Milton Keynes Core Strategy, Adopted July 2013

- 16.4 The Core Strategy (2013) replaces only the strategic policies in the Local Plan (2005); where most of the policies in the latter are saved.

Milton Keynes Local Plan (2005)

- 16.5 There are no directly relevant policies dealing with ground conditions and contamination.

National Guidance

National Planning Policy Framework (2012)

- 16.6 Specifically relating to Ground Conditions and Contamination is Chapter 11 of the NPPF (Ref. 16.1), Conserving and Enhancing the Environment, which highlights that the planning system should contribute to and enhance the natural and local environment. Paragraph 109 states:

“The planning system should contribute to and enhance the natural and local environment by:

- protecting and enhancing valued landscapes, geological conservation interests and soils;*
- recognising the wider benefits of ecosystem services;*

- *minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government’s commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*
- *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; and*
- *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.”*

16.7 The aim of the development should be to minimise pollution and other adverse effects on the local and natural environment. Paragraph 111 states:

“Planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), providing that it is not of high environmental value....”

16.8 Paragraph 120 states:

“To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. 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. Where a site is affected by contamination or land stability issues, responsibility issues, responsibility for securing a safe development rests with the developer and/or landowner.”

16.9 Paragraph 121 states:

“Planning policies and decisions should ensure that:

- *The site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;*
- *After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and*
- *Adequate site investigation information, prepared by a competent person, is presented.”*

Non-Statutory Policy Documents

- 16.10 Another key piece of guidance is the Environment Agency's Model Procedures; Contaminated Land Report 11 (CLR 11) (Ref. 16.2), which indicates that a Conceptual Site Model (CSM) should identify those contamination sources, pathways and receptors which are "likely" to represent an "unacceptable" risk either to human health or the surrounding environment.
- 16.11 The investigation of land is predominantly guided by Eurocode 7 (Ref. 16.3) with respect to geotechnical design. With regard to the investigation of potentially contaminated land, British Standard BS10175:2011 (Ref. 16.4) is the primary guidance.

Assessment Methodology And Significance Criteria Scope Of The Assessment

- 16.12 An EIA Scoping Report (2013) for the Proposed Development was submitted to Aylesbury Vale District Council. A Formal Scoping Opinion was received (September 2013) from Aylesbury Vale District Council containing the following response regarding Ground Conditions and Land Contamination from the relevant stakeholders

Consultation

Contaminated Land Officer – Aylesbury Vale District Council

- 16.13 The Contaminated Land Officer for Aylesbury Vale District Council provided the following comments regarding ground conditions.

'Due to the scale of the development and the proposed redevelopment of the site into residential use I recommend that as a minimum a desk study in relation to contaminated land must be submitted with the full planning application. Depending on the outcome of the desk study further investigative work may be required. This is in order to accurately quantify the risks to end users and to the wider environment from the presence of potentially contaminated land

In addition if a full planning application is submitted, depending on the information submitted with the application I would recommend that the following conditions are placed on the application.

CON1 Development shall not commence until a contaminated land assessment and associated remedial strategy, together with a timetable of works, has been submitted to and approved in writing by the LPA. The agreed remediation works shall be fully completed before any other construction work commences.

The assessment/strategy shall include the following:

The contaminated land assessment shall include a desk study which shall detail the history of the site uses and propose a site investigation strategy based on the relevant information discovered by the desk study.

The site investigation, including relevant soil, soil gas, surface and groundwater sampling, shall be carried out by a suitably qualified and accredited consultant/contractor in accordance with a Quality Assured sampling and analysis methodology.

A site investigation report detailing all investigative works and sampling on site, together with the results of analysis, risk assessment to any receptors and a proposed remediation strategy shall be submitted to the LPA. The LPA shall approve such remedial works as required prior to any remediation commencing on site. The works shall be of such a nature as to render harmless the identified contamination given the proposed end-use of the site and surrounding environment including any controlled waters.

RE59 to ensure that the potential contamination of the site is properly investigated, the risks to the planned end-user group(s) quantified, and its implication for the development approved fully taken into account.

CON2 The approved remediation works shall be carried out in full on site under a quality assurance scheme to demonstrate compliance with the proposed methodology and best practice guidance. If during the works contamination is encountered which has not previously been identified then the additional contamination shall be fully assessed and an appropriate remediation scheme agreed with the LPA.

Within 1 month of completion of the remediation works, a validation report shall be submitted to and approved in writing by the LPA. The validation report shall include

details of the completed remediation works and quality assurance certificates to show that the works have been carried out in full in accordance with the approved methodology. Details of any post-remedial sampling and analysis to demonstrate that the site has reached the required clean-up criteria shall be included in the validation report together with the necessary documentation detailing what waste materials have been removed from the site.

RE59A To ensure that the potential contamination of the site is properly dealt with and the risks to the end user group(s) minimised’.

Method of Baseline Data Collection

Introduction

- 16.14 With respect to ground conditions at the Application Site, a process of risk assessment has been undertaken in order to consider and assess the potential environmental effects that are likely to occur during the site preparation, construction and operational phases of the Proposed Development.
- 16.15 In line with the legislative regime outlined in Sections 16.3 to 16.10, the assessments undertaken and utilised in the preparation of this chapter have been structured around the identification and assessment of potential pollution linkages and have included assessments

relating to soil/water contamination and the potential risks posed to human health, Controlled Waters, buildings / structures and environmental receptors.

- 16.16 The assessments are undertaken by firstly identifying the relevant sources of contamination, pathways for migration and significant receptors i.e. potential pollution linkages. The potential pollution linkages are initially developed as part of a desk study focusing on baseline conditions are presented within a CSM. A preliminary risk assessment may be applied at this time based on the likelihood of all three parts of the pollution linkage existing and the sensitivity of the receptor. The development of the CSM is part of an iterative process.
- 16.17 Following the preparation of a preliminary CSM, a quantitative assessment of the contamination; implemented by comparing appropriate geochemical results (resulting from an intrusive site investigation) with assessment criteria that are relevant to the identified receptor and / or specific pollution linkage scenario. In the first instance, a set of generic criteria are generally referenced in an assessment e.g. human health GACs generated by CLEA and Environmental Quality Standards (EQS) for water quality. The results of the quantitative risk assessment are used to establish the potential existence and / or significance of a pollution linkage and to inform the on-going development of the CSM.
- 16.18 A qualitative assessment can then be made of the potential environmental effects and their predicted significance with respect to the construction and operational phases of the Proposed Development. Effects have the potential to be adverse, beneficial or negligible. The assessment of effects is based on both the sensitivity of the identified receptors and the magnitude of the change expected. Sensitivity and magnitude are then assessed within a matrix, as a function of one another, to predict the significance of the effect.
- 16.19 Where potentially complete pollution linkages are identified, appropriate mitigation measures may need to be incorporated into the Proposed Development. Residual effects are those risks and / or potential effects that remain following the incorporation of mitigation measures.

Methodology

- 16.20 For the purpose of this chapter, a desk based qualitative preliminary risk assessment has been undertaken to establish the potential for significant ground contamination to exist at the Application Site and the likely risks posed to a range of sensitive receptors, including humans, aquifers and flora. The findings of this preliminary risk assessment are presented in the Desk Study and Preliminary Risk Assessment (May 2014) (hereafter referred to as 'the Pell Frischmann Report'), a copy of which can be found in **Appendix 16.1**. The Pell Frischmann Report was informed by:
- eMapsite GroundSure Report (March 2013) which contained historical Ordnance Survey (OS) extracts, environmental data sheets and sensitivity plans (see **Appendix 16.1**);
 - British Geological Survey (BGS) Geology Maps (Geology Map 1:110,560 and 1:50,000

Sheet 78).

- 16.2 The Pell Frischmann Report includes a Site-Specific CSM which identifies the likely significant potential pollutant linkages. Consideration is given in the CSM to the potential sources of contamination, migration pathways and sensitive receptors. Likely significant impacts of ground contamination upon human health, property, Controlled Waters and flora were assessed as part of the preliminary environmental risk assessment using this source-pathway receptor approach.
- 16.22 The findings of the Pell Frischmann report have been used to inform the qualitative assessment presented in this Chapter of likely significant impacts to, and from, any potential ground contamination likely to exist at the Site. In accordance with guidance (for example DEFRA Circular 01/2012), the site-specific conceptual model of the likely significant pollutant linkages within the Pell Frischmann Report has been updated, where necessary, for the purposes of this assessment to reflect the Proposed Development. Using the information obtained from the above sources, an appraisal of the means by which sources might affect receptors (the pathways) has been carried out.
- 16.23 This assessment has been based upon the maximum extent Proposed Development parameters. This represents a precautionary ‘worst-case’ assessment. Notwithstanding this, the deviation between the maximum and minimum extent parameters would not lead to significantly different ground conditions and contamination impacts. Furthermore, all contamination risks would be subject to many mandatory legislative controls so that these risks would not be materially or significantly different between the maximum and minimum extent Proposed Development parameters.
- 16.24 The Scoping Response received from AVDC has agreed and confirmed that a desk-based ground conditions assessment was acceptable for the purposes of the EIA. This is because it was considered that a desk based assessment would be satisfactory to enable a full identification and assessment of the likely significant impacts. Therefore no Site Investigation (SI) has been undertaken to inform the EIA.

Significance Criteria

- 16.25 There are no published criteria for assessing the significance of potential impacts from ground conditions and contamination. Significance criteria have therefore been developed using the criteria outlined in Chapter 2 of this ES, contaminated land guidance, and professional expert judgement.
- 16.26 Environmental effects associated with the Proposed Development have the potential to be adverse, beneficial or negligible. For example, in terms of beneficial effects, the Proposed Development may remove source of contamination or it may break a pathway that currently links a source (contamination) to a receptor. Conversely, in terms of adverse effects the development may introduce a more sensitive receptor to a contamination source existing at the

site. The significance of an impact partly depends on the timescales involved, i.e. short, medium or long term and the extent of the area affected.

Sensitivity

- 16.27 The sensitivity of a receptor depends on the nature of the receptor and how sensitive the receptor is with respect to potential impacts from an identified source. For example, health of future site users may be identified as a potential receptor; however a child or children are more sensitive to contamination than adults. In terms of the Application Site, children are considered to be a target end user due to the residential nature of the Proposed Development. As such, the sensitivity of the receptor may be considered to be relatively high in that respect.
- 16.28 Alternatively, groundwater receptors may be at risk from contamination. However, groundwater within a Principle Aquifer and a Source Protection Zone that is utilised as potable water source would be considered a more sensitive receptor than a shallow Secondary Aquifer where no groundwater abstractions/uses are present.
- 16.29 In terms of ground conditions, sensitive receptors are defined Table 16.1.

Table 16.1: Sensitivity of Receptors

Scale	Receptor Sensitivity Guidance/Example
High	Very sensitive receptor: from a particularly vulnerable group e.g. children, elderly; a highly sensitive environment e.g. legally designated site; a receptor where the exposure to the contamination source is likely to be more significant/direct e.g. construction workers; where contamination is more likely to result in a severe or permanent effect.
Medium	Sensitive receptor, though not from a particularly vulnerable group and or where the impact is likely to result is a less significant and/or shorter term effect e.g. adults visiting a site for a short period of time with little direct contact with any contamination areas, perched/shallow ground water that is not currently being extracted/used.
Low	Receptor which may have some or only limited sensitivity to impacts and where the limited impacts are anticipated to be short term not considered significant (e.g. buildings with little to no sensitivity to most contaminants).

Magnitude of Effects

- 16.30 The magnitude of effects associated with the Proposed Development is determined by the baseline conditions of the Assessment Site, how far the conditions will deviate from the

baseline condition during the construction and operational phases of the Proposed Development (i.e. the magnitude of the change) and by assessing the effect that this change in condition may have on the source-pathway-receptor model with respect to each pollution linkage. A qualitative assessment of the potential magnitude of the effects is undertaken prior to the consideration of mitigation measures. The qualitative criteria used to assess how far an impact deviates from the baseline condition (i.e. the magnitude of change) are summarised in Table 16.2. This assumes that worst-case scenarios with respect to potential negative effects on identified pollution linkages occur during both the construction and operational phases of the Proposed Development.

Table 16.2: Magnitude of Effect

Magnitude	Criteria
Negligible	Results in no discernible change or effect to the receptor. Change is of insufficient magnitude to significantly affect the use/integrity of the receptor. No pollution linkages present i.e. source, pathway or receptor is not present.
Minor	Results in minor effect on receptor but affect does not present significant possibility of significant harm/pollution, if site investigation data is available then GACs/EQS would not be exceeded.
Moderate	Potentially complete pollution linkage identified, contamination source has the potential to affect the receptor, if investigation information is available generic assessment criteria likely to be exceeded.
Major	Complete pollution linkage identified and significant possibility of significant harm/pollution of water course is considered likely. Therefore land has the potential to be classified as 'Contaminated' under Part IIA of the EPA 1990.

Significance of Effects

- 16.31 The assessment of significance of environmental effects is based on both the sensitivity of the identified receptors and the magnitude of the effect as set out above. In order to predict the significance of the effects, sensitivity and magnitude are assessed as a function of one another. The significance of the effects has therefore been considered within a Significance Matrix, outlined in Table 16.3.
- 16.32 While assessing the significance of effects associated with the Proposed Development, it may be appropriate/necessary to take into account the potential duration and scale of the effect. The duration and scale may be considered as follows:

- The duration of the potential effect i.e. short term (less than 3 years), medium-term (between 3 -10 years) or long term (in excess of 10 years; and
- The extent of the receptor and/or the scale on which the receptor may be affected i.e. Local (on-site and within the vicinity of the site, e.g. site users and local residents); Regional (i.e. borough, counties e.g. a groundwater body that is utilised as a regional source of potable water); or National/International (e.g. sites with national/international environmental designations)

16.33 In terms of significance, effects also have the potential to be beneficial (+), adverse (-) or neutral as indicated in Table 16.3.

Table 16.3: Significance Matrix

		Magnitude of Effect			
		Major	Moderate	Minor	Negligible
Sensitivity	High	Major (+/-)	Major (+/-)	Moderate (+/-)	Negligible
	Medium	Major (+/-)	Moderate (+/-)	Minor (+/-)	Negligible
	Low	Moderate (+/-)	Minor (+/-)	Minor (+/-)	Negligible

(Note: + Beneficial, - Adverse)

16.34 The significance of environmental effects (hereafter referred to the Significance Criteria) that result from the Proposed Development are summarised in Table 16.4 below.

Table 16.4: Significance Criteria

Significance of Environmental Effects – Significance Criteria (from the Significance Matrix)						
Major Adverse	Moderate Adverse	Minor Adverse	Negligible	Minor Beneficial	Moderate Beneficial	Major Beneficial

16.35 As introduced previously, the CSM is developed as part of an iterative process. In the case of this chapter, the CSM is produced a part of the desk study which is based on an initial review of the baseline conditions. The CSM identifies potential pollution linkages which reflect the findings of the desk study and the associated preliminary risk assessments. Where no pollution linkage is identified, an environmental effect is unlikely to exist and therefore no further assessment is undertaken.

16.36 Where potentially complete pollution linkages are identified an environmental effect may exist. The Significance Criteria have been applied to the assessment and the CSM after the results of the desk study have been considered. The Significance Criteria are initially applied before any mitigation measures are taken into account.

16.37 Following the application of the Significance Criteria, the incorporation of mitigation measures can be considered and the effects and significance are updated to reflect any potential benefits/changes that the Proposed Development may have on the Assessment Site.

With respect to pollution linkages, mitigation measures tend to aim to tackle/reduce the potential contamination source and/or break pathways between a source and receptor.

- 16.38 Residual Effects are those risks and/or potential effects which remain following the incorporation of appropriate mitigation measures. These are summarised in the residual effects text at the end of this chapter.

Assumptions and Limitations

- 16.39 For the purpose of this assessment, the following assumptions were made:

- The assessment presented in this Chapter is based wholly on the baseline information and preliminary risk assessment presented in the Pell Frischmann Report (**Appendix 16.1**).

Baseline Conditions

- 16.40 The baseline conditions have been established from the desk study information reviewed to date (**Appendix 16.1**). The following sections present a summary of the current baseline conditions.

Current Uses of the Site and Surrounding Area

- 16.41 As described in **Chapter 3**, the Assessment Site is dominated by farmland/grassland, with a number of small farm-type buildings and several country lanes/footpaths.
- 16.42 The site is bound to the north by two main roads (A421 and B4034), to the east by residential properties, to the south by a disused railway line and to the west by another road.
- 16.43 The Assessment Site is surrounded by predominantly a mixture of residential and industrial/commercial uses particularly in the north and east. To the south and west is predominantly open grassland with minor developments.
- 16.44 A detailed description of the Application Site and surrounding area are present in the Pell Frischmann Report.

Historical Land Uses of the Site and Surrounding Area

- 16.45 Historically, the Application Site was largely used as farmland, with two minor tracks and a footpath occupying part of the area. As of June 2014 the site is predominately the same, although one track has been paved and several farm buildings are present.
- 16.46 A detailed review of historical land uses of the Application Site and the surrounding area, together with a copy of historical maps, are presented in the Pell Frischmann Report.

Geology

- 16.47 BGS geology maps indicate that the majority of the Application Site is underlain by Glacial Till deposits predominantly comprising clay with occasional oversized gravel which in turn are underlain by clays and mudstones of the Oxford Clay Formation.
- 16.48 The minor historical development (farm buildings) means there is a possibility that localised Made Ground may be present.

Hydrogeology

- 16.49 According to the Environment Agency's web site there are no groundwater bodies in the vicinity of the site that have been given a current quantitative chemical quality. The Glacial Till and Oxford Clay Formation are described as non-productive strata.
- 16.50 The Application Site is not located in, or near to, a Source Protection Zone for potable water supply.
- 16.51 There is a single licensed groundwater abstraction within 1000m of the Application Site. The license is located 634m to the west of the site and allows the abstraction of groundwater for 'general farming and domestic' purposes.

Hydrology

- 16.52 There are three minor unnamed streams on the Application Site, and an unnamed secondary river, 20m to the north of the site boundary at its nearest point.

Environmentally Sensitive Designations

- 16.53 No designated environmentally sensitive sites have been identified within proximity of the Application Site.

Potential Contamination Sources

- 16.54 Potential sources of contamination relating to historical and current uses of the Application Site have been identified through undertaking the preliminary risk assessment presented in the Pell Frischmann Report. The following historical and current sources of contamination may have resulted in localised contamination of underlying soils and groundwater:
- Highly localised Made Ground may be present in some areas of the Application Site as a result of the historical development. Made Ground may contain organic material (a potential course of gas) and asbestos containing materials;
 - Railway lines and associated sidings (various potential metaliferous and organic contaminants);

- Naturally occurring and potentially elevated levels of metals derived from underlying geological materials;
- Contamination associated with factories in the north; and
- Contaminants associated with the farming/agriculture industry.

Potential Pathways

16.55 Potential pathways, which may exist on the Assessment Site, established during demolition and construction and / or once the Proposed Development is completed, are as follows:

- Potential pathways relating to human health including: ingestion of, dermal contact with contact with contaminated soils, dust; and inhalation of dust, gases and vapours;
- Potential pathways via which contamination may cause pollution of Controlled Waters including downward and lateral migration through soils into groundwater; downward and lateral migration along foundations / service trenches, surface run- off and direct spills; and

Potential Receptors

16.56 Potential receptors relevant to the Application Site, that may currently be affected by contamination, as required by Part IIA of the EPA 1990, are given below;

- Human health (future users of the site including visitors, employees, construction and maintenance workers and off-site land users including residential occupants);
- Minor surface waters;
- Ecological receptors; and
- Development end use (buildings, utilities and landscaping);

Potential Geotechnical Risks

16.57 There are a number of potential geotechnical risks associated with the Application Site that may have an effect on the Proposed Development, these are as follows:

- Slope stability – moderate risk of compressible / collapsible ground hazards;
- Corrosion / chemical attack of buried concrete;
- Structural defects due to presence of compressible Made Ground beneath the foundations;

- Poorly designed foundations due to lack of ground investigation information; and
- The potential for obstructions within the ground.

Potential Significant Effects

- 16.58 The potential effects of the ground conditions on the Proposed Development have been segregated into effects that relate to the construction phase and operational phase of the Proposed Development.
- 16.59 Where a potential pollution linkage or geotechnical risk is incomplete, an environmental effect is unlikely to exist. Where potential pollution linkages or geotechnical risks have been identified it is considered likely that an environmental effect may exist. The significance of the effect has been quantified (as described in sections 16.19 to 16.38) and the Significance Criteria have been applied.

Construction

Potential effects to Human Health Risks from Land Contamination Risks

- 16.60 During construction works, workers on the Application Site would be more likely to be exposed to ground contamination since the construction areas would not be accessible to the general public. Construction works, particularly any earthworks associated with the excavation of foundations and service routes could disturb and expose construction workers to potentially localised ground contamination, including asbestos containing materials. These activities could create plausible pollutant linkages through dermal contact, inhalation and / or ingestion pathways.
- 16.61 In areas of bulk excavations and stockpiled material, dust could be generated during dry and windy conditions. Under these conditions, users of the Proposed Development and the general public using footpaths adjacent to the Application Site could temporarily be exposed through inhalation of potentially contaminated dust.
- 16.62 Construction workers on the Application Site would be subject to mandatory health and safety requirements under the Construction (Design and Management) regulations 2007 (Ref. 16.5) and the Control of Substances Hazardous to Health (COSHH) Regulations 2002 (Ref. 16.6).
- 16.63 Adherence to the legislative requirements described above, would significantly reduce the potential health risk posed to construction workers from ground contamination. However, since there is the potential for dust generation, and if contaminated it could affect the general public, the likely **impact** is considered at worst, to be temporary, short-term, local, **adverse** and of **moderate significance**.

Potential effects to Controlled Waters from Land Contamination Risks

- 16.64 Construction works could disturb any contamination within the upper strata, potentially creating a pollutant linkage through downward migration between near surface soils to the unnamed surface water streams and secondary river.
- 16.65 To facilitate construction works, it is anticipated that new potential sources of contamination would be introduced and stored on the Application Site in the form of, for example, diesel fuel, oils, chemicals and construction materials. As a result, there would be a risk of leakages or spillages directly or indirectly (for example, via the surface water drainage systems) into the ground, although the likelihood and frequency of occurrence is considered to be low.
- 16.66 Owing to the potential for localised ground contamination to exist on the Application Site and new sources of contamination likely to be temporarily introduced which could potentially create new preferential pathways, in the absence of mitigation there is likely the potential for a temporary, short-term, local **adverse** impact of **moderate significance** to occur in relation to controlled waters.

Potential Effects to the Proposed Development from Geotechnical Risks

- 16.67 Due to the age and also the evidence of historic development on the site (local farm buildings), there is the potential for localised thicknesses of Made Ground deposits and potential obstructions, such as old foundations. Without the warrant of ground investigation information, there is the potential for a temporary, short term, local **adverse** impact of **moderate to major significance** on the Proposed Development (in terms of the underlying ground conditions).

Operation

Potential Risk to Future Users from Land Contamination Risks

- 16.68 Although material would likely be removed from the Application Site during construction works, it is anticipated that some localised Made Ground may remain *in-situ* following the completion of the Proposed Development. Whilst much of the Application Site would be covered either by buildings or hard-standing, forming an effective barrier to any residual contamination within the Application Site soils, pollutant linkages could be present in relation soft landscaped and communal areas. Future users, visitors and maintenance workers could therefore be potentially exposed to contaminated Made Ground and soils through dermal contact, ingestion and inhalation of soils. 16.69 Made Ground could contain organic materials, which presents a potential source of ground gas. Consequently, there is the potential for gases to accumulate in buildings, where ventilation is poor.
- 16.70 The risk of harm to human health is generally low, although the risk would be expected to be moderate in soft landscaped areas, where there is potential for pollution linkages. In the absence of appropriate mitigation measures, the likely potential impact on human health

following completion and during operation of the Development, would be expected to be long-term, local, **adverse** and of **minor significance**.

Contamination of Controlled Waters

- 16.71 Large parts of the Development would be drained hardcover (i.e. buildings, roads and pedestrian routes), which would prevent the majority of infiltration into the ground. However, in gardens as publicly accessible soft landscaped areas rainwater would infiltrate the ground. Where gardens as soft landscaped areas coincide with potential sources of contamination, there is the potential for long-term leaching of contaminants, previously contained by hard-standing or buildings, to the adjacent streams and unnamed Secondary River. However, the potential for widespread contamination and thus the risk of pollution to the streams and the unnamed Secondary River is considered to be generally low to locally moderate.
- 16.72 Because potential pollutant linkages may be disturbed; in relation to long-term leaching of contaminants in the soft landscaping areas to the unnamed streams and secondary river, the potential impact is considered to be at worst, long-term, local, **adverse** and of **moderate significance**.

Potential Risk to Proposed Landscaping

- 16.73 The exposure mechanisms for fauna would be similar to those for human exposure. However, the principal risk would relate to exposure in soft landscaped areas. Plants could also be subject to exposure by root uptake. Phytotoxic elements (principally metals, some hydrocarbons and gases) would have the potential to inhibit plant growth. However, given that the potential for the proposed landscaping to be affected by contamination is likely to be low, the potential likely impact is considered to be **adverse** and of **minor significance**.

Exposure of Infrastructure to Contaminated Soils and Groundwater

- 16.74 Buried concrete structures may be susceptible to chemical attack, particularly from sulphates. Contamination may therefore compromise the structural integrity of underground structures. Where significant phenol, hydrocarbon, acids and metal contamination is present in Application Site soils or shallow groundwater, there is the potential for contaminants to corrode and permeate plastic water supply pipework and taint water supplies.
- 16.75 The potential for gross contamination to be present on the Application Site is considered to be low. Consequently, it would be expected that the potential impact of contamination

Potential Geotechnical Risks to Proposed Development

- 16.76 Buildings associated with the Proposed Development may be susceptible to damage particularly associated with foundation failure due to poor underlying ground conditions. Where significant Made Ground is present at the Application Site associated with historic surface ground

workings or previous development of the site there is potential for foundations to fail and compromise the structural integrity of the proposed buildings.

- 16.77 Whilst likely to be localised, it is expected that Made Ground would remain in-situ on the Application Site; as such the potential for structural defects is considered to be medium. Consequently, it would be expected that the potential impact of geotechnical risks on the Proposed Development are likely to be adverse and of major significance.

Mitigation Construction

Risks to Human Health

- 16.78 A SI and risk assessment would be undertaken prior to the construction works to determine the nature and extent of any contamination and whether any geotechnical risks exist at the Application Site. A recommended scope of the SI is given in the Pell Frischmann Report. If required (dependent upon the results of the SI) a Remediation Strategy would be developed. The Remediation Strategy would be implemented accordingly followed by a Validation Report.

- 16.79 During demolition and construction, precautions would be taken to minimise the exposure of workers and the general public to potentially harmful substances. Should asbestos containing materials be encountered, appropriate Health and Safety Plans would need to be developed as required under the Construction (Design and Management) Regulations 2007 to remove and dispose of any asbestos in an appropriate and safe manner. Attention would also be paid to restricting possible off-site dust emissions. Specific protection would be developed in accordance with provisions set out in the Construction Management Chapter to include:

- Use of any dust suppression techniques, including water spraying of access roads and stockpiled in dry weather;
- Provision of wheel washing facilities for vehicles leaving the Application Site;
- Avoid the stockpiling of contaminated materials, where possible;
- Covering of stockpiled materials on the Application Site; and
- Vehicles used to transport materials and aggregates would be enclosed.

Risks to Soil and Controlled Waters

- 16.80 As part of the aforementioned SI, a risk assessment would be undertaken to establish whether any risks are present to those controlled waters (unnamed streams and Secondary River).

16.81 Measures to minimise the potential risk to Controlled Waters during the construction works would be included in any Construction Management Plan prepared for the Proposed Development. Measures would likely include:

- The provision of adequate drainage to manage surface water run-off and minimise contaminated water reaching the adjacent unnamed streams and secondary river;
- Handling and storage of any potential hazard liquids / materials in accordance with Environment Agency requirements;
- Use of appropriately tanked and bunded areas for storage of fuels, oils and other chemicals; and
- Procedures for the management of materials, spillage and spill clean-up, use of best practice construction methods and monitoring.

Geotechnical Risks

16.82 An intrusive investigation is recommended to adequately determine the presence of the Made Ground across the site associated with historic development. Also the ground investigation will identify any risks associated with the natural ground conditions at the site which may pose a risk to the Proposed Development.

16.83 The ground investigation will identify appropriate foundation design and also identify any other mitigation measures required associated with abnormal ground conditions.

Operation

Potential Risk to Future Site Users from Ground Contamination

16.84 By undertaking a SI, and subsequently producing a Remediation Strategy if required, it would ensure that the Application Site would be 'suitable for use' and that no significant unacceptable contamination risk is posed to future human receptors. In addition, a suitable thickness of clean inert topsoil would be placed in soft landscaping areas where there is potential to come in to contact with contaminated soils.

16.85 As part of the SI, it is recommended that the ground gas regime on the Application Site is established and assessed. Gas protection measures would be implemented (if required) in accordance with guidance contained in 'Assessing Risks Posed by Hazardous Ground Gases to Buildings (revised) (C665)' and British Standard 8485 'Code of Practice for Characterisation and Remediation from Ground Gas in Affected Developments'.

Contamination of Controlled Waters

16.86 As described above, a SI would be undertaken to establish the nature and extent of ground contamination. Depending on the results of the SI, a Remediation Strategy, would be developed and implemented, to ensure that there are no unacceptable risks to the adjacent unnamed streams and Secondary River.

- 16.87 Car parking and hardstanding areas would be designed to prevent uncontrolled discharges to drains. The drainage system would be designed to incorporate interceptors, filters and silt traps to avoid the discharge of any fuels or oils that have entered the system into the underlying groundwater. The interceptor system would be regularly maintained to ensure it remains functional.

Potential Risks to Proposed Landscaping

- 16.88 Although ground contamination is considered unlikely to result in a significant impact on the proposed soft landscaping, a suitable thickness of clean topsoil would be placed in areas of landscaping to reduce the likelihood of plants coming into contact with any residual contamination.

Exposure of Infrastructure to Contaminated Soils and Groundwater

- 16.89 Although the potential impact of ground contamination on buried infrastructure was assessed to be insignificant, concrete for foundations, together with services including potable water supply pipes would be selected and designed using the results of the SI. Potable water supply pipes would be selected in accordance with The UK Water Industry Research Ltd guidance and in consultation with Thames Water.

Residual Effects Construction

Potential Risk to Future Site Users from Ground Contamination

- 16.90 Providing the mitigation measures described above are implemented, the risk of harm to human health during the construction works would likely be very low. Therefore, the likely residual impact on human health during the construction of the Proposed Development would be negligible.

Contamination of Controlled Waters

- 16.91 Following the implementation of and adherence to the above measures, the contamination risk to the unnamed streams and Secondary River would likely be very low, and thus the likely residual impact during the construction of the Proposed Development would be negligible.

Geotechnical Risks

- 16.92 Following the undertaking of the ground investigation and the implementation of any mitigation measures, the risks to building structures associated with abnormal ground conditions would likely be very low, and thus the residual impact during the construction of the Proposed Development would be negligible.

Operation

Potential Risk to Future Site Users from Ground Contamination

- 16.93 Following implementation of a Remediation Strategy and gas protection measures (if necessary) the contamination risk to humans is likely to be very low. Consequently, the likely residual impact from ground contamination on the future site users during operation of the Development is considered to be negligible.

Contamination of Controlled Waters

- 16.94 Following implementation of a Remediation Strategy (if necessary) the contamination risk to Controlled Waters is likely to be very low. Consequently, the likely residual impact from ground contamination on Controlled Waters during the operation of the Development is considered to be negligible.

Potential Risks to Proposed Landscaping

- 16.95 Following implementation of a Remediation Strategy (if necessary) the risk to areas of soft landscaping is likely to be very low. Consequently the likely residual impact from ground contamination during the operation of the Development is considered to be negligible.

Exposure of Infrastructure to Contaminated Soils and Groundwater

- 16.96 Providing the mitigation measures presented above are adhered to the likely residual impact from soils and groundwater contamination during operation of the Development is considered to be negligible.

Cumulative Impacts

- 16.97 No cumulative impacts relating to ground conditions and land contamination are anticipated.

Summary

- 16.98 The main effects relating to potential soil and controlled water contamination result from the disruption to existing ground contamination during construction works, waste, fuel and chemical storage and use of plant and the potential for fuels, oils and suspended solids to enter drainage systems.
- 16.99 The main effects relating to potential geotechnical risks result from abnormal ground conditions associated with the historic surface ground workings and previous development of the site. Effects may also be caused by poor natural ground conditions.
- 16.100 It is proposed to conduct ground investigation at the Application Site prior to the detailed design of the Proposed Development in order to delineate areas of contamination, risks to human health, Controlled Waters, the presence of ground gases and identify any geotechnical risks prior to the construction of the Proposed Development.

16.101 Following the ground investigation works, should any risks be identified, mitigation measures will be implemented in order to remove the risks at the Application Site.

16.102 Mitigation Measures are likely to include PPE for construction and maintenance workers, interceptors within the drainage system, implementing a cover system with clean certified material, and appropriately designed foundations to accommodate any ground risks.

16.103 If all mitigation measures are implemented then it is anticipated that overall there is likely to be direct effect on all receptors of a negligible significance.

16.104 Table 16.5 contains a summary of the likely effects of the Proposed Development.

REFERENCE LIST

- Ref. 16.1: National Planning Policy Framework – Department for Communities and Local Government, March 2012;
- Ref. 16.2: Model Procedures for the Management of Land Contamination (CLR 11), Department for the Environment, Food and Rural Affairs and Environment Agency, 2004;
- Ref. 16.3: BS EN 1997:2004 – Eurocode 7 – Part 1 Geotechnical Design;
- Ref. 16.4: BS10175:2011 – Investigation of Potentially Contaminated Sites – Code of Practice – British Standards Institution, 2011;
- Ref. 16.5: SI2007/320 – Construction (Design and Management) Regulations (CDM) 2007 – Health and Safety Executive, 2007; and
- Ref. 16.6: SI2002/2677 – Control of Substances Hazardous to Health Regulations - 2002

Table 16.5: Table of Significance – Ground Conditions and Land Contamination

Potential Effect	Nature of Effect	Significance	Mitigation / Enhancement Measures	Geographical Importance*							Residual Effects
				I	UK	E	R	C	B	L	
Remediation / demolition / Construction											
Risk to Site Personnel	Temporary (Short term)	Moderate Adverse	PPE and welfare facilities							*	Negligible
Risk to Controlled Waters	Temporary (Short term)	Moderate Adverse	Retention Reservoirs and Interceptors Best Practice and good housekeeping						*		Negligible
Completed Development											
Risk to End Users from Contamination	Permanent	Minor Adverse	Site Investigation and Remediation Strategy							*	Negligible
Risk to Controlled Waters from	Permanent	Moderate Adverse	Site Investigation and						*		Negligible

Contamination			Remediation Strategy								
Risks to proposed structures from geotechnical hazards	Permanent	Moderate Adverse	Site Investigation							*	Negligible
Risks to Proposed Landscaping from Contamination	Permanent	Minor Adverse								*	Negligible
Risks to proposed structures from contamination	Permanent	Minor Adverse								*	Negligible
Cumulative Effects											
No cumulative effects	N/A	N/A	N/A								N/A

* **Geographical Level of Importance**

I = International; UK = United Kingdom; E = England; R = Regional; C = County; B = Borough; L = Local

17. SIGNIFICANT INTERACTIVE & CUMULATIVE EFFECTS

Introduction

- 17.1 The likely significant interactive and cumulative effects of the Proposed Development following implementation of the proposed mitigation measures have been assessed in Chapters 5 to 16. This Chapter provides a summary of the main effects.

Statement of Significance

- 17.2 Table 17.1 summarises the likely significant effects of the Proposed Development.

Table 17.1: Likely Significant Effects

Topic	Stage of Development	Receptor	Duration of Effect	Mitigation Measure	Significance of Effect
Archaeology	Construction & Operation	Area 1 late prehistoric/Roman settlement	Permanent	Area retained within open space.	Negligible
		Area 2 late prehistoric/Roman settlement	Permanent	Area retained within open space.	Negligible
		Area 3 late prehistoric/Roman settlement	Permanent	Area retained within open space.	Negligible
		Area 4 late prehistoric/Roman settlement	Permanent	Area retained within open space.	Negligible
		Hedgerows and parliamentary enclosure field system	Permanent	All hedgerows to be retained.	Negligible
		Weasel Lane	Permanent	Weasel Lane to be retained except where internal roads cross the lane.	Minor
		Newton Longville Conservation Area	Permanent	Addressed in design and layout, and by providing strategic landscaping.	Minor
		Listed Buildings at Westbrook End, Newton Longville	Permanent	Addressed in design and layout, and by providing strategic landscaping.	Minor
		Lower Salden Farmhouse	Permanent	No mitigation required.	Negligible
Agriculture	Construction	Loss of approximately 20 Ha of best and most versatile agricultural land	Permanent	It is not possible to mitigate the loss of agricultural land.	Moderate adverse
		Dagnall Farm	Permanent	Part time business and loss of a small proportion of farmed area. No	Minor adverse

				mitigation required.	
		Part of Hurdlesgrove Farm	Permanent	Remaining farm business unaffected. No mitigation required.	Minor adverse
		Land farmed by Messrs Cook	Permanent	Part time business and loss of a large proportion of farmed area. No mitigation required.	Minor adverse
		Leys Ground Farm	Permanent	Small loss of farmed area and remaining business unaffected. No mitigation required.	Negligible
	Operation	Trespass onto neighbouring agricultural land	Permanent	No mitigation required.	Negligible
		Loss of approximately 20 Ha of best and most versatile agricultural land	Permanent	It is not possible to mitigate the loss of agricultural land.	Moderate adverse
Ecology	Construction	Loss of hedgerow	Permanent	New hedgerow and woodland planting.	Minor
		Loss of semi-natural woodland	Permanent	New woodland planting.	Negligible
		Loss of bat foraging habitat	Temporary	Provide hop-overs.	Minor (short-term)
		Loss of bat roosting habitat	Permanent	Appropriate felling methodology implemented where necessary.	Minor
		Loss of reptile habitat	Permanent	Existing habitat protected, and enhanced reptile movement corridors created.	Minor
		Disturbance/killing of reptiles	Permanent	Existing habitats protected.	Negligible
		Loss of breeding bird habitat	Permanent	New hedgerow, woodland, wetland and species-rich grassland created and variety of nest boxes installed.	Minor
		Disturbance to breeding birds	Temporary	Potential breeding habitat only removed outside breeding season, and new habitat created.	Minor (short-term)
		Loss of skylark breeding habitat	Permanent	No mitigation.	Minor
		Loss of wintering bird	Permanent	New hedgerow,	Minor

		habitat		woodland, wetland and species-rich grassland created.	
		Loss of badger foraging habitat	Permanent	New woodland, hedgerows, species-rich grassland and wetland created.	Moderate
		Disturbance to badger sett	Temporary	Construction in vicinity of badger sett between December and April avoided, non-working areas within 30m of sett identified, and badger check completed prior to works.	Negligible
		Disturbance/killing of GCN	Permanent	Trapping areas within 500m of P8 defined.	Negligible
	Operation	Damage to Howe Park Wood SSSI from increased recreation pressure	Permanent	Extensive areas of on-site open space provided.	Negligible
		Damage to Railway sidings east of Salden Wood/83F08 LWS from pollution	Permanent	No mitigation.	Negligible
		Damage to Broadway and Thrift Wood/83B16 LWS from increased recreation pressure	Permanent	Extensive areas of on-site open space provided.	Negligible
		Damage to Milton Keynes Wildlife Corridor (wetland and woodland) from increased visitor pressure	Permanent	Provision extensive on-site open space	Negligible
		Disturbance to foraging and commuting bats	Permanent	Hop-overs created, new hedgerows and woodland planted, and light spill on linear features avoided.	Minor
		Disturbance to breeding birds	Permanent	Nest boxes provided.	Negligible
		Disturbance to badgers	Permanent	Enhanced foraging area close to main sett provided.	Negligible
		Disturbance/killing of reptiles from residents and domestic animals	Permanent	No mitigation.	Minor
	Drainage	Construction	Surface water run-off	Temporary	Temporary attenuation ponds constructed.

		Hydrocarbon pollution of groundwater from vehicles and storage of liquids and chemicals	Temporary	EA guidance - Pollution Prevention Guidance 6 - to be implemented. Wheel and boot washing facilities provided. Fuel tanks stored in bunded hardstanding. Oil interceptor devices used.	Negligible
	Operation	Surface water run-off	Permanent	Sustainable Drainage System (SUDS) such as swales and attenuation ponds created to reduce surface water runoff and prevent pollutants entering watercourse.	Negligible
Landscape	Construction & Operation	Bedfordshire and Cambridgeshire Claylands (NCA 88)	Permanent	Green infrastructure provided.	Negligible
		LCT 4.9 Newton Longville – Stoke Hammond Claylands	Permanent	Open space managed and new woodland and trees planted.	Minor adverse
		LCT 4.7 Whaddon Chase	Permanent	New blocks of woodland provided on western and southern boundaries.	Minor adverse
		LCT 4.8 Horwood Claylands	Permanent	New blocks of woodland provided.	Minor adverse
		Immediate Application Site context	Permanent	New woodland and trees planted and new green spaces provided.	Moderate/Minor adverse
		Application Site	Permanent	Hedgerows and hedgerow trees mostly retained and reinforced. New woodland, trees and hedgerows planted.	Moderate adverse
		Vehicular users of A421 & Whaddon Road (Viewpoint 1)	Permanent	New planting provided.	Minor adverse
		Pedestrian users of the Midshire & Swan's Way (Viewpoint 2)	Permanent	New planting and open space provided.	Minor adverse/Negligible

		Pedestrian users of Mid Shires Way footpath (Viewpoints 3 & 4)	Permanent	No mitigation.	Minor adverse/Negligible
		Vehicle users of track (Viewpoint 5)	Permanent	No mitigation.	Negligible
		Approximately 10 houses at Chase Farm (Viewpoint 6)	Permanent	Hedgerows mostly retained. New blocks of woodland planted on western boundary.	Negligible
		Vehicular users of Access road to Springfield Farm (Viewpoint 7)	Permanent	No mitigation.	Negligible
		Residents of Lower Salden Farm (Viewpoint 8)	Permanent	New woodland planted.	Negligible
		Users of footpaths between Mursley and Newton Longville (Viewpoint 9 & 10)	Permanent	Landscape planting and green infrastructure provided.	Minor adverse/Negligible
		Users of footpath past Cowpasture Farm (Viewpoint 11)	Permanent	Trees and green infrastructure provided. Sports pitches provided on highest ground.	Minor adverse
		Users of Footpath from Newton Longville (Viewpoint 12)	Permanent	Existing trees and hedgerows retained.	Minor adverse
		Users of playing fields/Milton Keynes Boundary Walk, Newton Longville (Viewpoint 13)	Permanent	Trees and green infrastructure provided.	Minor adverse/Negligible
		Approximately 20 Houses on northern edge of Newton Longville (Viewpoint 14& 15)	Temporary at construction, permanent at operational phase	Open space and woodland provided along Weasel Lane corridor. Trees, open space and green infrastructure provided on highest ground.	Temporary Major adverse during construction and at start of operational phase reducing to Moderate adverse once mitigation measures implemented
		Bletchley Road (Viewpoint 16)	Permanent	Additional landscape planting provided on southern boundary.	Minor/Moderate adverse
		Approximately 29 houses on the edge of Bletchley (Viewpoint 17)	Temporary at construction, permanent at operational phase	Open space provided.	Temporary Major adverse during construction and at start of operational phase reducing to Moderate adverse once mitigation measures

					implemented
		Users of Weasel Lane footpath & footpath to Newton Longville (Viewpoint 18)	Temporary at construction, permanent at operational phase	Trees and hedgerows along Weasel Lane corridor retained and reinforced. Additional woodland and green infrastructure provided.	Temporary Major adverse during construction and at start of operational phase reducing to Moderate adverse once mitigation measures implemented
		Users of footpath in Tattenhoe Park (Viewpoint 19)	Permanent	No mitigation.	Negligible
		Vehicular users of A421 and footpath users of subway (Viewpoint 20)	Permanent	No mitigation.	Negligible
		Future residential within Tattenhoe Park (Viewpoint 21)	Permanent	No mitigation.	Minor adverse/Negligible
		The Leys Farmhouse (Viewpoint 22)	Temporary at construction, permanent at operational phase	Existing trees and hedgerows retained. Additional woodland and trees planted. Green open space provided.	Temporary Major adverse during construction and at start of operational phase reducing to Moderate adverse once mitigation measures implemented.
		Bletchley Leys Farmhouse (Viewpoint 22)	Permanent	Existing trees and hedgerows retained. Green infrastructure provided along Weasel Lane and on western boundary.	Moderate/Minor adverse
		Vehicular users on Whaddon Road at railway bridge (Viewpoint 23)	Temporary at construction, permanent at operational phase	Additional landscape planting provided alongside railway.	Temporary Major adverse during construction and at start of operational phase reducing to Moderate adverse once mitigation measures implemented.
		Vehicular users of Shenley Road (Viewpoint 24)	Permanent	Existing trees and hedgerows retained.	Negligible
		Newton Longville, Whaddon Road (near Fire Lane) residents (Viewpoint 25)	Permanent	Open space and woodland provided along Weasel Lane corridor. Trees, open space and green infrastructure provided on highest	Moderate/Minor adverse

				ground.	
		Newton Longville, Whaddon Road users (Viewpoint 25)	Permanent	Open space and woodland provided along Weasel Lane corridor. Trees, open space and green infrastructure provided on highest ground.	Moderate/Minor adverse
		Users of Weasel Lane (west of site) (Viewpoint 26)	Permanent	Existing trees and hedgerows along Weasel Lane retained. New blocks of woodland planted.	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. Alignment and visibility improved 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. Increased capacity and improvements at Tattenhoe Roundabout. Alignment and visibility improved at Bottle Dump Roundabout.	Negligible
		Traffic levels on Buckingham	Permanent	Travel Demand	Moderate reducing

		Road		Management Strategy, Framework Travel Plan and Public Transport Strategy implemented. Increased capacity and improvements at Tattenhoe Roundabout.	to Minor once mitigation measures implemented
		Traffic levels on A421 Standing Way (between Tattenhoe and Windmill Hill Roundabouts)	Permanent	Travel Demand Management Strategy, Framework Travel Plan and Public Transport Strategy implemented. Increased capacity and improvements at Tattenhoe Roundabout.	Negligible
		Traffic levels on V1 Snelshall Street	Permanent	Travel Demand Management Strategy, Framework Travel Plan and Public Transport Strategy implemented.	Negligible
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	Construction	Construction noise on residents	Temporary	Construction Environmental Management Plan implemented. Noise monitoring conducted to ensure noise control techniques are implemented.	Moderate/Minor
		Road traffic noise during construction on residents	Temporary	Construction Environmental Management Plan implemented.	Minor
		Construction vibration on residents	Temporary	Construction Environmental	Neutral

				Management Plan implemented.	
	Operation	Operational noise on residents	Permanent	Addressed in design and layout, with dwellings separated from main noise sources and noise mitigation measures implemented.	Neutral
		Operational road traffic noise on residents	Permanent	Low-noise road surfacing used for new roads and existing roads which have been improved.	Minor/Neutral
		Vibration during operation on residents	Permanent	No mitigation.	Neutral
Socio-Economic	Construction	Employment opportunities for existing residents	Temporary	No mitigation.	Negligible
	Operation	Employees for existing and future businesses	Permanent	Land for employment uses provided, which would be attractive to small businesses. Proposed Development connected to employment sites by walking, cycling and public transport.	Minor Beneficial
		Employment opportunities for future residents	Permanent	Land for employment uses, comprising small scale starter business units, provided.	Minor Beneficial
		Education, community and health facilities for residents	Permanent	Primary school, secondary school and neighbourhood centre provided.	Moderate Beneficial
		Green infrastructure and recreation facilities for residents	Permanent	Open space and recreation facilities provided.	Minor Beneficial
Services & Utilities	Construction	Loss of supply during works to connect to the supply network	Temporary	Supply shut down localised and planned for quiet periods. Affected users notified. Essential supplies maintained. Good construction practice implemented.	Minor

	Operation	Shortages of service supplies due to constraints in the supply network	Temporary	Supply maintained by utility companies.	Negligible
Waste	Construction	Increased waste from site clearance, excavation and construction activities	Temporary	Site Waste Management Plan prepared to minimise the amount of waste generated and disposed of. Construction waste reused on-site or reused and recycled off-site.	Minor
	Operation	Off-site waste treatment and disposal facilities for household waste	Permanent	Internal and external waste and recycling storage facilities provided. Home composting facilities provided in private gardens. Bring Sites provided.	Minor
		Commercial waste facilities	Permanent	Waste and recycling storage facilities provided.	Negligible
Soil & Ground Conditions	Construction	Site personnel	Temporary	Personal protective equipment and welfare facilities provided.	Negligible
		Controlled waters	Temporary	Liquid retention reservoirs and interceptors provided. EA guidance - Pollution Prevention Guidance 5 and 6 - to be implemented.	Negligible
	Operation	End users from contamination	Permanent	Site investigation and remediation strategy implemented.	Negligible
		Controlled waters from contamination	Permanent	Site investigation and remediation strategy implemented.	Negligible
		Proposed structures from geotechnical hazards	Permanent	Site investigation and remediation strategy implemented.	Negligible
		Proposed landscaping from contamination	Permanent	Site investigation and remediation strategy implemented.	Negligible

		Proposed structures from contamination	Permanent	Site investigation and remediation strategy implemented.	Negligible
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Cumulative Effects

- 17.3 Cumulative effects are impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the Proposed Development. Table 17.2 identifies the cumulative effects, their significance, and any mitigation measures required to be included within the Proposed Development.
- 17.4 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.

Table 17.2: Cumulative Effects

Topic	Stage of Development	Receptor	Duration of Effect	Mitigation Measure	Significance of Cumulative Effect
Landscape	Construction & Operation	Users of A421 and residents of Shenley Road in Bletchley from cumulative effect of Proposed Development and development at Tattenhoe Park.	Permanent	Landscape planting and green infrastructure provided.	Negligible
Landscape	Construction & Operation	Users of Stoke Road and Whaddon Road in Newton Longville from cumulative effect of Proposed Development and development at Newton Leys.	Permanent	Hedgerows and hedgerow trees mostly retained and reinforced. Landscape planting and green infrastructure provided.	Minor
Landscape	Operation	Existing residents at nearest properties, on northern edge of Newton Longville, and on the edge of Bletchley.	Permanent	Existing trees and hedgerows retained. Additional woodland and trees planted. Green infrastructure and open space provided. Additional landscaping provided along Weasel Lane corridor, and at southern and western boundary.	Minor/Moderate adverse during construction and at start of operational phase
Air Quality – Dust	Construction	Existing residents at nearest properties, on northern edge of Newton Longville, and on the edge of Bletchley.	Temporary	Construction Environmental Management Plan and Dust Management Plan implemented.	Negligible

Air Quality – Increased Traffic Emissions	Operation	Existing residents at nearest properties, on northern edge of Newton Longville, and on the edge of Bletchley.	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 - Construction and Road Traffic	Construction	Existing residents at nearest properties, on northern edge of Newton Longville, and on the edge of Bletchley.	Temporary	Construction Environmental Management Plan implemented. Noise monitoring conducted to ensure noise control techniques are implemented.	Moderate/Minor adverse
Noise - Operational	Operation	Existing residents at nearest properties, on northern edge of Newton Longville, and on the edge of Bletchley.	Permanent	Addressed in design and layout, with dwellings separated from main noise sources and noise mitigation measures implemented.	Neutral
Noise - Operational Road Traffic	Operation	Existing residents at nearest properties, on northern edge of Newton Longville, and on the edge of Bletchley.	Permanent	Low-noise road surfacing used for new roads and existing roads which have been improved.	Minor/Neutral
Waste	Construction	Cumulative effect of increased waste from site clearance, excavation and construction activities from Proposed Development and other committed development within and on the edge of Milton Keynes	Temporary	Site Waste Management Plan prepared to minimise the amount of waste generated and disposed of. Construction waste reused on-site or reused and recycled off-site.	Minor

17.5 There will be cumulative effects arising from the Proposed Development and other developments on the topics of landscape and waste. There would be cumulative effects on the 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

- 17.6 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.

Table 17.3: Interactive Effects

Receptor	Topic	Stage of Development	Duration of Effect	Mitigation Measure	Significance of Interactive Effect
Water	Drainage – Surface Water Run-off	Construction	Temporary	Temporary attenuation ponds constructed.	Negligible
	Drainage – Hydrocarbon Pollution of Groundwater	Construction	Temporary	EA guidance - Pollution Prevention Guidance 6 - to be implemented. Wheel and boot washing facilities provided. Fuel tanks stored in bunded hardstanding. Oil interceptor devices used.	Negligible
	Drainage – Operational Surface Water Run-off	Operation	Permanent	Sustainable Drainage System (SUDS) such as swales and attenuation ponds created to reduce surface water runoff and prevent pollutants entering watercourse.	Negligible
	Soil & Ground Conditions – Controlled Waters	Construction	Temporary	Liquid retention reservoirs and interceptors provided. EA guidance - Pollution Prevention Guidance 5 and 6 - to be implemented.	Negligible

- 17.7 Interactive effects related to water would arise from the Proposed Development. Those interactive effects would mostly arise during the construction phase and would be temporary. The effects on water would be of negligible significance, and would not increase as a result of interactive effects. The proposed mitigation measures would prevent pollutants from entering watercourses or the drainage system.

Conclusions

- 17.8 The ES has identified a number of Moderate Adverse and Moderate/Minor Adverse effects arising from the Proposed Development. Moderate adverse effects are significant in EIA terms.
- 17.9 Most of the moderate adverse effects e.g. on the topics of ecology, landscape and noise, and on residential receptors, occur during the construction phase of the Proposed Development and as such would be temporary. The construction impacts on air quality, noise and waste would be mitigated by the implementation of a Construction Environmental Management Plan, Dust Management Plan, and Site Waste Management Plan, which would be secured via planning conditions. The significant moderate effects on residents as a result of construction activities would remain, although noise control techniques would be implemented to reduce the negative impacts. The significant effects on badger foraging habitat during the construction phase would remain, although the creation of new woodland, hedgerows, species-rich grassland and wetland as part of the Proposed Development would reduce the adverse effects. The moderate adverse effects on agricultural land cannot adequately be addressed through mitigation measures and as such a significant environmental effect on this topic would remain as a result of the Proposed Development. The minor adverse effects on the existing farm businesses are a consequence of development on undeveloped land which cannot be addressed through mitigation measures.
- 17.10 There would be some moderate adverse effects arising once the Proposed Development is completed, but in all cases, except for the loss of agricultural land, mitigation measures are proposed to address or reduce those significant effects. There would be some loss of ecological habitats as a result of the Proposed Development, which would be mitigated by habitat enhancement measures e.g. new woodland, hedgerows, species-rich grassland and wetland which would be delivered through a Biodiversity Management Plan. There would be no moderate adverse effects on ecology after the proposed mitigation measures have been implemented. The significant effects on landscape and views e.g. at the application site and surrounding area, and from neighbouring residential properties and users of the footpath and cycle network would be mitigated through a Landscape Strategy, comprising additional woodland, trees and hedgerows. The significant effects on the application site, the nearest residential properties, and users of the footpath and cycle network would remain, although over time those effects would reduce as the landscape enhancement measures become established. There would be moderate adverse effects on traffic levels on Buckingham Road as a result of the Proposed Development. The significant effects would be addressed by improvements to Tattenhoe Roundabout and Bottle Dump Roundabout, and through mitigation measures comprising a Travel Demand Management Strategy, Framework Travel Plan and Public Transport Strategy to reduce traffic levels and increase the use of sustainable modes of transport. The Biodiversity Management Plan, Landscape Strategy, Travel Demand Management Strategy, Framework Travel Plan and Public Transport Strategy would be secured via planning conditions.
- 17.11 There will be cumulative effects arising from the Proposed Development and other developments on the topics of landscape and waste. There would be cumulative effects on the 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 identified mitigation measures e.g. the Construction Environmental Management Plan and Landscape Strategy would be implemented to address and reduce the significant environmental effects.

18. CONCLUSIONS

Introduction

- 18.1 This Chapter of the ES sets out the conclusions of the assessment of likely significant effects arising from the Proposed Development. The likely significant effects have been identified and the proposed mitigation measures have been assessed in Chapters 5 to 16. Chapter 17 identifies the likely significant cumulative and interactive effects of the Proposed Development.
- 18.2 The Proposed Development will provide for a mixed-use sustainable urban extension on 144.77 Ha of land to the south west of Milton Keynes. In summary, the proposed development comprises the following: up to 1,855 mixed tenure dwellings (C3), an employment area (B1), a neighbourhood centre, land for a primary school and secondary school, allotment space, and multi-functional green open space, and associated infrastructure.
- 18.3 Development Parameters have been established and assessed so that appropriate planning conditions can be defined which would provide limits and controls for future reserved matters applications. The Development Parameters to be defined by planning conditions include:
- the location and types of land use;
 - the maximum quantum of floorspace for the proposed uses;
 - the maximum heights of development;
 - landscaping and open space; and
 - highway access and pedestrian and cycle linkages.
- 18.4 The likely significant effects on the potential receptors of the Proposed Development, both during construction and operation have been considered in the various ES technical studies. The potential sensitive receptors can be summarised as follows: neighbouring residential areas; heritage assets including conservation areas, listed buildings and areas of archaeological interest; agricultural land and farm businesses; protected ecological habitats and species; the surrounding landscape; the highway, cycle and footpath networks; and existing watercourses.
- 18.5 Assessment of the environmental impacts was undertaken alongside the design process, so that many of the measures to mitigate the likely significant adverse effects have been incorporated into the Proposed Development. For example, the areas of archaeological interest at the Application Site (four areas of late prehistoric/Roman settlement) are retained within the proposed open space. The existing trees, woodland and hedgerows have been retained and enhanced to minimise potential effects on ecology and landscape and visual matters. Potential effects on the highway network will be addressed by improvements to Tattenhoe Roundabout and Bottle Dump Roundabout. The Proposed Development includes a Sustainable Drainage System (SUDS) such as swales and attenuation ponds in order to reduce surface water runoff and prevent pollutants entering the watercourse.
- 18.6 EA guidance on pollution prevention during the construction phase – Works and Maintenance In or Near Water: PPG5 and Working at Construction and Demolition Sites: PPG6 – will be

complied with. For example, wheel and boot washing facilities will be provided, fuel tanks will be stored in bunded hardstanding areas, and oil interceptor devices will be used.

- 18.7 The Construction Environmental Management Plan, Dust Management Plan and Site Waste Management Plan will ensure that the construction process is managed effectively so that significant adverse effects do not occur, in particular in terms of air quality, noise and waste. A Biodiversity Management Plan will be prepared to ensure that the ecological enhancement measures to mitigate significant adverse effects on habitats and protected species are delivered as part of the Proposed Development. A Landscape Strategy has been prepared to identify the strategic landscaping and green infrastructure required to address landscape and visual effects arising as a result of the Proposed Development. A Construction Phase Traffic Management Plan will be implemented to minimise the construction traffic impacts. A Travel Demand Management Strategy, Framework Travel Plan and Public Transport Strategy will be implemented to address traffic impacts and deliver improvements to non-car modes of travel.

Significant Effects

- 18.8 The ES has identified a number of Moderate Adverse and Moderate/Minor Adverse effects arising from the Proposed Development. Moderate adverse effects are significant in EIA terms.
- 18.9 Most of the moderate adverse effects e.g. on the topics of ecology, landscape and noise, and on residential receptors, occur during the construction phase of the Proposed Development and as such would be temporary. The construction impacts on air quality, noise and waste would be mitigated by the implementation of a Construction Environmental Management Plan, Dust Management Plan, and Site Waste Management Plan, which would be secured via planning conditions. The significant moderate effects on residents as a result of construction activities would remain, although noise control techniques would be implemented to reduce the negative impacts. The significant effects on badger foraging habitat during the construction phase would remain, although the creation of new woodland, hedgerows, species-rich grassland and wetland as part of the Proposed Development would reduce the adverse effects. The moderate adverse effects on agricultural land cannot adequately be addressed through mitigation measures and as such a significant environmental effect on this topic would remain as a result of the Proposed Development.
- 18.10 There would be some moderate adverse effects arising once the Proposed Development is completed, but in all cases, except for the loss of agricultural land, mitigation measures are proposed to address or reduce those significant effects. There would be some loss of ecological habitats as a result of the Proposed Development, which would be mitigated by habitat enhancement measures which would be delivered through a Biodiversity Management Plan. The significant effects on landscape and views would be mitigated through a Landscape Strategy, comprising additional woodland, trees and hedgerows. The significant landscape effects on the application site, the nearest residential properties, and users of the footpath and cycle network would remain, although over time those effects would reduce as the landscape enhancement measures become established. There would be moderate adverse effects on traffic levels on Buckingham Road as a result of the Proposed Development. The significant effects would be addressed by improvements to Tattenhoe Roundabout and Bottle Dump

Roundabout, and through mitigation measures comprising a Travel Demand Management Strategy, Framework Travel Plan and Public Transport Strategy to reduce traffic levels and increase the use of sustainable modes of transport. The Biodiversity Management Plan, Landscape Strategy, Travel Demand Management Strategy, Framework Travel Plan and Public Transport Strategy would be secured via planning conditions.

- 18.11 In Table 18.1 the potential sensitive receptors and the mitigation measures to address significant adverse effects on them arising as a result of the Proposed Development are identified.

Table 18.1 Potential Sensitive Receptors

Category	Sensitive Receptor/Land Use	Mitigation
Land Use	<p>Properties within the Application Site and in neighbouring residential areas including:</p> <ul style="list-style-type: none"> Residents at Chase Farm, Lower Salden Farm, The Leys Farmhouse, and Bletchley Leys Farmhouse; and Residents on edge of Bletchley, Far Bletchley, and Newton Longville. 	<p>Addressed in design and layout. Dwellings separated from main noise sources and noise mitigation measures implemented. Low-noise road surfacing used for new roads and existing roads which have been improved. Construction Environmental Management Plan and Dust Management Plan implemented. Noise monitoring conducted to ensure noise control techniques are implemented.</p>
Cultural Heritage	<ul style="list-style-type: none"> Newton Longville Conservation Area; Listed Buildings; Areas of Archaeological Interest including late prehistoric/Roman settlements within the Application Site; and, Areas of ridge and furrow. 	<p>Late prehistoric/Roman settlement retained in areas of open space. Addressed in design and layout, and by providing strategic landscaping.</p>
Agricultural Land	<ul style="list-style-type: none"> Agricultural land quality comprising Grade 3a and sub-Grade 3b; and, Three existing farm businesses (two full-time and one part-time). 	<p>It is not possible to mitigate the loss of agricultural land. There is no need for any mitigation in relation to the occupying farming businesses. Two of the businesses will remain operating off-site as viable businesses and the other two businesses only operate on a part-time basis.</p>
Ecology	<ul style="list-style-type: none"> Milton Keynes Wildlife Corridor Wetland and Woodland within the Application Site Railway Sidings east of Salden Wood/83F08 Semi-natural woodland Mature trees Hedgerows Great Crested Newts Bats Reptiles Breeding and Overwintering Birds Badgers 	<p>Existing habitats protected and enhanced. Biodiversity Management Plan prepared.</p>
Landscape & Visual	<ul style="list-style-type: none"> Newton Longville Conservation Area; Landscape Character Areas of Newton Longville – Stoke Hammond Claylands, Whaddon Chase, and Horwood Claylands; Users of footpaths on Midshires and Swan's Way, Weasal Lane, Milton Keynes Boundary Walk, and at Cowpasture Farm and around Newton Longville; 	<p>Hedgerows and hedgerow trees mostly retained and reinforced. New woodland, trees and hedgerows planted. Landscape Strategy prepared.</p>

	<ul style="list-style-type: none"> Residents at Chase Farm, Lower Salden Farm, The Leys Farmhouse, and Bletchley Leys Farmhouse; and Residents on edge of Bletchley, Far Bletchley, and Newton Longville. 	
Transport, Movement and Access	<p>Vehicles, pedestrians and cyclists using the local highway network, including at:</p> <ul style="list-style-type: none"> A421 (Standing Way); Whaddon Road; Weasel Lane; Milton Keynes Boundary Walk; and, Other Rights of Way. 	<p>Travel Demand Management Strategy, Framework Travel Plan and Public Transport Strategy implemented. Increased capacity and improvements at Tattenhoe Roundabout. Alignment and visibility improved at Bottle Dump Roundabout.</p>
Water	<p>Existing watercourses at the Application Site and in the vicinity:</p> <ul style="list-style-type: none"> Tattenhoe Brook; Tributary of River Ouzel; and, Field drains. 	<p>Pollution Prevention Guidance to be implemented. Wheel and boot washing facilities provided. Fuel tanks stored in bunded hardstanding. Oil interceptor devices used. Swales and attenuation ponds created to reduce surface water runoff and prevent pollutants entering watercourse.</p>

Cumulative Effects

- 18.12 The ES has identified cumulative effects associated with the Proposed Development i.e. impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the Proposed Development. The traffic modelling undertaken to inform the transport assessment 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 have been assessed. The landscape related cumulative effects arise from the developments at Tattenhoe Park and Newton Leys. The construction waste related cumulative effects arise from committed developments within and on the edge of Milton Keynes. There would be cumulative effects on the 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

- 18.13 The ES has identified interactive effects associated with the Proposed Development. The interactive effects relate to water. The effect on water would arise from impacts on surface

water run-off, hydrocarbon pollution of groundwater and controlled water. Those interactive effects would mostly arise during the construction phase and would be temporary. The effects on water would be of negligible significance, and would not increase as a result of interactive effects. The proposed mitigation measures would prevent pollutants from entering watercourses or the drainage system.

Conclusions

- 18.14 In conclusion, the ES has identified a number of Moderate Adverse and Moderate/Minor Adverse effects arising from the Proposed Development both during the construction and operational phase. The construction impacts on air quality, noise and waste would be mitigated. The significant effects on badger foraging habitat during the construction phase would remain, although the creation of new woodland, hedgerows, species-rich grassland and wetland as part of the Proposed Development would reduce the adverse effects. The moderate adverse effects on agricultural land cannot adequately be addressed through mitigation measures and as such a significant environmental effect on this topic would remain. The minor adverse effects on the existing farm businesses are a consequence of development on undeveloped land which cannot be addressed through mitigation measures.
- 18.15 There would be some moderate adverse effects arising once the Proposed Development is completed, but in all cases, except for the loss of agricultural land, mitigation measures are proposed to address or reduce those significant effects. The Biodiversity Management Plan, Landscape Strategy, Travel Demand Management Strategy, Framework Travel Plan and Public Transport Strategy would be secured via planning conditions. The significant landscape effects on the application site, the nearest residential properties, and users of the footpath and cycle network would remain, although over time those effects would reduce as the landscape enhancement measures become established.