Infinity Garden Village (Wragley Way)

ENVIRONMENTAL STATEMENT
Volume 2
Main Technical Studies

June 2019



Hallam Land Management

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter A: Introduction and Background

June 2019

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A1.0 Introduction

Purpose

1.1 The purpose of this Environmental Statement is to assess the direct and indirect likely significant effects of proposed residential and employment development at Wragley Way (being part of Infinity Garden Village) upon: population; human health; biodiversity; land soils; water; air and climate; material assets; cultural heritage and the landscape. It thereby forms part of the related applications by Hallam Land Management Limited ('the Applicant') for outline planning permissions from South Derbyshire District Council and (for part of the residential application) Derby City Council.

1.2 This chapter addresses the following:

- Background and Context
- Policy
- Structure of Environmental Statement
- The Environmental Statement Team
- Availability of Document

1.3 This chapter of the Environmental Statement ('ES') has been prepared by Planning and Design Group (UK) Limited ('P&DG').

About the Author

1.4 P&DG is a planning and urban design consultancy with extensive experience of the identification, promotion and securing of development opportunities through the planning system. Members of the P&DG team have undertaken numerous EIAs across a variety of development types. P&DG's contribution to this EIA has been led by Mr David Peck BA(Hons) MRRP MRTPI assisted by Mrs Claire Adie BA(Hons) MA MRTPI, both Chartered Members of the Royal Town Planning Institute.

A2.0 Background and Context

Applicant

2.1 This ES has been prepared on behalf of Hallam Land Management Limited ('HLML' – the Applicant). HLML is the strategic land and planning promotion arm of the Henry Boot Group of Companies. HLML has been working with local landowners, the local authorities and other stakeholders for over fifteen years to assess and promote the opportunities offered by land in this area to meet the development needs of the local community. This has resulted in the allocation of land within both South Derbyshire and Derby City Local Plans and support from Government as part of the Garden Village programme.

Site Context

2.2 The site (comprising of two planning application areas) comprises agricultural land adjacent to existing development on the southern edge of Derby. The southern boundary of the site is defined by the A50 (Derby Southern Bypass). The western edge of the site is marked by the Derby to Birmingham railway. The site's eastern edge falls to the east of Deep Dale Lane. The site also incorporates land to the east of existing development.

2.3 The total site area for the ES is 149 hectares (368 acres), with the 'residential' proposals extending to 128 ha (316 acres) and the 'employment' proposals to 21 ha (52 acres). The distance between the westernmost and easternmost boundaries is around 2.8 kilometres (1.7 miles) at its maximum.

2.4 The ES site falls mainly within South Derbyshire District. It abuts land within Derby City to the north. Part of the 'residential' proposal site falls within Derby City, though no built development is proposed within that area.

2.5 The ES site falls within the area identified as 'Infinity Garden Village'.

Design Process

2.6 The proposals have been subject to extensive engagement and discussions over an extended period with South Derbyshire District Council, Derby City Council, Derbyshire County Council and other statutory bodies and consultees, including the Highways Agency. In addition there has been engagement with community representatives and other stakeholders, supplementing the Councils' own consultation in respect of their Local Plans and other statutory obligations. Most recently, these processes of engagement and consultation have been focussed around and through the

Infinity Garden Village proposals. The Design and Access Statement that accompanies these planning applications sets out details of how the design of the proposals has evolved.

Proposed Development

2.7 The Proposed Development assessed within this ES is comprised of two components, generally described as follows:

'Residential Component':

Development of up to 1,850 dwellings, a 2 form entry primary school, a local centre (including community hall, retail and other local services and facilities), public house, drive-through restaurant, petrol filling station, strategic highway infrastructure including new junction on the A50 and associated road links, public open space including children's play provision, surface water drainage infrastructure, landscaping, earthworks and ancillary supporting infrastructure.

'Employment Component':

Development of employment uses, and related road links, surface water drainage infrastructure, landscaping, earthworks and ancillary supporting infrastructure.

2.8 The built-form components development of the Proposed Development are as follow:

Use	Development Quantum
Residential Component	
Residential dwellings	Up to 1,850 dwgs
2 form entry primary school	between 1.6 and 2 hectares site area
Local centre (including community hall, retail and other local services and facilities)	up to 1,900 sqm gross floor area
Public house	750 sqm gross floor area
Drive-through restaurant	450 sqm gross floor area
Petrol filling station	450 sqm gross floor area
Employment Component	
Employment uses (Use Classes B1, B2 and B8)	a minimum of 46,500 sqm up to 51,100 sqm gross floor area

2.9 The proposals for the new junction on the A50, link road and related works are as set out in the planning application submitted on behalf of Derbyshire County Council to Derbyshire County Council, ref. CD9/0319/110. That application can be viewed via the following link:

https://apps.derbyshire.gov.uk/applications/planning-applications/profile.asp?AppCode=CD9/0319/110&AppType=2

2.10 The County Council's description for that planning application is as follows: *'Demolition of Ashlea Farm and related buildings off Deep Dale Lane and the development of a new all movement junction on the A50 and connecting link road to Infinity Park Way, with associated works including: street lighting columns, footways/cycleways, construction of earth mounds, flood compensation areas, acoustic fencing and landscaping.'*

2.11 Where relevant, this ES has regard to the proposals for the junction on the A50 and connecting link road, as set out in the above referenced application. Whilst the Proposed Development assessed within this ES makes provision for the A50 junction, link road and related works, the applications supported by this ES do not seek planning approval of the detailed design of those works.

2.12 The proposed development assessed by this ES is more fully described within Chapter C 'Site and Scheme Description'.

A3.0 Policy Context

Purpose

3.1 The purpose of this section of the Introductory chapter is to set out the main national and development plan policy and guidance material to the assessment of the Proposed Development. Individual technical chapters and their corresponding Technical Appendices may refer in detail to specific policies and guidance

National Policy

3.2 The National Planning Policy Framework (NPPF 2019) is a material consideration in planning decisions. Among other things, it provides for several objectives relevant to the proposal, including:

- the achievement of sustainable development (para 7)
- a presumption in favour of sustainable development in planning related decisions (para 11)
- the need for a plan-led planning system, with plans providing a positive vision for the future of an area and a framework for addressing economic, social and environmental priorities (para 15)
- plan policies to set out an overall strategy for the pattern, scale and quality of development, and make sufficient provision for development including housing and transport infrastructure (para 20)
- the avoidance of significant adverse impacts on the plan's economic, social and environmental objectives (para 32)
- the Government's objective of significantly boosting the supply of homes (para 59)
- the provision of affordable housing at major sites (para 64)
- establishing housing requirement (para 65)
- the preparation of strategic housing land availability assessments to inform policies which identify a sufficient supply and mix of sites, taking into account their availability, suitability and likely economic viability (para 67)
- the supply of large numbers of new homes through larger scale developments such as significant extensions to existing villages and towns, provided they are supported by the necessary infrastructure and facilities (para 72)
- conditions in which businesses can invest, expand and adapt, taking into account the need to support growth and allow areas to build on their strengths and counter any weaknesses and address the challenges of the future (para 80)
- achieving healthy, inclusive and safe places (para 91)

- social, recreational and cultural facilities (para 92)
- provision of school places (para 94)
- access to a network of high quality open spaces and opportunities for physical activity (para 96)
- realisation of opportunities from proposed transport infrastructure (para 102)
- large scale transport facilities that need to be located in the area (para 104)
- the effective use of land in meeting the need for homes and other uses while safeguarding and improving the environment and facilitating safe and healthy living conditions (para 117)
- achieving appropriate densities and the efficient use of land (para 122)
- achieving well designed places (para 124)
- good design to create better places in which to live and work, and help make development acceptable to communities (para 125)
- climate change (para 150)
- the avoidance of inappropriate development in flood risk areas (para 155)
- the prevention of development contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability (para 170)
- biodiversity (para 175)
- the suitability of sites for proposed uses talking account of ground conditions and risks from land instability and contamination (para 178)
- the limitation of light pollution from artificial light on local amenity (para 180)
- development to contribute towards compliance with relevant limit values, taking into account Air Quality Management Areas (para 181)
- integration of development (para 182)

Development Plan

3.3 The development plan documents which form a part of the statutory development plan for South Derbyshire are the adopted Local Plan (Parts 1 and 2), and within Derby City the Derby City Local Plan Core Strategy Part 1 (2017) and saved policies of the City of Derby Local Plan Review (2006).

South Derbyshire Local Plan Part 1

3.4 The 'residential' proposals fall primarily within the area allocated by Policy H15: Wragley Way (South Derby). The land is expected to deliver a total of 1,950 homes with 1,300 of these homes delivered during the lifetime of the Local Plan.

3.5 Policy H15 recognises the sustainable location of the allocated land given proximity to a range of services, facilities and public transport access to the Sinfin District Centre. The policy also notes the phased nature of development across the allocation but recognises the need for a comprehensive approach to secure appropriate infrastructure delivery when required.

3.6 Through Policy H15 a range of policy criteria are established that are required to be delivered or met as a part of the whole allocation, specifically:

- New highway infrastructure to mitigate transport impacts associated the whole allocation including provision for and/or contributions to the South Derby Integrated Transport Link (SDITL)
- Contributions made toward A50/A514 and A50/A38 junction improvements
- Development should not prejudice the construction of a potential junction connecting allocated land to the A50, this connection may be needed after construction of the SDITL (the quantum of homes occupied prior to construction of the SDITL is to be agreed with relevant organisations)
- Provision for a new primary school and on-site local shopping centre to serve development across the whole allocation
- Quality pedestrian and cycle links made to nearby services, amenities, residential and employment areas
- Provision of a green buffer across boundary land to the east, south and west of the allocation
- Improvements made to existing green infrastructure alongside the provision of new green infrastructure on-site

3.7 Policy H15 represents a joint, cross boundary allocation operating alongside Policy AC18 – Wragley Way of the Derby City Local Plan Part 1: Core Strategy. Collectively, this allocation forms a part of a wider sustainable urban extension to Derby delivered between Derby City Council, South Derbyshire District Council and wider partners.

3.8 Policy S1: Sustainable Growth Strategy states the intention to promote sustainable growth in order to meet the South Derbyshire's objectively assessed need for housing and employment development through the Local Plan. The policy draws on the social, economic and environmental roles of

planning, as outlined in the NPPF, that are essential to the delivery of sustainable growth.

3.9 Policy S2: Presumption in Favour of Sustainable Development reinforces the NPPF's positive and proactive approach to planning that reflects the general presumption in favour of sustainable development. Policy S2 states that planning applications that accord with all relevant Local Plan policies (Part 1 and 2) 'will be dealt with positively and without delay, unless material considerations indicate otherwise.'

3.10 Policy S4: Housing Strategy outlines the importance of delivering on allocated, strategic sites in order to accommodate the majority of the housing target for at least an additional 12,618 dwellings over the Local Plan period.

3.11 Policy S6: Sustainable Access states the intention to reduce the need to travel by private car through the appropriate location of new development to minimise travel distances and supporting measures that boost sustainable transport options.

3.12 Policy SD1: Amenity and Environmental Quality considers the potential for development to adversely impact on surface and ground water levels, any impact on local habitats, air quality and the impact of development on wider amenity issues, for example noise.

3.13 Policy SD2: Flood Risk underlines a sequential approach to flood risk management that gives priority to the development of sites with the lowest risk of flooding. Also outlined is the requirement of new development to minimise the likelihood of increasing local flood risk and, where appropriate and necessary, incorporate Sustainable Drainage Systems ('SUDS').

3.14 Policy SD3 Sustainable Water Supply, Drainage and Sewerage Infrastructure states the need for new development to consider the need for adequate water supply, sewerage and drainage infrastructure.

3.15 Policy H21: Affordable Housing states that up to 30% of new housing development will be negotiated as affordable housing on sites of 15 dwellings or more. This is with consideration given to the local housing market, development viability and any phasing.

3.16 Policy BNE1: Design Excellence looks to promote a high standard of development design that relates to the general principles of sustainable development and improves the quality of life for local residents.

3.17 Policy BNE2: Heritage Assets states that development that affects South Derbyshire's heritage assets will be expected to protect, conserve and enhance the assets and their settings in accordance with national guidance.

3.18 Policy BNE3: Biodiversity outlines support for development which contributes to the protection, enhancement, management and restoration of biodiversity or geodiversity.

3.19 Policy BNE4 Character and Local Distinctiveness seeks to ensure the character, local distinctiveness and quality of South Derbyshire's landscape and soilscape will be protected and enhanced through the careful design and sensitive implementation of new development. Developers will be expected to retain key valued landscape components such as mature trees, established hedgerows and topographical features within development sites unless it can be demonstrated that the loss of features will not give rise to unacceptable effects on local landscape character.

3.20 Policy INF1: Infrastructure and Developer Contributions establishes the intention to review planning obligations through a Supplementary Planning Document and look to adopt a Community Infrastructure Levy. In line with general viability, development will be expected to contribute to on or off-site infrastructure provision where any need is identified.

3.21 Policy INF2: Sustainable Transport supports development where associated travel generation has no undue detrimental impact and where the opportunity for on/off-site sustainable transport (including walking and cycling) methods are positively considered.

3.22 Policy INF4: Transport Infrastructure Improvement Schemes looks, in relation to the planning application, to deliver the SDITL in partnership with a range of public and private organisations.

3.23 Policy INF5: East Midlands Airport sets out requirements for consultation with the operator of East Midlands Airport in regards to officially safeguarded areas for East Midlands Airport, and possible restrictions on building height or other development which might create a bird hazard, as described in Department for Transport Circular 11/2003.

3.24 Policy INF6: Community Facilities outlines the requirement that developments either provides, or makes a proportionate contribution to, appropriate community facilities proportionate to the scale of development.

3.25 Policy INF7: Green Infrastructure sets out that the Council will seek to conserve, enhance and wherever possible extend green infrastructure in the

District by working with partners to: protect ecological, ecological and geological assets; secure development that maximises the opportunities to conserve, enhance and restore biodiversity and geological diversity and to increase provision of, and access to, green infrastructure; promote the appropriate management of features of major importance for wild flora and fauna; support the development of the Green Infrastructure Network.

3.26 Policy E4: Strategic Location for Sinfin Moor Employment Site Extension identifies land at Sinfin Moor for development within Use Classes B1(b), B1(c), B2 and B8 as an extension to planned new employment development at Sinfin Moor (Infinity Park). This allocation abuts the eastern edge of the 'employment' application.

South Derbyshire Local Plan Part 2

3.27 Policy BNE7: Trees, Woodland and Hedgerows outlines the expectation that, where appropriate, any development proposals have regard to a related arboricultural and/or hedgerow survey and any necessary mitigating action is taken where risk is identified.

3.28 Policy BNE10: Heritage seeks to conserve and enhance the historic environment.

3.29 Policy RTL1: Retail Hierarchy supports a new Local Centre at Wragley Way.

3.30 Policy INF12: Provision of Secondary Education Facilities identifies that 'Land at Southern Derby Area/Infinity Garden Village' is allocated for secondary education provision, and that the site will be identified through the provisions of Policy INF13. Furthermore, it states that the school will provide a minimum of an 800-pupil place secondary school on a minimum of 10 hectares.

3.31 Policy INF13: Southern Derby Area and Infinity Garden Village confirms support for a mix of uses as part of the Infinity Garden Village development. In order to support the required infrastructure delivery, Policy INF13 states that a joint 'development framework document' will be prepared to guide the development and cross boundary collaboration between South Derbyshire District Council, Derby City Council, Derbyshire County Council and developers. Once approved, the development framework document will guide the delivery of the following development in support of the Infinity Garden Village proposal:

- Local Plan Part 1 Policy H15: Wragley Way
- Local Plan Part 1 Policy E4: Infinity Park Extension
- Local Plan Part 1 Policy INF4: The South Derby Integrated Transport Link

- Local Plan Part 1 Policy H15 vii: A new local shopping centre
- Local Plan Part 1 H15 ix: Green and Blue Infrastructure across the Southern Derby Area with consideration to Derby City's Green Wedge policy
- Local Plan Part 2 INF12: New secondary school
- Local Plan Part 1 Policy H15 iii: An A50 junction at Deep Dale Lane to serve the Southern Derby Area proposals.

3.32 Policy INF13 states that until the development framework document is approved, any necessary infrastructure required to deliver the comprehensive approach will be supported.

Derby City Local Plan - Part 1: Core Strategy

3.33 Policy CP1(a) Presumption in Favour of Sustainable Development states that when considering development proposals, the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the NPPF.

3.34 Policy CP1(b) Placemaking Principles for Cross Boundary Growth confirms that the Council will work collaboratively on proposals for development on the edge of the City, either wholly or partly within the administrative boundary of a neighbouring authority to seek to ensure schemes:

- Demonstrate joint working with neighbouring authorities, and with partners, to achieve a coordinated and well-designed form of development with appropriate infrastructure delivered in a timely manner;
- Create sustainable, safe and high-quality urban extensions which are well integrated with and accessible from existing areas of the city;
- Take a strategic, integrated and sustainable approach to water resource management, including SuDS and flood risk mitigation, biodiversity and green infrastructure.
- Thoroughly assess the traffic impacts of the development on the City's road network to mitigate adverse impacts.
- Provide new and improved community and commercial facilities and services to sustainably meet the day to day needs of new and existing residents.

3.35 Policy CP2 Responding to Climate Change affirms the Council's commitment to tackling the causes and effects of climate change, ensuring that all development takes account of opportunities to reduce greenhouse gas emissions and minimise the impacts caused as a result of a changing climate.

3.36 Policy CP3 Placemaking Principles espouses the need for high quality design.

3.37 Policy CP4 Character and Context expects that all proposals for new development will be make a positive contribution towards the character, distinctiveness and identity of neighbourhoods.

3.38 Policy CP6 Housing Delivery confirms the Council will work collaboratively with its Housing Market Area partners, to ensure that the City's full, objectively assessed needs for market and affordable housing are met.

3.39 Policy CP9 Delivering a Sustainable Economy states that the Council is committed to realising the vision of a thriving, sustainable economy that contributes to making the D2N2 Local Enterprise Partnership area more prosperous, better connected and increasingly economically resilient and competitive.

3.40 Policy CP16 Green Infrastructure seeks to maintain, enhance and manage Derby's green infrastructure to ensure that everyone has access to high quality, natural and semi-natural habitats, green space and sport and recreation facilities.

3.41 Policy CP17 Public Green Space confirms the Councils' commitment to ensuring that everyone Policy has access to a network of multi-functional public green spaces. The Council will seek to ensure that this network provides a diverse range of spaces to meet city-wide needs.

3.42 Policy CP18 Green Wedge seeks to limit development in land designated as Green Wedge to seven types of development. This includes, amongst others, green space and nature conservation. The policy's explanatory text informs that the Green Wedges' primary function is to define and enhance the urban structure of the city as a whole, in particular by reinforcing local identity by maintaining areas of open land between the City's neighbourhoods. It notes that 'All have important existing or potential recreational and ecological value'. Where urban extensions occur, outside of the city boundary, the Council states that it will seek to ensure that the wedge itself, inside and outside, the City will be continued.

3.43 Policy CP19 Biodiversity seeks to ensure that biodiversity and geodiversity assets across the City will be protected, enhanced, managed, restored, strengthened and created in a manner appropriate to their significance.

3.44 Policy CP20 Historic Environment confirms the Council's recognition of the historic environment as one of Derby's greatest resources and will protect it

through the preservation, enhancement, restoration and repair of heritage assets.

3.45 Policy CP23 Delivering a Sustainable Transport Network seeks to ensure that people living, working and travelling within Derby will have viable travel choices and effective, efficient and sustainable transport networks which meet the needs of residents and businesses while supporting sustainable economic growth and competitiveness.

3.46 Policy CP24 Transport Infrastructure outlines the Council's intention to work with partners to deliver the Council's long-term transport strategy in association with the Local Transport Plan and support the implementation of strategic proposals and initiatives that help create an economically and environmentally sustainable transport network. The policy states that one of the initiatives is the South Derby Integrated Transport Link Phases 1 and 2.

3.47 Policy AC15 Land South of Wilmore Road, Sinfin (Infinity Park Derby) allocates a total of 86.8 hectares of land to the south of Wilmore Road for the development of a new high-quality business park accommodating B1, B2 and B8 uses. The policy supports proposals for delivery of the South Derby Integrated Transport Link, subject to the requirements of Policy CP24, and proposals that help provide sustainable and accessible links to new housing at Wragley Way.

3.48 Policy AC18 Wragley Way identifies that land south of Wragley Way will form a new sustainable urban extension to Derby, the majority of which will be within South Derbyshire. It acknowledges that land within Derby City will deliver a minimum of 180 homes. The strategic location south of the urban extent of the City will provide over 2,000 new homes and supporting infrastructure. The policy confirms that Derby City Council will work with South Derbyshire District Council to ensure the comprehensive masterplanning of the area, including amongst other matters, the establishment of green infrastructure links, employment opportunities, links to the open countryside within South Derbyshire, recreational benefits and related infrastructure, including new highway infrastructure, school provision, shopping and community facilities landscaping between new homes and proposed employment and improvements to the Green Wedge.

City of Derby Local Plan Review

3.49 Policy GD5 Amenity seeks to ensure a satisfactory level of amenity is provided as part of development proposals.

3.50 Policy E12 Pollution states that planning permission will not be granted for development which would generate pollutants that would be unacceptably

detrimental to the health and amenity of users of the development, users of adjoining land or the environment.

3.51 Policy E17 Landscaping Schemes states that in granting planning permission, conditions will be applied requiring the undertaking of landscaping schemes, where necessary to achieve stated objectives including minimising adverse visual impacts, retaining and incorporating natural features such as trees and hedges and providing visual and ecological links between important environmental resources such as green wedges.

3.52 Policy E21 Archaeology states planning permission will not be granted for development which is likely to adversely affect nationally important archaeological remains.

3.53 Policy E24 Community Safety requires new development to provide a safe and secure environment and take full account of the need for community safety and crime prevention measures.

3.54 Policy E30 Safeguarded Areas around Aerodromes states that within the safeguarded area new development will only be permitted where it will not result in a serious safety hazard to aircraft.

Supplementary Planning Documents

3.55 The following Supplementary Planning Documents (SPD) are relevant to the proposal:

- SDDC Affordable Housing SPD (November 2017)
- SDDC Cycling Strategy (2001)
- SDDC Design Guide SPD (November 2017)

A4.0 Structure of the Environmental Statement

Purpose

4.1 The purpose of this section of the Introductory chapter sets out the structure of the ES.

Structure

4.2 The findings of the EIA are set out in this ES which comprises three volumes:

- Volume 1 – Non Technical Summary
- Volume 2 – Main Technical Studies
- Volume 3 – Appendices and Figures to the main Technical Studies
- Volume 4 – A plan which details the Proposed Development parameters

4.3 A summary of the form and nature of consultation which has taken place with the local community, consultees, and stakeholders in relation to the EIA is also included, including a summary in Chapter B (Scope and Methodology) and further specific detail in technical Chapters D to L.

4.4 The ES contains all the information required in Schedule 4 of the 2017 Regulations which is necessary to assess the environmental effects of the development and also accords with the details specified in paragraph 18(3), 18(4) and 18(5) which defines what comprises an ES.

A5.0 The Environmental Statement Team

The ES Team

5.1 HLML has assembled an experienced team to undertake the EIA of the Proposal. The team and their roles are identified below within Table A1.

Table A1: ES Team Members and Responsibilities

Chapter	Title	Responsibility
A	Introduction and Background	Planning and Design Group
B	Scope, Methodology	Planning and Design Group
C	Site and Scheme Description	Planning and Design Group
D	Transport	RPS
E	Water Environment	BWB
F	Ground Conditions	BWB
G	Heritage and Archaeology	Orion
H	Landscape and Visual Impact	FPCR
I	Ecology	FPCR
J	Air Quality	Air Quality Consultants
K	Noise	Cole Jarman
L	Socio Economics	Planning and Design Group
M	Cumulative Impacts	Planning and Design Group
N	Mitigation and Monitoring	Planning and Design Group

Professional Credentials

5.2 In accordance with Regulation 18(5) of the 2017 EIA Regulations, this EIA has been undertaken by competent experts within the relevant technical specialisms that are addressed within the body of the ES.

A6.0 Availability of Document

6.1 An electronic (CD-ROM) copy of the full ES can be obtained from:

Planning and Design Group (UK) Limited
Pure Offices
Lake View Drive
Sherwood Park
Nottingham
NG15 0DT

Tel: 01623 7263256

E: midlands@panddg.co.uk

6.2 A charge of £25 (incl. VAT and postage and packing) will be payable in advance for each CD-ROM.

6.3 Alternatively the ES and associated details of the planning applications can be viewed at https://www.southderbyshire.gov.uk/ or during the opening hours of South Derbyshire District Council (SDDC) at the following address:-

South Derbyshire District Council
Civic Offices
Civic Way
Swadlincote
Derbyshire
DE11 0A

Tel. 01283 595795.

6.4 All comments on the ES (and planning applications) should be issued to SDDC.

A7.0 Abbreviation and Definitions

1.	HLM	Hallam Land Management
2.	DCityC	Derby City Council
3.	DCC	Derbyshire County Council
4.	DFD	Development Framework Document
5.	EIA	Environmental Impact Assessment
6.	ES	Environmental Statement
7.	IGV	Infinity Garden Village
8.	NPPF	National Planning Policy Framework
9.	SDDC	South Derbyshire District Council

A8.0 References

1. National Planning Policy Framework (2019)
2. South Derbyshire Local Plan Part 1 (2016)
3. South Derbyshire Local Plan Part 2 (2017)
4. Derby City Local Plan Core Strategy Part 1 (2017)
5. City of Derby Local Plan Review (2006)

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter B: Scope and Methodology

June 2019

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B1.0 Introduction

1.1 The purpose of this chapter is to describe the process undertaken to identify the possible significant environmental effects giving rise to the need for Environmental Impact Assessment ('EIA'). It also provides information on how the EIA has assisted in the iterative process of master planning the Proposal ('the Proposed Development') for the site of Infinity Garden Village Wragley Way ('the Site').

1.2 Individual chapters (Chapters D to N and the Cumulative Assessment at Chapter O) describe the specific technical methodologies adopted to identify and assess the potential environmental effects arising.

Structure

1.3 The structure of this chapter is as follows:

- Scope of the Environmental Impact Assessment.
- Methodological Approach – An overview of the methodological approach applied in this Environmental Statement (ES).
- Consultation and Engagement - An overview of the process of consultation which has taken place to inform and assist in the process of EIA.
- Difficulties - A review of the some of the overall difficulties in the process of assessments that have arisen in carrying out the EIA. Further detail is provided in chapters D to M where relevant and applicable.
- Summary and Conclusions.

1.4 Chapter C provides a description of the Site and the Proposed Development.

B2.0 Requirement for an EIA

2.1 The purpose of this section is to set out why EIA is being undertaken with reference to the Proposed Development and the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

Legislative Background

2.2 EIA is a process undertaken in respect of certain types of development prior to the grant of planning permission.

2.3 The need for EIA is derived from EU Directive No 2014/52/EU on the assessment of certain public and private projects on the environment. The EIA Directive was first produced in 1985 as 85/337/EEC and has been amended several times since. The Directive was originally incorporated into UK planning legislation in Regulations issued in 1988 with further key updates in 1999, in 2011 and (for some parts of the UK) in 2015.

2.4 On 16 May 2017, the Town and Country Planning (EIA) Regulations 2017 (2017 EIA Regulations) came into force in England to incorporate the requirements of the 2014 Directive into domestic legislation.

2.5 This ES sets out the findings of an assessment of the potential for significant environmental effects of the proposed development on the basis that they fall within Part 10(b) (The Town and Country Planning (Environmental Impact Assessment) Regulations 2017) of the 2017 EIA Regulations.

2.6 Part 10(b) relates to *"urban development projects, including the construction of shopping centres and car parks, sports stadiums, leisure centres and multiplex cinemas"* which provide in excess of 1 hectare of urban development. For such developments, Environmental Impact Assessment ("EIA") is required where the scheme gives rise to significant environmental effects.

2.7 For Schedule 2 developments, the Regulations require that an EIA be undertaken where the development is *"likely to have significant effects on the environment by virtue of factors such as its nature, size of location".*

2.8 Schedule 3 of the 2017 Regulations goes on to identify the characteristics of the development, the sensitivity of the location and the characteristics of the potential impact as the key 'Selection Criteria for screening Schedule 2 Development'.

2.9 In the light of these, EIA will be required for Schedule 2 development in three main types of case:

- Major development which is of more than local importance;
- Developments located in particularly environmentally sensitive or vulnerable locations; and
- Developments with unusually complex and potentially hazardous environmental effects.

2.10 Due to the likely scale and nature of the Proposed Development, it is considered that the scheme gives rise to the need for EIA. The assessment has been carried out to ensure that potential significant environmental effects from the development are identified, assessed and presented in an ES to enable SDDC (and DCC) to consider the scheme's impact alongside the outline planning applications.

B3.0 The Scope of the EIA

3.1 The scope of the EIA relates to the red line boundary submitted with this submission (drawing no. 13.060/14).

3.2 The EIA addresses the following:

- Transport
- Water Environment
- Ground Conditions
- Heritage and Archaeology
- Landscape and Visual Impact
- Ecology
- Arboriculture
- Air Quality
- Noise
- Agriculture and Soils
- Socio Economics
- Cumulative Impacts
- Mitigation and Monitoring

3.3 The above described list provides a broad range of information on a variety of topics, each relating to matters that will be addressed as discrete chapters as part of the Environmental Statement ("ES").

3.4 In accordance with Schedule 4, Part 8 of the 2017 EIA Regulations the scheme has been reviewed in the context of its vulnerability to major accidents and/or disasters.

3.5 Given the nature, scale and location of the proposals, no potential vulnerability to the risk of major accidents and /or disasters has been identified.

EIA Process and Difficulties

3.6 The EIA considers the likely environmental effects based on current knowledge of the site and surroundings, desk top assessment, survey and fieldwork and information available to the EIA team. Regard is given to national planning policy guidance and relevant national, strategic and local planning policy and other legislation of relevance to individual topic areas. This topic-specific guidance is considered within further detail within individual chapters of the ES.

3.7 The EIA has been completed with reference to best practice and relevant legislation and has addressed all those matters that could reasonably be required to assess the effects of the proposed development. This includes those arising from the Proposed Development itself as well as those temporary effects arising during the construction phase.

3.8 An extensive amount of the information has been made available to establish the baseline position for the Site and for consultation and assessment of the likely impacts by the EIA team. The development of the design has emerged from an iterative process of assessment and development between the design and EIA team. The project for which planning permission is sought incorporates those revisions or modifications that are necessary or appropriate to avoid or minimise significant adverse effects on the environment. Where 'built in' mitigation is taken into account in the technical assessments, this is identified.

3.9 Following the Council's formal consultation on the planning applications and associated ES, new issues may emerge or practices identified which may affect the findings in this ES. Throughout the ES, the difficulties in compiling information and testing impacts or the assumptions that have been adopted are noted explicitly.

3.10 Examples of such difficulties include: -

- Information being unavailable to the team or the necessity to rely on reasonably available data in carrying out the EIA.
- Assessment of construction is based on broad parameters ahead of detailed design and appointment of a contractor. Potentially different construction programmes may be identified which may lead to an earlier start on site than identified or potentially leading to differences to the length of the construction period. These variables cannot be clarified at this stage but sufficient information is available to be able to assess the likely worst-case scenario; and
- Availability of accepted methodologies (e.g. there is no generally accepted criteria for assessing the significance of impacts on socio-economics). In these situations, professional judgement, experience and agreement of other forms of assessment have been relied as the basis of EIA.

3.11 Where limitations and difficulties have arisen on individual topic areas, these are identified in each chapter as appropriate.

B4.0 Methodological Approach

4.1 The EIA has been prepared in accordance with the requirements of the 2017 EIA Regulations and with reference to best practice including that published by the Institute of Environmental Management and Assessment ("IEMA"). All information required or reasonably required to identify the significant environmental effects of the development, as defined by Schedule 4 of the Regulations has been provided as part of the ES.

4.2 The assessment includes a consideration of relevant policy and legislation of relevance as well as considering comments received by consultees during the pre-submission period.

4.3 Each technical assessment follows a consistent approach and format: -

- Brief review of relevant policy and legislative context;
- Confirmation of the detailed topic specific assessment methodology, consultation undertaken and confirmation on how the assessment relates to the standard significance criteria adopted for the EIA (see below);
- Consideration of Baseline Conditions including an identification of sources of information, site history, current environmental conditions and future trends/anticipated changes to current conditions that could be anticipated without the scheme;
- Identification of the potential effects including a summary of those resources/receptors likely to be affected, the sensitivity of those receptors to accommodate change; the degree of change resulting from the proposal; the change of events or pathways linking cause to effect and a prediction of the significance of effects in terms of nature, extent and magnitude including whether it is direct/indirect, short/long term, permanent/temporary, beneficial/adverse;
- The scope for incorporating mitigation measures to avoid, reduce, remedy or compensate for any identified effects; and
- Identification of any effects remaining after mitigation.

4.4 Mitigation measures that are identified within specific ES Chapters, and the mechanisms for monitoring their effectiveness, are consolidated and set out in a coordinated manner in a dedicated Chapter N (Mitigation and Monitoring) within the ES.

4.5 The effects of individual environmental matters will be classified by reference to a common list of EIA significance criteria, comprising: -

1 Substantial beneficial
2 Moderate beneficial
3 Minor beneficial
4 Neutral/negligible
5 Minor[1] adverse
6 Moderate[2] adverse
7 Substantial[3] adverse

4.6 The ES includes a clear description of the likely significant environmental effects on the environment including direct/indirect effects, secondary, cumulative, short/medium/long term, permanent/temporary and beneficial/adverse effects arising from the development.

[1] Minor – slight, very short or highly localised effects
[2] Moderate – limited effects which may be considered significant
[3] Substantial – considerable effects (by extent, duration or magnitude) or of more than local significance or breaching identified standards or policy

B5.0 Consultation & Engagement

5.1 In accordance with the National Planning Policy Framework (NPPF paragraphs 39-46) the Proposed Development has been subject to extensive early engagement and discussions with the Council and local community. This consultation has influenced the emerging design proposals.

5.2 Detailed engagement with key stakeholders with the ability to inform the process of EIA has been undertaken in the context of each technical area and is described in Chapters D to N of this ES. This section considers how consultation has also influenced the form of development alongside the process of EIA as part of an iterative process.

Engagement with Councils and other Key Stakeholders

5.3 The applicant has engaged extensively with the Local Planning (South Derbyshire and Derby City Councils) and Local Highways Authorities (Derbyshire County and Derby City Council, Highways England) along with other key stakeholders over an extended period, including participation in the Local Plan processes for both District and City. This process has enhanced the mutual understanding of the forms of development that may be appropriate, acceptable and achievable on the site and within the wider area, including associated infrastructure requirements.

Infinity Garden Village

5.4 Hallam Land Management has from embryonic stages supported and engaged with the processes that led to the designation of Infinity Garden Village. Hallam Land Management is actively involved in working groups that are striving to deliver IGV and maximise the benefits that it will bring about. This includes the Infinity Garden Village Liaison Group, consisting of elected Parish, District and City members, representing local constituencies; Council Officers from the District, City and County; Neighbourhood Planning Bodies, business representatives; representatives from the landowners and proposed developers; and local residents.

Public Engagement

5.5 The applicant has established a website (www.wragleyway.co.uk) where details of the proposals can be found, along with contact details for the applicant in case of queries or concerns. Previous applications have also been advertised by way of a leaflet distributed to homes within the local area. The applicant has previously presented details of the wider proposals to the Sinfin Neighbourhood Board and other community exhibitions.

A50 Junction and SDITL Proposals

5.6 Derbyshire County Council hosted public exhibitions on about the proposals for the new junction on the A50 and part of the South Derby Integrated Transport Link. Feedback from those exhibitions informed the proposals before the submission of the planning application (ref. CD9/0319/110) for that new infrastructure.

OPUN Design Review

5.7 OPUN, the East Midlands Design Review Panel, undertook a Design Review of the emerging Wragley Way residential development proposals in July 2014, involving a site visit, meeting and written response. Key issues identified by OPUN for further consideration included:

- Vision and Identity - The need to develop a clear Vision for the site.
- Noise – The need to consider noise impact mitigation as part of the overall design approach, primarily relating to traffic on the A50.
- Link Road and Wragley Way – The opportunity to make use of parts of Wragley Way as part of any new link road, thereby avoiding unnecessary (and costly) new highway infrastructure that would unnecessarily segregate the site and be counterproductive towards positive urban design outcomes.
- Landscape Strategy – Ensuring opportunities for retaining existing landscape features within the scheme are recognised and explored.
- Local Centre – Making sure any new Local Centre(s) complement the existing Sinfin District Centre and other local services and facilities, having regard to travel catchments (especially walking distances) and likely market demand for / viability of Local Centre uses.
- Utilities – Potential opportunities to relocate existing utilities (gas main, overhead power lines) to minimise long term impacts on urban design considerations, recognising the likely high costs of relocation.

5.8 HLML's design team have carefully considered and responded positively to this early feedback.

Response to Process of Engagement

5.9 The Applicant and the project team have sought to ensure that issues raised during the process of consultation relating to the EIA have been incorporated into the scheme as part of an iterative process.

B6.0 Abbreviations & Definitions

1. SDDC - South Derbyshire District Council
2. EIA - Environmental Impact Assessment
3. ES - Environmental Statement

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter C: Site and Scheme Description

June 2019

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C1.0 Introduction

Purpose

1.1 This Environmental Statement ("ES") chapter describes the Site and its relationship to the wider area. The Chapter provides a description of the Proposed Development and the design process together with consideration of Alternatives that have formed the basis of this Environmental Impact Assessment ("EIA").

1.2 This chapter is structured as follows:

- Section 2.0 – Site Location and Description
- Section 3.0 – Description of Development
- Section 4.0 – Construction Methodology
- Section 5.0 - Consideration of Alternatives

C2.0 Location & Description

Purpose

2.1 This section describes the location of the Wragley Way site hereafter referred to as 'the Site' and describes its features within the surrounding area.

Location

2.2 The site (comprising of two planning applications areas) comprises agricultural land adjacent to existing development on the southern edge of Derby. The southern boundary of the site is defined by the A50 (Derby Southern Bypass). The western edge of the site is marked by the Derby to Birmingham railway. The site's eastern edge falls to the east of Deep Dale Lane. The site also incorporates land to the east of existing development.

2.3 The total site area for the ES is 149 hectares (368 acres), with the 'residential' proposals extending to 128 ha (316 acres) and the 'employment' proposals to 21 ha (52 acres). The distance between the westernmost and easternmost boundaries is around 2.8 kilometres (1.7 miles) at its maximum.

2.4 The ES site falls mainly within South Derbyshire District. It abuts land within Derby City to the north. Part of the 'residential' proposal site falls within Derby City, though no built development is proposed within that area.

2.5 The ES site falls within the area identified as 'Infinity Garden Village'.

Infinity Garden Village

2.6 On 2nd January 2017 the Government announced its support for the delivery of 14 new garden villages across England. Infinity Garden Village (IGV) is one of these, located on the southern edge of Derby and straddling the administrative boundary of both South Derbyshire District Council (SDDC) and Derby City Council (DCC).

2.7 The IGV concept emerged from various components of proposed growth in the southern Derby area, now committed in the Local Plans of both Derby City and South Derbyshire, in the area of land framed by Rolls Royce to the north, Chellaston to the east, the A50 to the south and Sinfin in the west.

2.8 The key components of Infinity Garden Village are:

- the delivery of around 2,130 new homes on land at Wragley Way, supported by a primary school, local centre and extensive network of green and blue infrastructure (SDDC Policy H15 and DCC Policy AC18);
- the delivery of around 117 hectares of new employment space as an extension to Infinity Park Derby (SDDC Policy E4 and DCC Policy AC15);
- the delivery of a new secondary school (SDDC Policy INF12); and
- the delivery of new transport infrastructure including the Southern Derby Integrated Transport Link (SDITL) (SDDC Policy INF4 and DCC Policy CP24) and a new junction on the A50 (SDDC Policy INF13).

2.9 The Proposed Development considered by this ES fall within the boundary of IGV.

The Infinity Garden Village Site

2.10 The IGV area extends to over 450 hectares. The IGV site is generally flat, comprising primarily agricultural land enclosed by hedgerows with limited tree planting and pockets of woodland. There are a combination of watercourses and open field drains across the site, and areas are prone to periodic flooding.

2.11 The landscape character of IGV falls within The Trent Valley Washlands, comprising of a mixture of Lowland Village Farmlands and Wet Pasture Meadows. These landscape character areas and their associated farms possess a special character that is described further in the Landscape Character of Derbyshire.

2.12 The IGV site contains many wildlife habitats, including for example semi-improved neutral grassland, species rich hedge with trees, wet and dry ditches, standing and flowing water, semi-natural broadleaved woodland. None of these are statutorily designated.

2.13 The existing Infinity Park employment area in the northern part of IGV is part of the Nottingham and Derby Enterprise Zone which aims to create a focus for the further development of advanced manufacturing and related services, especially transport engineering supply chains. The first building on the enterprise zone, an innovation centre known as I-Hub, was opened in July 2016. The Rolls Royce manufacturing plant also lies within this area. Permissions have already been granted for further employment floorspace within the DCC allocation within IGV.

2.14 To the east of IGV is the residential suburb of Chellaston, the nearest parts of which are comprised of housing estates constructed during the 1990s and 2000s, bounded by the Sustrans cycle link that runs along the former Derby

and Sandiacre canal corridor towards the City Centre. This canal corridor forms the eastern edge of IGV. An existing local centre within Chellaston is close to the IGV area, including a convenience store and the Chellaston Medical Centre.

2.15 The Derby Southern Bypass (A50) to the south provides a strategic link between the M1 in the east and the A38 and M6 to the west. Connectivity to the A38 provides further strategic links to Birmingham. Whilst the new T12 roadlink (Infinity Park Way) between the Bonnie Prince A50 junction to the south of Chellaston and Rolls Royce to the north has now been provided, there remain concerns in respect of congestion at key junctions in the area – on both County Council and Derby City roads, particularly at peak times.

2.16 Stenson Road and Sinfin Lane (beyond Stenson Fields to the north of Wragley Way) provide key but constrained connections into the City, whilst Wragley Way and Infinity Park Way presently provide a degree of east to west movement – although incomplete at present. Deep Dale Lane, Arleston Lane and Stenson Road provide rural and leisure connections to the south, traversing the A50, towards the Trent and Mersey Canal. This is a conservation area and provides an important leisure resource for the area and includes a marina and public house at Stenson. Sinfin Moor Lane presently provides a non-vehicular route between Sinfin and Chellaston.

2.17 Sinfin to the north-west is one of the most deprived areas of Derby and is in the bottom 20% of wards in the national index of multiple deprivation. Stenson Fields adjoins Sinfin. There are numerous services and facilities close by, within these areas including:

- Sinfin District Centre – including an Asda superstore, Sinfin Library and Health Centre;
- City of Derby Academy, a secondary school;
- Stenson Fields and Ashcroft Primary Schools;
- Sinfin Park with several sports pitches, a play area, community buildings and cafe;
- Sinfin Golf Course – a municipal 18-hole golf course; and
- Sinfin Moor Park Local Nature Reserve.

2.18 The western limit of IGV is formed by the Derby to Birmingham railway line, passing through Burton-upon-Trent. Beyond this line is open agricultural land stretching west towards Findern and the A38.

2.19 The Proposed Development considered by this ES comprises land within the western and central parts of IGV.

Planning History

Residential Proposals

2.20 Two sites within Derby City to the north and north west of the application site have been granted planning permission for residential development. Land south of Wragley Way, to the west of Deep Dale Lane, is currently being developed by Davidsons Homes, providing 130 new homes, following the grant of outline planning permission (ref. 05/13/00596) and reserved matters approval (ref. 03/16/00338). Land to the east of Deep Dale Lane has been granted outline planning permission for up to 50 dwellings (ref. 02/15/00211). These sites are allocated by the Derby City Local Plan Part 1: Core Strategy Policy AC18 – Wragley Way.

2.21 An application for outline planning permission has been made to South Derbyshire District Council for up to 100 dwellings (ref. 9/2017/0922) on land to the east of Deep Dale Lane, to the immediate south of the above 50 dwellings site. That application remains under consideration by SDDC.

2.22 All three of the above sites have been considered as part of the comprehensive masterplan-led proposals assessed as part of this ES

A50 Junction and SDITL Planning Application

2.23 A planning application (ref. CD9/0319/110) has been submitted on behalf of Derbyshire County Council to construct a new junction on the A50 (Junction 3A) at Deep Dale Lane and part of the Southern Derby Integrated Transport Link (SDITL) Phase I to Infinity Park Way on land at Sinfin, Derby. The application site extends to 69.3 hectares and straddles the administrative boundary between South Derbyshire and Derby City. As the planning application is for new roads and is submitted by Derbyshire County Council (the Highway Authority for land in South Derbyshire), it constitutes a 'County Matter' and as such the County are the Local Planning Authority (LPA) to determine that part of the application that lies in South Derbyshire. Derby City are the LPA for that part of the site that lies within the City, so whilst it is one development proposal, the planning application has been submitted to both LPAs to determine that part of the application that lies within its administrative boundary.

2.24 The new A50 junction and link road are integral to unlocking the potential of IGV and delivering its objectives, including the significant quantum of new homes and employment development.

2.25 The Proposed Development assessed by this ES has been prepared comprehensively having regard to the proposed new junction and SDITL. The Proposed Development would rely upon that new infrastructure. The 'residential' proposals includes the land required to deliver the new junction and part of the SDITL. The 'residential' proposals show details of the A50 junction and SDITL proposal but does not itself seek detailed planning permission for them, as that is being sought by the application submitted on behalf of the County Council. Those details of 'access' for which detailed approval is sought by the 'residential' application are fully compatible with the County Council's proposals.

C3.0 Description of Development

Purpose

3.1 The purpose of this section is to describe the development, the subject of the assessment.

Proposal Description

3.2 The Proposed Development assessed within this ES is comprised of two components, generally described as follows:

'Residential Component':

3.3 Development of up to 1,850 dwellings, a 2 form entry primary school, a local centre (including community hall, retail and other local services and facilities), public house, drive-through restaurant, petrol filling station, strategic highway infrastructure including new junction on the A50 and associated road links, public open space including children's play provision, surface water drainage infrastructure, landscaping, earthworks and ancillary supporting infrastructure.

'Employment Component':

3.4 Development of employment uses, and related road links, surface water drainage infrastructure, landscaping, earthworks and ancillary supporting infrastructure.

3.5 The built-form components development of the Proposed Development are as follows:

Use	Development Quantum
Residential Component	
Residential dwellings	Up to 1,850 dwgs
2 form entry primary school	between 1.6 and 2 hectares site area
Local centre (including community hall, retail and other local services and facilities)	up to 1,900 sqm gross floor area
Public house	750 sqm gross floor area
Drive-through restaurant	450 sqm gross floor area
Petrol filling station	450 sqm gross floor area
Employment Component	
Employment uses (Use Classes B1, B2 and B8)	a minimum of 46,500 sqm up to 51,100 sqm gross floor area

3.6 The new local centre, located centrally within the site, would provide essential local services and facilities (including a new primary school).

3.7 A section of the South Derby Integrated Transport Link (SDITL) would extend through the site, connecting westwards from the new A50 junction.

3.8 The mixed use area adjacent to the new A50 junction would include a public house, drive-through restaurant and petrol filling station.

3.9 Significant areas of open space would be provided. A 'linear park' would be created alongside the southern boundary. Additional areas of open space would be located throughout the site. Retained trees and hedgerows would be incorporated into these open spaces, along with new planting.

3.10 Together with retained and new drainage infrastructure (watercourses, ditches, swales), the Proposed Development would be set within a 'framework' of 'blue' and 'green' infrastructure.

Access

3.11 This 'residential' component provides details of and seeks approval for the means of part access to the Proposed Development. Other matters of detail (layout, scale, appearance, landscaping) are reserved for future agreement.

3.12 The 'residential' component of the Proposed Development seeks detailed approval for the following accesses and access-related work:

- A new 50m Inscribed Circle Diameter (ICD) roundabout on Stenson Road at its junction with Wragley Way;
- A new staggered signalised junction at the existing Arleston Lane/Wragley Way junction;
- A spur on the western arm of the northern roundabout of the new A50 junction; and
- A spur on the western arm of the roundabout located on the eastern section of the South Derby Integrated Transport Link.

3.13 The proposals for the new junction on the A50, link road and related works are as set out in the planning application submitted on behalf of Derbyshire County Council to Derbyshire County Council, ref. CD9/0319/110. That application can be viewed via the following link:

https://apps.derbyshire.gov.uk/applications/planning-applications/profile.asp?AppCode=CD9/0319/110&AppType=2

3.14 The County Council's description for that planning application is as follows:

'Demolition of Ashlea Farm and related buildings off Deep Dale Lane and the development of a new all movement junction on the A50 and connecting link

road to Infinity Park Way, with associated works including: street lighting columns, footways/cycleways, construction of earth mounds, flood compensation areas, acoustic fencing and landscaping.'

Plans

3.15 The Proposed Development is described with reference to a Parameter Plan; an Illustrative Masterplan and detailed Access plans. Table C1 (Summary of Plans, Description of Development) sets out the plans referred to within this assessment. The Plans are set out within the Appendix C as described.

Table C1: Summary of Plans, Description of Development

Plan Reference	Plan Title	Location
Environmental Statement Site Boundary		
13.060/14 Location Plan	ES Site Boundary	Appendix C1 (Volume 4)
Parameter Plan		
13060_19a_IGV_Parameters Plan_220519	Parameters Plan	Appendix C2 (Volume 4)
Illustrative Masterplan		
13060_18a_IGV_Illustrative Masterplan_220519	Illustrative Masterplan	Appendix C3 (Volume 4)
Access Drawings		
JNY9033-18 Red Line Plan for DD Approval	Red Line Plan for DD Approval	Appendix C4 (Volume 4)
JNY9033-11 Proposed Highway junction – Jtn 23[	Proposed Highway Improvements Junction 23 - Wragley Way/Arleston Lane/SDITL	Appendix C5 (Volume 4)
JNY9033-13 Proposed Highway Junction – Jtn 15	Proposed Highway Improvements Junction 15 - Wragley Way/Stenson Road	Appendix C6 (Volume 4)
JNY9033-19 SDITL Road & Access to Dev	New SDITL Road Junction and Access to Development Site, Junction ref 19 - roundabout on SDITL eastern spur	Appendix C7 (Volume 4)

Plan Reference	Plan Title	Location
JNY9033-21 A50 North Junction & Access	New A50 Northern Junction and Access to Development Site, Junction ref 20B - A50 northern roundabout/Deep Dale Lane	Appendix C8 (Volume 4)

Parameter Plan

3.16 The Proposed Development is assessed with reference to parameters which encapsulate the key elements of the development concept. The parameters are intended to be flexible enough to allow the detailed design to be reserved for subsequent approval, whilst defining the key principles of the development in enough detail to allow any significant effects on the environment to be assessed for EIA. The Parameter Plan illustrates:

- EIA site boundary;
- Boundary between 'residential' and 'employment' components;
- Built Development (proposed);
- Built development (existing to be demolished);
- Access;
- Green and Blue Infrastructure;
- Equipped Areas for Play.

3.17 The parameters have been established following a process of testing different design options and masterplan layouts and establishing the associated impacts via the EIA process and as pre-application consultation.

Illustrative Masterplan Layout

3.18 An Illustrative Masterplan layout has been prepared to show one way in which the Site could be developed, including how buildings, routes and open spaces within the development could be provided, situated, and orientated in relation to each other and to buildings and spaces outside of the Proposed Development. This assessment has however appraised the overall maximum impact of the development with mitigation recommended accordingly. The Illustrative Masterplan is provided in Appendix C3.

Layout

3.19 The final layout details for the Proposed Development will be the subject of a future application for reserved matters approval. The Parameter Plan and Illustrative Masterplan, set out in Volume 4 and referenced Appendix C and highlighted Table C1, specify the development framework relating to land use, including the development envelope, key access routes and open spaces within the Site.

Scale

3.20 The final configuration of the buildings within the Proposed Development is not yet known, and scale is an issue reserved for future consideration. The majority of the residential dwellings are expected to be 2 storeys high, with some 2 and a-half and 3 storeys high. A limited portion of the dwellings (most likely apartments) may be 4 storeys high. Commercial and community buildings may also be up to 3 storeys high. The maximum height of the employment buildings would be 18m to ridge.

Appearance

3.21 The detail of the final appearance of the Proposed Development is reserved for future consideration. The consideration of the neighbouring context will be central to informing the final character of the development and the appearance of the new buildings. Analysis of the local vernacular will result in the design of new buildings which will integrate well with their surroundings, having regard to the opportunity for innovative design.

Landscaping

3.22 The parameter plan (Technical Appendix C2) indicates the broad form of proposed landscaped areas across the site including potential areas of public and natural open space.

Sustainability

3.23 The detailed sustainability and energy efficiency measures for the final development will be determined at reserved matters stage, through the discharge of conditions and Building Regulations as appropriate. A high quality of design throughout the development will help to promote respect towards the environment and increase the overall sustainability benefits of the site.

3.24 Sustainable development and sustainable living will be delivered through the inclusion of new, local retail services and community facilities and the opportunity to design new infrastructure which encourages safe cycling and walking within the Site, establishing cycle and walking networks that link into the existing neighbouring walking and cycling network.

3.25 The Proposed Development will deliver the following aspects which will contribute to healthy living and wellbeing:

- Incorporate a well-designed layout providing recreation and exercise space for new and existing residents;
- Promote walking and cycling to destinations using new and existing foot and cycle links;
- Provide green spaces through a well-connected green network that is easily accessible to all; and
- Enhance biodiversity by retaining existing trees, hedgerows and vegetation where possible on site and integrate these within a new green infrastructure network.

C4.0 Construction Methodology

Introduction

4.1 This section summarises the construction methodology to enable assessment of environmental effects arising during the construction of the Proposed Development.

4.2 A contractor to undertake the construction works has not yet been appointed.

4.3 Sufficient information is available at this time to enable the EIA team to undertake an assessment of the potential effects during the construction of the Proposed Development.

Programme of Works

4.4 It is expected that Infinity Garden Village as a whole will be developed over a period of between 10 and 20 years. The residential proposals assessed by this ES will likely be completed in advance of full build out of the employment areas. Residential development will be phased such that necessary infrastructure is provided at the required time.

4.5 The residential site could support a number of housing developers at the same time, operating from different locations within the allocation. This would allow for a greater diversity of housing product to be provided. Concurrent development from multiple outlets would also allow local housing need to be met more rapidly. New dwellings would therefore likely be constructed at a rate of up to 150 dwellings per year. Commercial, recreational and leisure uses would be built out in response to market demand. Local services and facilities, including new primary school, would be phased to meet community needs.

Construction Process

4.6 All activities undertaken on site will be subject to a risk assessment and method statement. These will be undertaken by trained staff, following an approved procedure. The works can be broadly summarised as follows:

Initial Site Setup

4.7 The initial site setup will establish the primary site compound required to support engineering works, including offices and welfare facilities. Parking provision, temporary water, power and telecoms supply will be set up as required.

4.8 A fuel storage area will be set up within the site compound, which will be double bunded to prevent contamination during refuelling and filling operations. A permanent perimeter fence will be installed where this is required for safety and security reasons.

4.9 Construction compounds will be situated away from residential dwellings where possible to ensure that any impact(s) on existing residential properties is minimised.

Earthworks

4.10 It is assumed that an earthworks strategy will be developed that will minimise import or export fill material where possible, with the possibility to stock pile excavated material on the Site.

4.11 The bulk of earthworks will require the transportation of material across the Site and will require the use of excavators and earth moving equipment.

Installation of Highway Drainage and Services

4.12 The delivery of the Proposed Development will require the construction and provision of foul and storm drainage, gas supply, electricity supply, water supply and ductwork for telecommunication links/ lighting cables. This will require the use of excavators.

Highway Construction

4.13 The construction of the road structure that will serve the residential dwellings and commercial and community uses will require the utilisation of compaction machinery and will likely involve the import of pre-prepared road construction materials.

Building Foundations

4.14 The construction of the foundations is likely to require the import of pre-mixed concrete materials.

Buildings Construction

4.15 The construction of the residential dwellings, commercial and community uses will require the import of numerous types of materials to the Site, including bricks, wooden roof frames, roof tiles, windows/doors and materials for the internal fixtures including bathrooms/kitchens and heating systems.

Site Specific and Environmental Control Measures

4.16 Access to the Site for construction related vehicles and deliveries will be via local roads until such time as a connection to the A50 is available. To increase awareness on the permitted traffic routes for construction, traffic warning signs will be installed at the site entrance/exit and will remain in place for the duration of the construction period.

4.17 To reduce the impact on the road network, local work force and suppliers close to the Site could be employed wherever possible.

4.18 The proposed working hours will be restricted to the hours indicated below, unless otherwise agreed with the Local Planning Authority, to ensure that key construction processes are not prejudiced. Critical construction works may occur outside these periods to ensure construction processes on site are not prejudiced:

0700-2100 Monday-Friday
0700-1400 Saturday

4.19 Occasional working on Sundays and Bank Holidays (for essential works only) is proposed, with prior approval agreed by the Local Planning Authority in association with the Environmental Health Officer.

4.20 Where possible, deliveries to the Site will be programmed to occur outside the morning and evening peak periods to avoid additional delay and queuing.

4.21 On site archaeological, arboricultural and ecological assets will be protected during site construction via suitable safeguarding measures as a requirement of the contractor's appointment, and as detailed within the Construction Environment Management Plan. Similarly, water courses on site (and beyond) and existing site services (for example gas mains, electricity pylons) will be protected from contamination or damage during construction in accordance with the plan.

4.22 The use of artificial lighting will be minimised. During winter periods construction work will be programmed to minimise the need for artificial lighting and this should be restricted to locations away from existing properties where possible.

4.23 Particular care will be required to maintain dust emissions at a practicable minimum during the construction activities, particularly when working in the vicinity of environmentally sensitive receptors or downwind from existing

residential properties. Best practice mitigation will be required, particularly during dry conditions, and dust reduction methods will be employed such as:

- Seeding and sealing any earth stockpiles retained on site;
- Sheeting of vehicles transporting material to/from the site;
- Limiting the speed of general vehicles within the site to 20mph;
- Any haul roads/temporary access roads will be regularly cleansed;
- Provision of wheel washing facilities and/or road sweeping at access points onto local roads (to prevent mud from getting on to public highways);
- Damping down haul roads/temporary roads using mobile water bowsers during dry periods; and
- Visual monitoring at sensitive locations on a daily basis.

4.24 Strict controls on the sequencing of works and the provision of noise protection where required would be developed. This can include:

- the positioning of static plant away from existing properties;
- turning off mobile plant when not in use;
- the use of effective silencers on all construction plant, machinery and vehicles.

4.25 Construction tasks that are expected to generate the highest noise levels will be programmed to avoid sensitive times. Care will be taking during the loading and unloading of vehicles, dismantling scaffolding and moving materials etc to minimise impact noise.

4.26 Further details of the methods used to address the following issues, as well as roles and responsibilities, would be provided within a Construction Environment Management Plan and a Waste Management Plan:

- dust suppression and mud control;
- noise controls;
- site compound(s) locations;
- car parking arrangements;
- construction vehicle movements;
- landscape character, visual amenity and ecology considerations;
- archaeology considerations;
- geology, soils and water considerations; and
- waste generation and disposal.

C5.0 Alternatives

Introduction

5.1 Schedule 4(2) of the 2017 Regulations (Ref 1) requires: an identification of the reasonable alternatives that have been studied by the developer; which are relevant to the proposed project and its specific characteristics; and an indication of the main reasons for selecting the chosen option including a comparison of the environmental effects. This section provides a review of those alternatives that have been studied.

No Development

5.2 If no development was to come forward at the Site then the site would remain in its current use. The 'do nothing' approach would retain this use. No other scenario seems likely.

The Consideration of Alternatives

5.3 The Illustrative Masterplan and Parameters Plan result from scheme iteration over a number of years. Given that the Site is identified for development within local planning policy, no alternative sites have been considered for the location of the development.

Choice of Scheme

5.4 Having considered the Environmental factors highlighted above, taking account of likely effects the indicative masterplan and parameter plans detailed at Table C1, the Proposed Development as set out on 13060_18a_IGV_Illustrative Masterplan_220519 represents the Choice of Scheme for the purposes of the 2017 Regulations. The scheme choice represents the best arrangement taking account of all the environmental considerations assessed.

C6.0 Abbreviation & Definitions

1. DCityC - Derby City Council
2. DCC - Derbyshire County Council
3. DFD - Development Framework Document
4. EIA - Environmental Impact Assessment
5. ES - Environmental Statement
6. IGV - Infinity Garden Village
7. NPPF - National Planning Policy Framework
8. SDDC - South Derbyshire District Council

C7.0 References

- The Town and Country Planning (Environmental Impact Assessment) Regulations 2017

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter D: Transport

June 2019

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D1.0 Introduction

1.1 This Chapter of the Environmental Statement ("ES") has been prepared by RPS Consulting Services Limited on behalf of Hallam Land Management ("the Applicant"). This Chapter assesses the potential Transport environmental impacts of the Proposed Development, and the likely significance of such impacts during its construction and operational phases.

1.2 In particular, it considers the likely environmental effects on the highway network in terms of severance, pedestrian amenity (including cyclists), fear and intimidation, driver and pedestrian delay, accidents and safety as a result of the changes to traffic flows from the proposed development. It addresses the impact of the development for each of the potential parameters and addresses the impact on identified sensitive receptors.

1.3 This chapter, including its associated figures and appendices, is not intended to be read as a standalone assessment. Reference should be made to all other chapters contained within the ES.

1.4 The data provided within this chapter is not reliant on data provided within other chapters of this ES, however the data within this chapter is used in the assessment of Air Quality and Noise.

1.5 An outline of transport-related policies and guidance is also provided, together with the methodology used in this assessment. The assessment sets out the existing baseline conditions on the transport network surrounding the site, the future baseline, and then considers the likely impact of the proposed development on the transport network.

1.6 The proposal includes for 1,850 dwellings, a new 2 form entry Primary School, Local Centre, Public House, Petrol Filling Station and employment uses as well as new primary access junctions. The proposal also includes for part of the South Derby Integrated Transport Link (SDITL) which will connect with the new A50 junction and Infinity Park link road being proposed by Derbyshire County Council. Offsite highway measures will be provided to mitigate the developments impact and improve pedestrian/cycle access. Details of the aforementioned proposals are illustrated on Figure D1 included within Appendix D1 and referenced in the text within Section D6.

1.7 Although the Transport Assessment (TA) and Travel Plan (TP) are not bound as part of this ES, they constitute environmental information relevant to the determination of the application that this ES accompanies This ES chapter, TA and TP have been prepared by RPS.

D2.0 Policy Context

National Planning Policy

National Planning Policy Framework (NPPF)

2.1 The National Planning Policy Framework (NPPF) was published in February 2019, with the purpose of planning to help achieve sustainable development. A previous version was adopted in March 2012.

2.2 The most pertinent issue raised within the NPPF in relation to transport is highlighted within Section 9 paragraph 108. This states that:

> *"In assessing sites that may be allocated for development in plans, or specific applications for development, it should ensure that:*
>
> *Appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location.*
>
> *Safe and suitable access to the site can be achieved for all users; and*
>
> *Any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree."*

2.3 Further, paragraph 109 states that:

> *"Development should only be prevented or refused on highway grounds if there would be an unacceptable impact on highway safety or residual cumulative impacts on the road network that would be severe."*

2.4 In the context of paragraph 108 within the NPPF, a TA including a TP are provided as part of the proposed development. Furthermore, the opportunities for sustainable travel modes are promote as part of the proposed development and are outlined within the report.

2.5 In the context of the second bullet point of paragraph 108, it is considered that the access proposals are safe and suitable for all people as required by paragraph 108 of the NPPF.

2.6 Finally, in the context of the last bullet point of paragraph 108 and 109, the proposed development provides improvements which would otherwise not be achieved, and which do provided improvements over the current

arrangements. Accordingly, and as demonstrated by the TA, the residual cumulative impact of the proposed development is not severe.

2.7 Paragraph 111 states that:

"All developments that will generate significant amounts of movements should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment, so that the likely impacts of the proposal can be assessed."

2.8 In the context of paragraph 111, the proposed development will include a Framework Travel Plan which will encompass the residential development, proposed employment uses and the new primary school. This Travel Plan has been submitted alongside this application.

Local Planning Policy

2.9 The site assessed by this ES lies within two local authorities, namely Derby City and South Derbyshire District. Adjacent land within Derby City has been granted planning consent for residential development. Remaining allocated land on which planning permission has not yet been granted falls within South Derbyshire (see ES Chapter A). Below, are the relevant planning policies for both Derby City Local Plan and South Derbyshire District Council.

Derby City Local Plan (2017)

2.10 The Derby City Local Plan – Part 1 Core Strategy was adopted by the Council on Wednesday 25th January 2017. It is the key planning document for the City setting out a long-term strategy for the spatial development of Derby to 2028.

2.11 In respect of Transport, the Local Plan states the following policies.

2.12 CP23 – Delivering a Sustainable Transport Network:

A) The Council will support proposals that:

1. *Promote greater travel choice and equality of opportunity for all through the deliver and promotion of high quality and accessible walking, cycling and public transport networks, which maintaining appropriate access for car users and the movement of goods;*
2. *Include initiatives to manage down traffic impacts, promote sustainable transport and the development of accessible sites;*
3. *Contribute to better safety, security and health for all by*

improving road and rail safety, improving security on transport networks and promoting active travel;
4. Contribute to tackling climate change by developing low-carbon travel and lifestyle choices, including the provision of infrastructure to support the use of low carbon vehicles, active travel and reducing the need to travel through the provision of improved IT infrastructure;
5. Support growth and economic competitiveness by delivering reliable and efficient transport networks that will enhance connectivity to, from and within the City; and
6. Ensure that investment in transport contributes to the enhancement of the urban and natural environment.

B) Actively manage the pattern of development to ensure that new development:
7. Is located in accessible locations that are well served by frequent high- quality bus service and which help to facilitate walking and cycling.
8. Connects residents to jobs, shopping, leisure, open space, health and educational opportunities
9. Implements, and/ or contributes to, appropriate on-site and offsite measures to mitigate the impact of development
10. Contributes to improving public transport cycle and pedestrian infrastructure and public transport services.
11. Includes proportionate Transport Assessments and Travel Plans for all major applications and any proposal where transport issues are likely. Developers will be expected to agree appropriate transport modelling for use in their evidence with the Council.
12. Is not permitted where it would cause, or exacerbate, severe transport problems, including unacceptable impacts on congestion, road or rail safety, the rail network, access and air quality – including any cumulative impacts on Air Quality Management Areas (AQMA).
13. Is not permitted where it would sever or prejudice the re-use of the routes of former railway lines and canals which have the potential to function as a pedestrian footpath, cycleway or bridleway or where the need has been identified for a new public transport facility, freight connection or extension to an existing network has been identified or possible introduction in the future.
14. Is not permitted where it would sever Public Rights of Way or prejudice access to these routes, unless an alternative route or routes can be secured which are of equal or better quality.
15. Provides appropriate levels of parking for cars, motor cycles and bicycles, having regard to the standards set out in Appendix C. In highly accessible locations, a lower level of parking will be

encouraged. In all cases, the individual circumstances of each proposal will be taken into account, including the realistic requirements of the user(s), the accessibility of the area by different transport modes and the possible impact of the parking on the transport network.

2.13 Policy CP24 – Transport Infrastructure;

Initiatives will include:
a) Supporting the implementation of Highways England's A38 Derby Junctions Grade Separation Scheme;
b) Implementation of 'T12' and the 'South Derby Integrated Transport Link' Phases 1 and 2
c) Implementation of improvements to the A52 between Raynesway and Pentagon island, including improved access to Park & Ride
d) Implementation of improvements at the A50 junctions with the A514 and A38
e) Supporting the implementation of the Boulton Moor Park and Ride site in South Derbyshire
f) Implementation of the Park & Ride at Royal Derby Hospital
g) Implementation of the Statement of Actions in the Rights of Way Improvement Plan
h) Implementation of a strategic cycle network
i) Supporting the implementation of Network Rails Electrification of the Midland Mainline
j) Implementing the restoration of the Derby Canal
k) Ensuring connectivity to HS2

2.14 The site is identified in the Local Plan as Policy AC18, the policy states that the council will work with South Derbyshire District Council to ensure that:

a) *new highway infrastructure is provided to help mitigate the impact of the development on the local and strategic road networks. This will include the development of, or contributions towards, the construction of the South Derby Integrated Transport Link. The potential for a new junction onto the A50 to be delivered in the future should not be prejudiced. Contributions may also be required towards improvements to the Strategic Road Network as necessary.*
b) *Appropriate primary school provision is made to serve the wider development as a whole*
c) *Secondary school needs are met through the extension of existing facilities and / or the provision of a new secondary school;*

d) New on-site local shopping and community facilities are provided to meet the needs arising from the new development
e) Appropriate flood mitigation and drainage measures are implemented
f) Appropriate landscaping / buffering is provided between new homes and the proposed employment site south of Wilmore Road (Infinity Park), the Derby to Birmingham railway line west of Stenson Road, the Local Wildlife Site/ Local Nature Reserve at Sinfin Moor Lane Meadows and between new homes and the A50 trunk road.
g) A mix of new green infrastructure is provided to meet the needs of residents. Green infrastructure should be integrated to create a cross boundary network of green spaces.
h) Improvements to the Green Wedge at Sinfin Moor. The boundaries of the Green Wedge should also be strengthened.
i) Cycleway and pedestrian links are provided and/or improved across and around the site including links to Infinity Park, the local District Centre at Sinfin and to the open countryside and wider rights of way network.

Within the City, the City Council will require development;

j) To be designed to integrate fully with the larger element if the development in South Derbyshire, particularly in terms of scale, design and road, cycle and pedestrian links
k) Where appropriate, to contribute the provision of supporting infrastructure which will be required as a result of the development. Supporting infrastructure will be carefully planned and co-ordinated between the two authorities and may be required within the City and/ or South Derbyshire.

South Derbyshire Local Plan

2.15 The Local Plan for South Derbyshire has been prepared in two parts. Part 1 was adopted by Full Council on June 13, 2016. The Local Plan Part 2 was adopted by Full Council on 2nd November 2017.

2.16 The site is identified as an allocated development under Policy H15 which states:

A. Residential development on land at Wragley Way will provide for around 1,950 dwellings within South Derbyshire.

B. The Council will require the below listed site specifics and accordance with other Local Plan policies:

I. New highway infrastructure to mitigate the transport impact on the local and strategic road networks of the whole site. This will include the provision of and/or contributions to the construction of the South Derby Integrated Transport Link;

II. Developer contributions are to be made towards improvements to the A50/A514 and A50/ A38 junctions to safeguard the operation of the Strategic Road Network;

III. Any development should not prejudice the construction of a potential junction connecting the site to the A50, which may potentially be needed following the completion of the South Derby Integrated Transport Link;

IV. The provision of sufficient new primary school provision on site for the development as a whole;

V. High quality pedestrian and cycle links should be provided across the site and to the nearby residential, retail and employment developments together with recreational areas;

VI. The number of homes to be occupied before completion of the South Derby Integrated Transport Link shall be agreed with the Council;

VII. A new on-site local shopping centre shall be provided which should be commensurate in size to the needs of the community, taking into account the surrounding retail provision available. The location of the centre should be the focal point at the heart of the new community;

VIII. The east, south and west of the site will require a green buffer and landscaping from the railway line and the A50 and enhancements to a defensible boundary along Sinfin Moor; and

IX. Improvements to existing green infrastructure shall be made, along with the provision of new green infrastructure on site."

2.17 Policy INF2 Sustainable Transport states:

i) Planning permission will be granted for development where:
a) Travel generated by the development, including goods vehicle movement, should have no undue detrimental impact upon local amenity, the environment, highway safety, the efficiency of transport infrastructure and the efficiency and availability of public transport services;
b) Appropriate provision is made for safe and convenient access to and within the development for pedestrians, cyclists, public transport users and the private car; and
c) Car travel generated by the development is minimised relative to the needs of the development.
ii. In order to achieve this, the Council will secure, through negotiation, the provision by developers of contributions towards off-site works where needed;
iii. In implementing this policy account will be taken of the fact that in more remote rural areas there is often less scope to minimise journey lengths and for the use of non-car modes;
iv. Planning applications for development with significant transport implications should be accompanied by a Transport Assessment and Travel Plan identifying the transport impacts of the proposal and measures needed to meet the criteria set out in Part 1 of this policy. Travel Plan measures should be funded by developer contributions appropriate for the impacts on the transport network caused by the development. For development that is expected to have less significant transport implications, planning applications shall be accompanied by a Transport Statement.

B. Walking and Cycling
i. The Council will work in partnership with County Councils, neighbouring local authorities, the National Forest Company, charitable organisations, landowners and developers to secure the expansion, improvement and protection of walking and cycling networks, including public rights of way, cycle routes, greenways and supporting infrastructure. Routes should be coherent, direct, continuous, safe, secure and attractive and should contribute to the wider green infrastructure network wherever possible;
ii. Where a need is identified in Part 1 of this policy, the council will seek to negotiate the provision by developers of contributions toward new, or the enhancement of existing, walking and cycling routes and supporting infrastructure;
iii. Development that is likely to prejudice the use of disused railway lines or canals for walking, cycling or horse riding will only be permitted, where it can be demonstrated that there would be no practical prospect of implementation in the future;

iv. Cycling and greenway network proposals will be identified in Supplementary Planning Documents.

C. Public Transport
i. The Council will work in partnership with County Councils, neighbouring local authorities, public transport operators and community transport operators to improve public transport services, infrastructure and information provision in the district;
ii. Development should be designed and laid out in such a way as to ensure that, wherever possible, public transport services are within convenient walking distance of all site residents, staff and visitors;
iii. Where a need is identified under Part 1 of this policy, the Council will seek to negotiate the provision by developers of measures to encourage the use of public transport. These may include:
a) Bus shelters and laybys;
b) Railway stations and public transport interchanges; and
c) Initial financial contributions towards the cost of running public transport services.

E. Parking
Development should include appropriate car parking provision having regard to:
a) Parking standards to be published as a Supplementary Planning Document;
b) The need to ensure that development would not have an undue detrimental impact on pedestrian and cyclist movement and highway safety;
c) The need to encourage travel on foot, by cycle and by public transport in preference to the private car by minimising parking provision;
d) The need to provide sufficient conveniently located spaces to meet the needs of people with impaired mobility;
e) The conclusions of and Transport Assessment undertaken in accordance with Part 2 of this policy;
f) The need to encourage the use of low emission vehicles."

Derbyshire Local Transport Plan 2011 to 2026

2.18 The Derbyshire Local Transport Plan (LTP) is a relevant consideration, because it covers land adjacent to the development site, and west along Wragley Way. The junctions studied for this report include a number that are covered by this LTP.

2.19 The five transport goals are:

1. *"Supporting a resilient local economy.*
2. *Tackling climate change.*
3. *Contributing to better safety, security and health.*
4. *Promoting equality of opportunity.*
5. *Improving quality of life and promoting a healthy natural environment.*

The plan puts emphasis on supporting a resilient local economy, contributing to better safety, security and health, and improving quality of life and promoting a healthy natural environment.

It aims to achieve longer term benefits for climate change and measures to help people under the equality of opportunity goal."

D3.0 Assessment Methodology & Significance Criteria

3.1 This assessment has been undertaken in accordance with guidance given in the following documents:

- Institute of Environmental Assessment (now IEMA) Environmental Assessment of Road Traffic (1993) (IEMA Guidance); and
- Design Manual for Roads and Bridges (DMRB), Volume 11, Environmental Assessment

3.2 This is also reviewed against on site observations and traffic survey information obtained covering the local area around the proposed development site as well as modelling carried out using the Derby Transport Model for the South Derby Growth Zone. The surveys include Automatic Traffic Counters (ATCs) and peak hour turning movement counts. The ATC surveys were undertaken over a week period identifying the number and type of vehicles, as well as speeds along Wragley Way, Deep Dale Lane and Stenson Road. Manual turning count surveys were undertaken at the following junctions:

- Stenson Road / Warwick Avenue;
- Sinfin Lane / Osmaston Park;
- Stenson Road / Blagreaves Lane;
- Sinfin Lane / Wilmore Road;
- Grampian Way / Arleston Lane / Asda Superstore;
- Grampian Way / Lynwood Road / Sinfin Lane;
- Merrill Way / Chellaston Road / Boulton Lane;
- Wragley Way / Arleston Lane;
- A50 / Swarkestone Road / Infinity Park Way;
- Stenson Road / A5132;
- Sinfin Lane / A5132 / Brookfield Junction;
- A5132 / A514;
- Stenson Road / Grampian Way; and
- Stenson Road / Wragley Way.

3.3 The significance of potential traffic and transport effects will be determined with reference to the above guidelines. The effect of significance will be derived from measures of the magnitude (or scale) of the change and the sensitivity (or importance) of the receptors affected. Categories of sensitivity and magnitude are defined to determine the significance of the effect.

3.4 The IEMA Guidance lists a number of environmental impacts, of which the following are assessed in this chapter:

- Severance;
- Driver delay;
- Pedestrian delay;
- Pedestrian amenity;
- Fear and intimidation; and
- Accidents and safety.

3.5 The IEMA Guidance sets out the broad principles of how to assess the magnitude of effect for each category which is summarised below:

1. **Severance**: the guidance states that "severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery". Further, "Changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance respectively". However, the Guidance acknowledges that the measurement and prediction of severance is extremely difficult (para 4.28 of IEMA);
2. **Driver delay**: this can be established at key junctions using conventional modelling techniques identifying the average delay in seconds. However, the advice identifies that such delays "… are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system."
3. **Pedestrian delay**: "changes in the volume, composition or speed of traffic may affect the ability of people to cross roads." The Guidance suggests that assessors "… use their judgement to determine whether pedestrian delay is a significant impact". As part of this assessment, the Department of Transport Local Transport Note 1/95 'Assessment of Pedestrian Crossings' has been used which reviews the average time is takes for a person to cross a road;
4. **Pedestrian amenity**: broadly defined as the relative pleasantness of a journey, it is affected by traffic flow, traffic composition and pavement width / separation from traffic. The Guidance suggests a tentative threshold for judging the significance of changes in pedestrian amenity of where traffic flow (or its lorry component) is halved or doubled; and
5. **Fear and intimidation**: the impact of this is dependent upon the volume of traffic, its HGV composition, its proximity to people or lack of protection caused by such factors as narrow pavement widths. The Guidance states that there are no commonly agreed thresholds for estimating this from known traffic and physical conditions, but it does nevertheless suggest thresholds which could be used, based on previous research. These thresholds are noted below in Table D1.

Table D1: Fear and Intimidation Thresholds

Degree of Hazard	Average traffic flow over 18 hour day – vehicles / hour 2-way	Total 18 hour HGV flow	Average vehicle speed over 18 hour day - mph
Extreme	+ 1,800	+ 3,000	+ 20
Great	1,200-1,800	2,000 – 3,000	15-20
Moderate	600-1,200	1,000 – 2,000	10-15

Note: although no category is given in the guidance for flows less than the above thresholds, for the purposes of this assessment any flows below the thresholds have been categorised as 'small' and would not be considered as significant.

6. **Accidents and Safety**: The Guidance states that "Professional judgement will be needed to assess the implications of local circumstances, or factors, which may elevate or lessen risks of accidents, e.g. junction conflicts".

3.6 The IEMA Guidance makes it clear that a *'… critical feature of Environmental Assessment is determining whether a given impact is significant.' Further, 'For many effects there are no simple rules or formulae which define thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor backed up by data or quantified information whenever possible. Such judgements will include the assessment of the numbers of people experiencing a change in environmental impact…'*.

3.7 Categories of receptor sensitivity have been defined from the principles set out in the IEMA Guidance, which includes the following:

1. The need to identify particularly groups or locations which may be sensitive to changes in traffic conditions;
2. The list of affected groups and special interests set out in the guidance;
3. The identification of links or locations where it is felt that specific environmental problems may occur; and
4. Such locations *'… would include accident blackspots, conservation areas, hospitals, links with high pedestrian flows.'*

3.8 These have been used to outline in broad terms the sensitivity of receptors to traffic for the categories of impact assessed in this section, although in detail, each receptor assessed will have a different sensitivity to each specific impact.

3.9 In the context of severance, pedestrian amenity, fear and intimidation, pedestrian and driver delay, accidents and safety, the following are identified as high, medium and low sensitivity. Chapter H 'Landscape and Visual Impact', records the sensitivity of users on a right of way network. Users of the right of way are generally defined as being of high visual sensitivity as their attention or interest is focused on the landscape.

3.10 In terms of the assessment of transport related effects, high sensitivity receptors include:

1. Schools, colleges and other educational institutions;
2. Retirement / care homes for the elderly or infirm;
3. Roads used by pedestrians with no footways; and
4. Accident blackspots.

3.11 Medium sensitivity receptors include:

1. Hospitals, surgeries and clinics;
2. Parks and recreations areas;
3. Shopping areas;
4. Roads used by pedestrians with narrow footways.

3.12 Low sensitivity receptors include:

1. Open space;
2. Tourist / visitor attractions;
3. Historical buildings; and
4. Churches.

3.13 The magnitude of effect depends upon the effect being assessed, and this has been based on the guidance relating to severance which suggests that 30%, 60% and 90% changes in traffic levels should be considered as 'slight', 'moderate' and 'substantial' impacts, respectively.

3.14 Generic significance criteria are applied throughout this Environmental Statement with the degree of significance in accordance with the DMRB guidelines HA 205/08 'Assessment and Magnitude of Environmental Effects' assessing the Projects impact based on Severe, Major, Moderate, Minor and Not Significant. These will be used, together with the assessment of magnitude of effect and receptor sensitivity, to determine the significance of effects.

3.15 DMRB Volume 11 provides further guidance on determining severance (Part 8, Chapter 6). It states that new severance should be described in terms of 'Slight', 'Moderate', or 'Severe' and that these categories '… should be coupled with an estimate of the numbers of people affected, their location and the community facilities from which they are served.' In addition (with specific reference to relief from existing severance), it acknowledges that there is a traffic flow threshold below which changes in Severance are not considered significant (existing AADT (Average Annual Daily Traffic) flow below 8000 vehicles).

3.16 Table D2 below is provided in DMRB Volume 11 'Determining Significance of Environmental Effects' (HA 205/08). The significance of the effect is formulated as a function of the receptor or resource environmental value (or sensitivity) and the magnitude of the project value (change). The category descriptions for Sensitivity of Receptor are based upon the level of importance and rarity of that receptor. The magnitude of impact is dependent upon the level of quality and magnitude in relation to the change as a result of the project.

Table D2: Significance of Effect Categories

		Sensitivity Receptor				
		Very High	High	Medium	Low	Negligible
Magnitude of Impact (Degree of Change)	Major	Severe	Severe or Major	Major or Moderate	Moderate or Minor	Minor
	Moderate	Major or Severe	Major or Moderate	Moderate	Minor	Not significant or Minor
	Minor	Moderate or Major	Moderate or Minor	Minor	Not significant or Minor	Not significant or Minor
	Negligible	Minor	Minor	Not significant or Minor	Not significant or Minor	Not significant or Minor
	No Change	Not Significant	Not Significant	Not significant or Minor	Not significant or Minor	Not significant or Minor

3.17 Examples of what each of the significance levels outlined in Table D2 mean for Transport and Access assessment are listed as follows:

7. **Severe** – This level of impact would see a significant change in vehicle movements especially HGVs and the level of pedestrian provisions would be limited, i.e. no footway provision or crossing facilities available. The impact to drivers would also be affected through increased delay and increased delay for pedestrians crossing the road. The location of the impact will also affect local communities and sensitive environments such as schools, churches etc.;
8. **Major** – A major impact would see reduced vehicle movements and delay compared with the severe impact, although the percentage increase in HGV movements is still high. There would also be an impact on pedestrians as there would be limited footway provision and crossing facilities available. The impact on sensitive environments will be less;
9. **Minor** – A minor impact would see fewer movements of HGV's or traffic flows would be lower in terms of percentage increase. There would also be suitable pedestrian facilities provided which includes wide footways and crossing facilities; and

10. **Negligible** – A negligible impact would be when the overall impact of both vehicle movements and HGV movements is very low and would not be perceptible to other local road users. There would be very minimal delay to drivers and pedestrians, and suitable pedestrian provision would be available in terms of wide footways possible segregated from the road and controlled pedestrian facilities.

D4.0 Baseline Conditions

4.1 The IEMA Guidance described under the Methodology section identifies that traffic flow increases 30% represent a reasonable threshold for inclusion of highway links within the assessment process, although a lower threshold may be appropriate where there are higher HGV flows. It also suggests that other specifically sensitive areas should be included where traffic flows have increased by 10% or more. Such sensitive areas may include accident black spots or links with high pedestrian flows.

4.2 For the purpose of this assessment the consideration of the effects of the proposed development will be undertaken on the following links and junctions and the effects of the changes in the traffic composition and volume will be assessed in relation to the significance criteria. The following links are referenced in accordance with Figure D2 within Appendix D2.

1. Deep Dale Lane (south);
2. Deep Dale Lane (north);
3. Wragley Way (west of Deep Dale Lane);
4. Arleston Lane;
5. Wragley Way (west of Arleston Lane);
6. Stenson Road (south of Wragley Way);
7. Stenson Road (north of Wragley Way);
8. Grampian Way (east of Stenson Road);
9. Stenson Road (north of Grampian Way);
10. Grampian Way (west of Sinfin Lane)
11. Sinfin Lane (north of Grampian Way);
12. Wilmore Road;
13. Sinfin Lane (north of Wilmore Road);
14. Stenson Road (north of Blagreaves Road);
15. Warwick Avenue;
16. Kenilworth Avenue; and
17. Osmaston Park Road.

4.3 Junctions:

A. Stenson Road / Warwick Avenue;
B. Arleston Lane/ Grampian Way
C. Grampian Way/ Sinfin Lane/ Lynwood;
D. Wragley Way / Arleston Lane;
E. Stenson Road / A5132;
F. A5132 / A514;
G. Stenson Road / Grampian Way;
H. Stenson Road / Wragley Way.

4.4 Baseline conditions comprise of the following scenario; existing situation (2018). The future scenarios include 2025 and 2030 future year assessments. The future year scenarios include for the following committed developments:

- Wragley Way (130 dwellings)
- Deep Dale Lane - Phase 1 (50 dwellings)

Existing Highway Network

4.5 The proposed allocated site area sits within South Derbyshire boundary although abuts the Derby City Boundary. The site is located to the south of Wragley Way, extending from the railway line at the western edge to a point approximately 250 metres east of Deep Dale Lane. The site is bounded by the A50 to the south. Stenson Road, Arleston Road and Deep Dale Lane all cut through the site.

4.6 A description of the existing local highway network is provided below.

Deep Dale Lane

4.7 Deep Dale Lane is located to the eastern side of the site on a north-south alignment and extends between Farmhouse Road to the north and Moor Lane / Sinfin Lane and then onto A5132 Twyford Road to the south. South of Wragley Way, Deep Dale Lane is predominately rural in character with verge and hedges on either side and continues beneath the A50 via a road tunnel. North of Wragley Way, Deep Dale Lane changes to an urban road with footways and street lighting serving a residential area.

4.8 A new footway is proposed along the eastern side of Deep Dale Lane as part of application ref 9/2017/0922 (100 dwellings land east of Deep Dale Lane) and application ref: 02/15/00211(50 Dwellings east of Deep Dale Lane) to link the site with the existing footways on Wragley Way and the rest of Deep Dale Lane.

4.9 The junctions onto Deep Dale Lane are all simple priority junction arrangements and the road width varies along its route from approximately 6.5m to the north of Wragley Way to around 5m to the south. No parking restrictions are provided along Deep Dale Lane.

4.10 The speed limit along Deep Dale Lane is 30mph between Farmhouse Road and a point 97m south of Wragley Way, south of this location the speed limit changes to the national speed limit (60mph).

Wragley Way

4.11 Wragley Way is an urban road serving existing residential properties and has a footway along the northern side of the road together with street lighting. This road continues on an east-west alignment between Deep Dale Lane to the east and Stenson Road to the west.

4.12 Wragley Way is approximately 6.5m in width and no parking restrictions are provided. The speed limit along Wragley Way is 30mph between Deep Dale Lane and Arleston Lane, west of Arleston Lane the speed limit changes to 40mph.

4.13 As part of the application (ref 02/15/00211) a new footway is to be provided along part of the southern side of Wragley Way, linking this development area to the existing bus stops and the footway on Deep Dale Lane.

Arleston Lane

4.14 Arleston Lane is located central to the site and extends between its junction with Grampian Way within the Sinfin District centre to the north of the site and to Buckford Lane to the south west. Buckford Lane joins the A5132 Twyford Road to the south.

4.15 Arleston Lane, north of Wragley Way, is an urban road that serves existing residential areas and has footways and street lighting, this section of Arleston Lane has a 30mph speed limit. To the south of Wragley Way, Arleston Lane is a rural lane narrowing to around 4m with passing places and as such is signed as being unsuitable for through traffic. This section of the lane is bound by verges and hedges and no footways are provided.

4.16 Arleston Lane continues across the A50 via a road bridge which is approximately 3.5m wide.

Stenson Road

4.17 Stenson Road is situated to the western side of the site and extends from A511 Warwick Avenue to the north to the A5132 to Buckford Lane to the south.

4.18 Stenson Road is subject to a 40mph speed limit at its junction with Wragley Way with a footpath on the western side, the footpath changes to the eastern side just north of Wragley Way.

4.19 North on Stenson Road there is a signal controlled on the priority traffic arrangement on the bridge that crosses the railway line. A footway / cycleway is provided on the eastern side of the bridge protected with guard railing. The footway / cycle link continues north into the city centre and east into the Sinfin area.

4.20 To the south of Wragley Way, Stenson Road is subject to the national speed limit until it reaches Stenson Village where the speed limit changes to 30mph. Traffic calming is provided in this village in the form of priority working and footway provision continues into the village centre.

A5132

4.21 The A5132 runs on an east-west alignment joining the A50 and A516 to the west and A514 and Swarkestone Road to the east, as well as joining the A38 mid-way. Swarkestone Road in turn links with the A50 at the Bonnie Prince Roundabout and then continues northwards into Derby City centre.

4.22 The A5132 is a rural route with limited footway provision until it enters the village of Hilton to the west.

A50

4.23 The A50 is a strategic dual carriageway route managed by Highways England extending from the A500 / M6 in Stoke on Trent, west of Derby, to junction 24A of the M1 in the east.

4.24 The junctions closest to the site are currently the A38 junction to the west of the site and the Bonnie Prince roundabout in Chellaston to the east. The quickest route to these junctions from the site would be via Stenson Road or Deep Dale Lane, however a new junction on the A50 is proposed.

Traffic Flows

4.25 For the purposes of this assessment, traffic count survey data has been collated from existing sources namely junction traffic surveys and Automatic Traffic Count surveys.

4.26 The traffic data and sources are summarised below.

Automatic Traffic Count (ATC)

4.27 360 Traffic Surveys Ltd were commissioned to undertake an ATC along Stenson Road, Wragley Way and Deep Dale Lane by RPS Consulting Services Ltd. In total, four ATCs were positioned on the three roads. The traffic counters recorded one week's data between Wednesday 13th February to Tuesday 19th February 2018, which include classified counts and speed surveys. The results of these surveys are provided in Table D3 below.

Table D3: Automatic Traffic Count (ATC) – Stenson Road, Wragley Way and Deep Dale Lane (2018)

Peak Period	Total Vehicle Movements – XX (HGVs)		85th Percentile Speed	
	Northbound / Eastbound (weekday average 18 hour)	Southbound / Westbound (weekday average, 18 hour)	Northbound / Eastbound	Southbound / Westbound
Stenson Road (north of Wragley Way)				
AM	352 (2)	288 (4)	38.4	38.3
PM	375 (2)	402 (8)		
Stenson Road (south of Wragley Way)				
AM	257 (2)	208 (1)	48.4	48.3
PM	283 (0)	286 (2)		
Wragley Way (east of Stenson Road)				
AM	174 (4)	146 (0)	43.4	43.3
PM	174 (6)	211 (1)		
Deep Dale Lane (south of Wragley Way)				
AM	143 (0)	210 (0)	38.4	38.3
PM	244 (0)	146 (0)		

4.28 A summary of the observed traffic flows and HGV percentages from the four ATC surveys close to the site are provided in Table D4.

Table D4: Traffic Flows and Percentage of HGVs - Stenson Road, Wragley Way and Deep Dale Lane (2018)

Direction	Total Vehicle Movements – XX (HGVs)		85th Percentile Speed	
	AM Peak Hour (7 Day Average)	PM Peak Hour (7 Day Average)	24 Hour (7 Day Average) All Vehicles	24 Hour (7 Day Average) >3.5T (HGVs)
Stenson Road (north of Wragley Way)				
Northbound	287	350	4165	23 (0.5%)
Southbound	256	367	4301	76 (1.8%)
Stenson Road (south of Wragley Way)				
Northbound	201	259	2910	12 (0.4%)
Southbound	188	255	2904	18 (0.6%)
Wragley Way (east of Stenson Road)				
Eastbound	150	164	2289	75 (3.3%)
Westbound	125	192	2147	14 (0.6%)
Deep Dale Lane (south of Wragley Way)				
Northbound	132	232	2060	3 (0.1%)
Southbound	201	138	2060	4 (0.2%)

4.29 The above tables show that the volume of traffic that currently use these routes is relatively low with two-way traffic movements below 700 vph in the peak periods. The above tables show that vehicle speeds along Stenson Road (south of Wragley Way) and Wragley Way are above the signed 40mph speed limit. The volume of HGVs that use these routes is also low.

Accident Data

4.30 A review of the accidents record is provided in the Section 'Accidents and Safety' provided later in this chapter.

Existing Pedestrian and Cycle Routes

4.31 There are no existing public rights of way through the site.

4.32 The site benefits from being located adjacent to adjacent developed areas which in turn have a good network of footways and cycle routes.

4.33 There are no formal cycle routes provided within the local area of the site, however the adjacent residential roads are relatively lightly trafficked routes and would be suitable for on road cycling. Given the local residential and rural nature of the area, it is considered that many of the local roads would lend themselves to being 'quiet routes' suitable for on road cycling. This allows easy access to existing cycle routes situated further north within Sinfin.

4.34 The National Cycle Route No. 66 goes through Sinfin District, access to which can be made via Arleston Road. This is a signed route forming part of the route that extends around Derby City linking with NCN route No.'s 68 and 54. Parts of these routes are on road and part are off road.

4.35 On Stenson Road, north of its junction with Wragley Way, there is a signalised vehicle priority arrangement on the road bridge over the railway, leading towards Derby City Centre. This arrangement includes separate marked pedestrian and cycle lane which forms part of the NCN Route 66.

Future Baseline Road Network

Future Baseline Traffic Flows

4.36 In providing a future baseline, traffic movements associated with committed developments identified in paragraph 17.2 have been obtained from the relevant Transport Assessment reports submitted as part of the various planning application.

4.37 In addition to the above, the future scenarios background growth applied has used the TEMPRO v7.2 database. The level of growth together with the committed developments is considered to provide a robust assessment.

4.38 The traffic flows for the highway network in the vicinity of the site are shown on Table D5 for the base 2018 and future 2025 and 2030 scenarios, with links identified on Figure D2 within Appendix D2.

Table D5: 2018 Baseline 2-way traffic – No Development

ID (ref: see Fig D2)	Link	Speed Limit (mph)	AM / PM 2-way all vehicle flow	18 hour 2-way all vehicle flow	24 hour 2-way all vehicle flow	18 hour >3.5T (HGVs)	24 hour >3.5T (HGVs)
1	Deep Dale Lane (south)	30	332/370	3947	4120	7	7
2	Deep Dale Lane (north)	30	282/316	3715	4205	0	0
3	Wragley Way (west of Deep Dale Lane)	30	268/372	4510	5104	34	37
4	Arleston Lane	30	268/372	3976	4500	85	91
5	Wragley Way (west of Arleston Lane)	40	275/356	4380	4436	97	89

ID (ref: see Fig D2)	Link	Speed Limit (mph)	AM / PM 2-way all vehicle flow	18 hour 2-way all vehicle flow	24 hour 2-way all vehicle flow	18 hour >3.5T (HGVs)	24 hour >3.5T (HGVs)
6	Stenson Road (south of Wragley Way)	40	619/537	6789	7770	15	15
7	Stenson Road (north of Wragley Way)	40	543/717	8320	8466	112	102
8	Grampian Way (east of Stenson Road)	30	1174/1225	14904	16870	102	110
9	Stenson Road (north of Grampian Way)	40	1174/1225	14088	16124	88	92
10	Grampian Way (west of Sinfin Lane)	30	1184/1310	15495	17538	340	366
11	Sinfin Lane (north of Grampian Way)	30	1184/1310	16057	18174	127	137
12	Wilmore Road	40	1088/1220	14339	16230	348	375
13	Sinfin Lane (north of Wilmore Road)	30	1312/1256	15954	29555	567	1198
14	Stenson Road (north of Blagreaves Lane)	30	1379/1486	22920	26233	846	884
15	Warwick Avenue	40	2247/2515	27965	32007	787	823
16	Kenilworth Avenue	40	2045/1858	22920	26233	846	884
17	Osmaston Park Road	40	2052/2151	24682	28250	964	1007

Table D6: 2025 Baseline 2-way traffic – No Development (includes Committed) excludes A50 infrastructure

ID (ref: see Fig D2)	Link	Speed Limit (mph)	AM / PM 2-way all vehicle flow	18 hour 2-way all vehicle flow	24 hour 2-way all vehicle flow	18 hour >3.5T (HGVs)	24 hour >3.5T (HGVs)
1	Deep Dale Lane (south)	30	368/410	4373	4563	8	8
2	Deep Dale Lane (north)	30	312/350	4116	4657	0	0
3	Wragley Way (west of Deep Dale Lane)	30	297/412	4996	5653	38	41
4	Arleston Lane	30	297/412	4405	4984	94	101

ID (ref: see Fig D2)	Link	Speed Limit (mph)	AM / PM 2-way all vehicle flow	18 hour 2-way all vehicle flow	24 hour 2-way all vehicle flow	18 hour >3.5T (HGVs)	24 hour >3.5T (HGVs)
5	Wragley Way (west of Arleston Lane)	40	304/394	4852	4913	107	98
6	Stenson Road (south of Wragley Way)	40	686/595	7520	8605	16	17
7	Stenson Road (north of Wragley Way)	40	602/794	9217	9376	124	113
8	Grampian Way (east of Stenson Road)	30	1300/1357	16511	18683	113	122
9	Stenson Road (north of Grampian Way)	40	1300/1357	15607	17858	98	102
10	Grampian Way (west of Sinfin Lane)	30	1311/1451	17165	19423	376	405
11	Sinfin Lane (north of Grampian Way)	30	1311/1451	17788	20128	141	152
12	Wilmore Road	40	1205/1351	15885	17975	386	415
13	Sinfin Lane (north of Wilmore Road)	30	2273/2382	28927	32733	1232	1327
14	Stenson Road (north of Blagreaves Lane)	30	2265/2058	25391	29054	937	979
15	Warwick Avenue	40	2489/2786	30979	35448	872	911
16	Kenilworth Avenue	40	2265/2058	25391	29054	937	979
17	Osmaston Park Road	40	2273/2382	27343	31287	1067	1115

Table D7: 2025 Baseline 2-way traffic – No Development (includes Committed & A50 Junction)

ID (ref: see Fig D2)	Link	Speed Limit (mph)	AM / PM 2-way all vehicle flow	18 hour 2-way all vehicle flow	24 hour 2-way all vehicle flow	18 hour >3.5T (HGVs)	24 hour >3.5T (HGVs)
1	Deep Dale Lane (south)	30	1802/1781	19023	21021	8	7
2	Deep Dale Lane (north)	30	652/607	7825	8857	0	0
3	Wragley Way (west of Deep Dale Lane)	30	1338/1285	16298	18446	38	41

ID (ref: see Fig D2)	Link	Speed Limit (mph)	AM / PM 2-way all vehicle flow	18 hour 2-way all vehicle flow	24 hour 2-way all vehicle flow	18 hour >3.5T (HGVs)	24 hour >3.5T (HGVs)
4	Arleston Lane	30	227/240	2904	3286	94	101
5	Wragley Way (west of Arleston Lane)	40	1298/1268	15937	18039	107	98
6	Stenson Road (south of Wragley Way)	40	728/640	8033	9194	16	17
7	Stenson Road (north of Wragley Way)	40	1747/1641	19899	22776	124	113
8	Grampian Way (east of Stenson Road)	30	1458/1378	17619	19942	113	122
9	Stenson Road (north of Grampian Way)	40	1808/1706	20634	23616	98	102
10	Grampian Way (west of Sinfin Lane)	30	1213/1318	15725	17798	376	405
11	Sinfin Lane (north of Grampian Way)	30	1358/1483	17653	19981	141	152
12	Wilmore Road	40	1288/1320	16205	18342	386	415
13	Sinfin Lane (north of Wilmore Road)	30	2426/2449	30285	34278	1232	1327
14	Stenson Road (north of Blagreaves Lane)	30	1739/1762	20559	23530	937	979
15	Warwick Avenue	40	2670/3018	33406	38234	872	911
16	Kenilworth Avenue	40	2422/2168	26956	30852	937	979
17	Osmaston Park Road	40	2450/2522	29199	33419	1067	1115

Table D8: 2030 Baseline 2-way traffic – No Development (includes Committed) excludes proposed A50 infrastructure

ID (ref: see Fig D2)	Link	Speed Limit (mph)	AM / PM 2-way all vehicle flow	18 hour 2-way all vehicle flow	24 hour 2-way all vehicle flow	18 hour >3.5T (HGVs)	24 hour >3.5T (HGVs)
1	Deep Dale Lane (south)	30	384/426	4553	4749	8	8
2	Deep Dale Lane (north)	30	325/364	4285	4847	0	0

ID (ref: see Fig D2)	Link	Speed Limit (mph)	AM / PM 2-way all vehicle flow	18 hour 2-way all vehicle flow	24 hour 2-way all vehicle flow	18 hour >3.5T (HGVs)	24 hour >3.5T (HGVs)
3	Wragley Way (west of Deep Dale Lane)	30	309/429	5202	5893	39	42
4	Arleston Lane	30	309/429	4586	5188	98	105
5	Wragley Way (west of Arleston Lane)	40	317/410	5052	5114	112	102
6	Stenson Road (south of Wragley Way)	40	714/619	7831	8956	17	18
7	Stenson Road (north of Wragley Way)	40	625/826	9597	9759	129	118
8	Grampian Way (east of Stenson Road)	30	1353/1412	17192	19445	118	127
9	Stenson Road (north of Grampian Way)	40	1353/1412	16250	18587	102	106
10	Grampian Way (west of Sinfin Lane)	30	1365/1510	17873	20216	392	422
11	Sinfin Lane (north of Grampian Way)	30	1365/1510	18521	20949	147	158
12	Wilmore Road	40	1254/1406	16540	18708	402	432
13	Sinfin Lane (north of Wilmore Road)	30	2365/2479	30120	34068	1283	1381
14	Stenson Road (north of Blagreaves Lane)	30	2357/2205	26816	30667	1005	917
15	Warwick Avenue	40	2590/2899	32257	36894	908	948
16	Kenilworth Avenue	40	2357/2142	26438	30239	976	1019
17	Osmaston Park Road	40	2273/2382	28470	32563	1111	1161

Table D9: 2030 Baseline 2-way traffic – No Development (includes Committed & A50 Junction)

ID (ref: see Fig D2)	Link	Speed Limit (mph)	AM / PM 2-way all vehicle flow	18 hour 2-way all vehicle flow	24 hour 2-way all vehicle flow	18 hour >3.5T (HGVs)	24 hour >3.5T (HGVs)
1	Deep Dale Lane (south)	30	2015/2003	21333	23574	8	8
2	Deep Dale Lane (north)	30	723/682	8731	9882	0	0
3	Wragley Way (west of Deep Dale Lane)	30	1485/1435	18141	20533	39	42
4	Arleston Lane	30	245/250	3079	3485	98	105
5	Wragley Way (west of Arleston Lane)	40	1434/1457	17961	20329	112	102
6	Stenson Road (south of Wragley Way)	40	753/662	8309	9510	17	18
7	Stenson Road (north of Wragley Way)	40	1902/1844	21995	25174	129	118
8	Grampian Way (east of Stenson Road)	30	1547/1484	18833	21316	117	127
9	Stenson Road (north of Grampian Way)	40	1928/1853	22201	25410	112	106
10	Grampian Way (west of Sinfin Lane)	30	1319/1363	16668	18866	392	422
11	Sinfin Lane (north of Grampian Way)	30	1465/1534	18630	21086	147	158
12	Wilmore Road	40	1375/1366	17027	19273	401	432
13	Sinfin Lane (north of Wilmore Road)	30	2515/2533	31362	35497	1282	1381
14	Stenson Road (north of Blagreaves Lane)	30	1761/1822	21042	24084	1004	1049
15	Warwick Avenue	40	2728/3122	34352	39317	907	948
16	Kenilworth Avenue	40	2511/2243	27914	31949	975	1019
17	Osmaston Park Road	40	2539/2609	30236	34606	1111	1161

D5.0 Potential Effects

Potential Sensitivity during construction and operation phases

5.1 Based upon the baseline conditions and methodology described previously in section D4, the considered sensitivity of the assessed highway links is given in Table D10 below. The groups assessed under this category are based on those identified in the IEMA under 'Affected Parties' and include the following:

1. People at home;
2. People in work places;
3. Sensitive groups including children, elderly and disabled;
4. Sensitive locations e.g. hospitals, churches, schools, historical buildings;
5. People walking;
6. People cycling;
7. Open spaces, recreational sites, shopping sites;
8. Sites of ecological / nature conservation value; and
9. Sites or tourist / visitor attraction.

Table D10: Sensitivity of the Assessed Highway Links

Link ID Ref (Fig D2)	Highway Link	Sensitive to change	Reason
1	Deep Dale Lane (south)	No	No residential properties or footways
2	Deep Dale Lane (north)	Yes	Existing residential area
3	Wragley Way (west of Deep Dale Lane)	Yes	Residential dwellings located to the north of Wragley Way
4	Arleston Lane	Yes	Existing residential area
5	Wragley Way (west of Arleston Lane)	Yes	Residential dwellings located to the north of Wragley Way
6	Stenson Road (south of Wragley Way)	No	No residential dwellings or footways
7	Stenson Road (north of Wragley Way)	Yes	Existing residential area
8	Grampian Way (east of Stenson Road)	Yes	Existing residential area
9	Stenson Road (north of Grampian Way)	Yes	Existing residential area
10	Grampian Way (west of Sinfin Lane)	Yes	Existing residential area
11	Sinfin Lane (north of Grampian Way)	Yes	Residential properties located to the west of Sinfin Lane and recreational field located to the east
12	Wilmore Road	Yes	Residential dwellings located to the south of Wilmore Road and industrial and workplace units located to the north

Link ID Ref (Fig D2)	Highway Link	Sensitive to change	Reason
13	Sinfin Lane (north of Wilmore Road)	Yes	Existing industrial and workplace units located on both sides of the road
14	Stenson Road (north of Blagreaves Lane)	Yes	Existing residential area
15	Warwick Avenue	Yes	Existing residential area, although properties set back from main road with allotments and recreation park located near Warwick Avenue
16	Kenilworth Avenue	Yes	Existing residential area and church located north of Kenilworth Avenue
17	Osmaston Park Road	Yes	Residential dwellings located north of Osmaston Park Road and visitor attraction and shopping area located to the south of the road

Potential effects during construction

5.2 A review of the level of HGV construction traffic has been undertaken based on information obtained from other development sites. The prediction is that there will be around 13 HGV movements per day and around 2 per hour during the development process. In terms of the overall number of construction related vehicles, the impact is considered to be less than the operational phase of development and as such the construction impact has not been assessed.

5.3 Access for all HGV construction vehicles will be via Stenson Road prior to the A50 junction being completed. Post the A50 junction completion, it is proposed that all HGV movements associated with the construction phase will be via the A50. A Construction Traffic Management Plan (CTMP) will be prepared as a condition to this application which will include details of how the construction phase is monitored and implemented.

5.4 The hours of operation during the construction phase will be between 07:00 to 19:00 Monday to Friday and 07:00 to 13:00 on Saturday. No construction will take place outside these hours or on Bank Holidays except in case of emergency. Such instances shall be notified in writing to the relevant highway authority within 48 hours of their occurrence.

5.5 The site will be developed in phases with initial phases being developed off Wragley Way and Deep Dale Lane. During these initial phases of development it is envisaged that the A50 junction will not be completed and as such the construction traffic will use Stenson Road as the main point of access.

5.6 Traffic associated with the construction of the Proposed Development is assessed to be low when compared to the traffic flows on the surrounding highway network. It is anticipated that any excavated material that is deemed

suitable will be used as part of the proposed landscaping works, leaving delivery of construction material and personnel as the major vehicle movements associated with the construction phase. Although some movements associated with the transporting of excavated materials may be needed.

5.7 Construction work carried out on the existing road network will be set out in accordance with the *Department for Transport's Chapter 8: Traffic Safety Measures and signs for road works and temporary situations (2009)*, which provides a standard of good practice on how traffic management during highway construction should be carried out, i.e. placement of traffic cones / barriers, temporary road signs / traffic lights etc. Pedestrian routes will be maintained during the construction period or diverted with clear signage. Pedestrians will be kept clear of any construction works by the provision of barriers and signage in accordance with the Department for Transport's Chapter 8 manual.

Assessment of Impact

5.8 The assessment of impacts determines both the change in magnitude of the impacts as well as their absolute levels. In determining the extent of the study area to be included as part of the ES, reference is made to the IEMA guidelines which states that as a rule of thumb that highway links only need to be considered whereby there is a change in traffic greater than 30% (or the number of heavy goods vehicles will increase by more than 30%) (Rule 1), or more than 10% where the link contains sensitive links (Rule 2).

5.9 Details of this assessment are identified in Tables D11 to D13 below. The proposed scenarios are as follows:

- Proposed Traffic Flows (2025) = 2018 Base Traffic flows plus growth to 2025, plus proposed development phases 1 and 2, and committed developments;
- Proposed Traffic Flows (2030) – No Employment = 2018 Base Traffic flows plus growth to 2030, plus proposed development (excluding employment), and committed developments; and
- Proposed Traffic Flows (2030) – All Development = 2018 Base Traffic flows plus growth to 2030, plus all proposed development and committed developments.

Table D11: Predicted Two-Way Traffic Impact over a 24 Hour Day (2025)

ID (ref: see Fig D2)	Link	Flow (Vehicles / HGVs)					
		2025 Base (including infrastructure)		2025 Proposed with Phase 1& 2		% Increase	
		AV	HGV	AV	HGV	AV	HGV
1	Deep Dale Lane (south)	21021	7	21791	8	4%	14%
2	Deep Dale Lane (north)	8857	0	9177	0	4%	0%
3	Wragley Way (west of Deep Dale Lane)	18446	41	18543	105	0.5%	159%
4	Arleston Lane	3286	101	4071	105	24%	4%
5	Wragley Way (west of Arleston Lane)	18039	98	19141	102	6%	4%
6	Stenson Road (south of Wragley Way)	9194	17	9450	18	3%	6%
7	Stenson Road (north of Wragley Way)	22776	113	23034	118	1%	4%
8	Grampian Way (east of Stenson Road)	19942	122	20041	127	0%	4%
9	Stenson Road (north of Grampian Way)	23616	102	23773	106	1%	4%
10	Grampian Way (west of Sinfin Lane)	17798	405	19844	422	11%	4%
11	Sinfin Lane (north of Grampian Way)	19981	152	20906	141	5%	-7%
12	Wilmore Road	18342	415	18508	432	1%	4%
13	Sinfin Lane (north of Wilmore Road)	34278	1327	20755	1161	-39%	-13%
14	Stenson Road (north of Blagreaves Lane)	23530	979	23982	1049	2%	7%
15	Warwick Avenue	38234	911	36336	948	-5%	4%
16	Kenilworth Avenue	30852	979	31456	1019	2%	4%
17	Osmaston Park Road	33419	1115	33855	1161	1%	4%

Table D12: Predicted Two-Way Traffic Impact over a 24 Hour Day (2030)

ID (ref: see Fig D2)	Link	Flow (Vehicles / HGVs)					
		2030 Base (including infrastructure)		2030 Proposed (No Employment)		% Change	
		AV	HGV	AV	HGV	AV	HGV
1	Deep Dale Lane (south)	23574	8	4312	8	-81%	0%
2	Deep Dale Lane (north)	9882	0	4775	0	-52%	0%
3	Wragley Way (west of Deep Dale Lane)	20533	42	2025	42	-90%	0%
4	Arleston Lane	3485	105	7384	105	112%	0%
5	Wragley Way (west of Arleston Lane)	20329	102	19907	102	-2%	0%
6	Stenson Road (south of Wragley Way)	9510	18	10176	18	7%	0%
7	Stenson Road (north of Wragley Way)	25174	118	28908	118	15%	0%
8	Grampian Way (east of Stenson Road)	21316	127	22137	127	4%	0%
9	Stenson Road (north of Grampian Way)	25410	106	28357	106	12%	0%
10	Grampian Way (west of Sinfin Lane)	18866	422	28114	422	49%	0%
11	Sinfin Lane (north of Grampian Way)	21086	158	27614	158	31%	0%
12	Wilmore Road	19273	432	20611	432	7%	0%

ID (ref: see Fig D2)	Link	Flow (Vehicles / HGVs)					
		2030 Base (including infrastructure)		2030 Proposed (No Employment)		% Change	
		AV	HGV	AV	HGV	AV	HGV
13	Sinfin Lane (north of Wilmore Road)	35497	1381	26124	1381	-26%	0%
14	Stenson Road (north of Blagreaves Lane)	24084	1049	37639	1049	56%	0%
15	Warwick Avenue	39317	948	40886	948	4%	0%
16	Kenilworth Avenue	31949	1019	32686	1019	2%	0%
17	Osmaston Park Road	34606	1161	35347	1161	2%	0%

Table D13: Predicted Two-Way Traffic Impact over a 24 Hour Day (2030)

ID (ref: see Fig D2)	Link	Flow (Vehicles / HGVs)					
		2030 Base (including infrastructure)		2030 Proposed (All Development)		% Increase	
		AV	HGV	AV	HGV	AV	HGV
1	Deep Dale Lane (south)	23574	8	4981	8	-79%	0%
2	Deep Dale Lane (north)	9882	0	4775	0	-52%	0%
3	Wragley Way (west of Deep Dale Lane)	20533	42	2827	105	-86%	150%
4	Arleston Lane	3485	105	8734	105	151%	0%
5	Wragley Way (west of Arleston Lane)	20329	102	21229	102	4%	0%
6	Stenson Road (south of Wragley Way)	9510	18	10163	18	7%	0%
7	Stenson Road (north of Wragley Way)	25174	118	31281	118	24%	0%
8	Grampian Way (east of Stenson Road)	21316	127	22734	127	7%	0%
9	Stenson Road (north of Grampian Way)	25410	106	29957	106	18%	0%
10	Grampian Way (west of Sinfin Lane)	18866	422	30012	422	59%	0%
11	Sinfin Lane (north of Grampian Way)	21086	158	29021	152	38%	-4%
12	Wilmore Road	19273	432	20850	432	8%	0%
13	Sinfin Lane (north of Wilmore Road)	35497	1381	27361	1381	-23%	0%
14	Stenson Road (north of Blagreaves Lane)	24084	1049	40657	1049	69%	0%
15	Warwick Avenue	39317	948	41336	948	5%	0%
16	Kenilworth Avenue	31949	1019	32767	1019	3%	0%
17	Osmaston Park Road	34606	1161	35220	1161	2%	0%

5.10 From the table above, in 2025 it is shown that the following links require further investigation:

- 3 - Wragley Way (west of Deep Dale Lane);
- 4 - Arleston Lane;
- 7 - Stenson Road (north of Wragley Way);
- 9 - Stenson Road (north of Grampian Way);
- 10 - Grampian Way (west of Sinfin Lane);and
- 14 - Stenson Road (north of Blagreaves Lane);

5.11 In 2030 the following require further investigation;

- 4 - Arleston Lane;
- 7 - Stenson Road (north of Wragley Way);
- 9 - Stenson Road (north of Grampian Way);
- 10 - Grampian Way (west of Sinfin Lane);
- 11 – Sinfin Lane (north of Grampian Way); and
- 14 - Stenson Road (north of Blagreaves Lane);

Severance

5.12 The significance categories are based upon the MEA (Manual of Environmental Appraisal – DfT 1983) indicators which determine the significance of the relief from severance. The categories identified are 'slight' being an increase of vehicle movements of 30%, 'moderate' being an increase of 60% and 'substantial' being an increase of 90% or more.

Severance effects during 2025 and 2030

5.13 The impact of traffic is dependent upon a wide range of factors, including volume of traffic, traffic speeds and operational characteristics and traffic composition (e.g. percentage of heavy goods vehicles).

5.14 The assessment of the vehicular (including HGVs) trip generation and distribution associated with the Proposed Development has been assessed in detail within the TA.

5.15 Tables D14 to D16 below identifies the level of severance using the IEMA guidance for the phases of development.

Table D14: Predicted Two-Way Traffic Impact over a 24 Hour Day (2025)

ID (ref: see Fig D2)	Link	Predicted Two-Way Traffic Impact over a 24 Hour Day (2025)						
		2025 Base (including infrastructure)		2025 Proposed with Phase 1& 2		% Increase		Severity of Impact
		AV	HGV	AV	HGV	AV	HGV	
3	Wragley Way (west of Deep Dale Lane)	18446	41	18543	105	1%	159%	Less than slight (Substantial HGV)
4	Arleston Lane	3286	101	4071	105	24%	4%	Less than slight
7	Stenson Road (north of Wragley Way)	9194	17	23034	118	3%	6%	Less than slight

ID (ref: see Fig D2)	Link	Predicted Two-Way Traffic Impact over a 24 Hour Day (2025)						
		2025 Base (including infrastructure)		2025 Proposed with Phase 1& 2		% Increase		Severity of Impact
		AV	HGV	AV	HGV	AV	HGV	
9	Stenson Road (north of Grampian Way)	19942	122	23773	106	0%	4%	Less than slight
10	Grampian Way (west of Sinfin Lane)	23616	102	19844	422	1%	4%	Less than slight
14	Stenson Road (north of Blagreaves Lane)	23530	979	23982	1049	2%	7%	Less than Slight

Table D15: Predicted Two-Way Traffic Impact over a 24 Hour Day (2030, No Employment)

ID (ref: see Fig D2)	Link	Predicted Two-Way Traffic Impact over a 24 Hour Day (2030)						
		2030 Base (including infrastructure)		2030 Proposed (No employment)		% Increase		Severity of Impact
		AV	HGV	AV	HGV	AV	HGV	
4	Arleston Lane	3485	105	7384	105	112%	0%	Substantial
7	Stenson Road (north of Wragley Way)	25174	118	28908	118	15%	0%	Less than slight
9	Stenson Road (north of Grampian Way)	25410	106	28357	106	12%	0%	Less than slight
10	Grampian Way (west of Sinfin Lane)	18866	422	28114	422	49%	0%	Slight
11	Sinfin Lane (north of Grampian Way)	21086	158	27614	158	31%	0%	Slight
14	Stenson Road (north of Blagreaves Lane)	24084	1049	37639	1049	56%	0%	Slight

Table D16: Predicted Two-Way Traffic Impact over a 24 Hour Day (2030, Full Development)

ID (ref: see Fig D2)	Link	Predicted Two-Way Traffic Impact over a 24 Hour Day (2030)						
		2030 Base (including infrastructure)		2030 Proposed (All development)		% Increase		Severity of Impact
		AV	HGV	AV	HGV	AV	HGV	
4	Arleston Lane	3485	105	8734	105	151%	0%	Substantial
7	Stenson Road (north of Wragley Way)	25174	118	31281	118	24%	0%	Less than slight
9	Stenson Road (north of Grampian Way)	25410	106	29957	106	18%	0%	Less than slight
10	Grampian Way (west of Sinfin Lane)	18866	422	30012	422	59%	0%	Slight
11	Sinfin Lane (north of Grampian Way)	21086	158	29021	152	38%	-4%	Slight

ID (ref: see Fig D2)	Link	Predicted Two-Way Traffic Impact over a 24 Hour Day (2030)						
		2030 Base (including infrastructure)		2030 Proposed (All development)		% Increase		Severity of Impact
		AV	HGV	AV	HGV	AV	HGV	
14	Stenson Road (north of Blagreaves Lane)	24084	1049	40657	1049	69%	0%	Moderate

5.16 The results in Tables D14 to D16 identify that whilst there will be an increase in traffic on the local highway network, the majority of highway links are identified as Less than slight or Slight, with only a few highway links in the 2030 scenarios being identified as a Moderate or Substantial increase. There is no difference between the 'without employment scenario' compared with the 'with full development scenario'.

5.17 The change to Moderate and Substantial levels in 2030 is due to the existing low level of traffic movements using this route, so whilst an increase in movements along this route will result in a Moderate or Substantial increase in terms of percentage change, traffic levels will remain relatively low in absolute terms.

5.18 The increase along Wragley Way (West of Deep Dale Lane) will see an increase in HGV movements on the basis that the full SDITL is not complete but the A50 junction and Infinity link road is complete. Once the SDITL is completed through the development site in 2030, the impact on this link reduces as HGV's will use the SDITL.

Driver delay

5.19 Driver delay can be established at key junctions using conventional modelling techniques identifying the average delay in seconds. However, the advice within the IEMA guidelines identifies such delays *'…are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system'*.

5.20 Driver delay has been determined for the base situation (2018), the 2025 phase of development and final development of 1,800 dwellings (2030) scenarios, using the industry standard computer modelling software 'LINSIG' and Junctions 9. The average delay in terms of minutes is provided in Table D17 below. The table below considers the impact of the junctions included as part of the TA.

Table D17: Predicted Driver Delay – No Development

Junction	Average Vehicle Delay per junction (Mins / Veh)					
	Base (2018)		Future (2025) – No Development		Future (2030) – No Development	
	AM	PM	AM	PM	AM	PM
A: Stenson Road / Warwick Avenue (Rdbt)	0.50	0.75	2.74	3.48	3.79	4.56
B: Grampian Way / Arleston Lane (Rdbt)	0.18	0.21	0.77	0.89	0.25	1.20
C: Grampian Way / Sinfin Lane (Rdbt)	0.19	0.12	0.28	0.22	0.36	0.25
D: Arleston Lane / Wragley Way	0.02	0.04	0.18	0.27	0.18	0.27
E: Stenson Road / A5132	0.19	0.18	1.21	0.78	0.86	0.73
F: Barrow Lane (A5132) / Swarkestone Road (A514)	0.19	0.20	0.68	0.40	0.64	0.39
G: Stenson Road / Grampian Way (Rdbt)	0.08	0.07	1.94	0.58	3.58	1.29
H: Stenson Road / Wragley Way	0.19	0.09	2.94	0.40	3.69	0.47

5.21 The above table shows that at Junctions B to D, and F there will only be a slight increase in delay to vehicles at these junctions with growth and committed development traffic. At junction A, E, G & H there will be a greater delay experienced.

5.22 The table below identifies the changes in delay at the existing junctions with the proposed development traffic. Wragley Way, Stenson Road and Deep Dale Lane are the new access layouts in 2025 and 2030. Junction H will be upgraded as part of the proposals to a new roundabout.

Table D18: Predicted Driver Delay – With Development

	Average Vehicle Delay per junction (Mins / Veh)					
	2025 Proposed with Phase 1& 2		2030 Proposed (All development)		2030 Proposed (No employment)	
	AM	PM	AM	PM	AM	PM
A: Stenson Road / Warwick Avenue (Rdbt)	2.79	3.84	16.0	20.33	13.2	16.89
B: Grampian Way / Arleston Lane (Rdbt)	0.86	1.04	5.42	12.35	3.34	7.70
C: Grampian Way / Sinfin Lane (Rdbt)	0.34	0.31	3.88	1.90	2.20	1.65
D: Arleston Lane / Wragley Way	0.21	0.30	1.82	4.38	1.75	3.54
E: Stenson Road / A5132	1.21	0.78	0.86	0.73	0.86	0.73
F: Barrow Lane (A5132) / Swarkestone Road (A514)	0.45	0.35	0.46	0.69	0.89	0.53

	Average Vehicle Delay per junction (Mins / Veh)					
	2025 Proposed with Phase 1& 2		2030 Proposed (All development)		2030 Proposed (No employment)	
	AM	PM	AM	PM	AM	PM
G: Stenson Road / Grampian Way (Rdbt)	4.15	0.60	9.79	14.88	7.38	12.88
H: Stenson Road / Wragley Way	0.11	0.11	0.09	0.19	0.09	0.17

5.23 The above table shows that there will be a large increase and greater delay experienced at junctions B, F and G, with the addition of development traffic.

5.24 Junctions B, C & G will all see improvement measures provided to mitigate the impact of the development traffic. The results of these proposals are identified in Table D19 below.

Table D19: Predicted Driver Delay – With Development & Mitigation

Junction	Average Vehicle Delay per junction (Mins / Veh)					
	2025 Proposed with Phase 1& 2		2030 Proposed (All development)		2030 Proposed (No employment)	
	AM	PM	AM	PM	AM	PM
B: Grampian Way / Arleston Lane (Rdbt)	0.24	0.23	0.90	2.61	0.52	1.26
C: Grampian Way / Sinfin Lane (Rdbt)	0.19	0.28	1.66	0.97	0.78	0.87
G: Stenson Road / Grampian Way (Rdbt)	0.08	0.07	0.12	0.28	0.09	0.19

5.25 Junction A is to be assessed although the proposed mitigation of upgrading this roundabout junction to a signalised junction will mitigate the developments impact. The above table shows that the proposed measures will reduce the vehicle delays ensuring that there is not an adverse impact.

Pedestrian Delay

5.26 The assessment of Pedestrian Delay considers the delay that is likely to occur to pedestrians as they cross the road. The majority of roads in the local area have or will have pedestrian activity.

5.27 In order to gain an understanding of how the increase in traffic affects pedestrian movements, reference is made to the Department of Transports Local Transport Note 1/95 "The Assessment of Pedestrian Crossings" this provides a general guide on the average time it takes to cross a two-lane road.

For able bodied people this is between 4-6 seconds on a typical urban road and between 10-12 seconds for elderly or disabled people.

5.28 All roads with existing pedestrian activity / footways or proposed pedestrian activity have been reviewed which includes all links. The results are provided in Tables D20 below. The maximum is the 2-way flows for roads with two-way flows or 1-way flows on one-way roads.

Table D20: Assessment of Pedestrian Delay during 2025

Highway Link (ID Ref: D2)		Average Pedestrian Delay (08:00-09:00)					
		2025 Base (No infrastructure & no development)		2025 Proposed (No development, including infrastructure)		2025 Proposed with Development	
		Maximum Vehicle Flow	Ave. Gap in Seconds	Maximum Vehicle Flow	Ave. Gap in Seconds	Maximum Vehicle Flow	Ave. Gap in Seconds
1	Deep Dale Lane (south)	368	10	1802	2	1902	2
2	Deep Dale Lane (north)	312	12	652	6	684	5
3	Wragley Way (west of Deep Dale Lane)	385	9	1338	3	1372	3
4	Arleston Lane	297	12	227	16	284	13
5	Wragley Way (west of Arleston Lane)	304	12	1298	3	1405	3
6	Stenson Road (south of Wragley Way)	686	5	728	5	754	5
7	Stenson Road (north of Wragley Way)	602	6	1747	2	1796	2
8	Grampian Way (east of Stenson Road)	1300	3	1548	2	1477	2
9	Stenson Road (north of Grampian Way)	1300	3	1808	2	1837	2
10	Grampian Way (west of Sinfin Lane)	1311	3	1213	3	1352	3
11	Sinfin Lane (north of Grampian Way)	1389	3	1483	2	1422	3
12	Wilmore Road	1205	3	1288	3	1300	3
13	Sinfin Lane (north of Wilmore Road)	2273	2	2426	1	1597	2

Highway Link (ID Ref: D2)		Average Pedestrian Delay (08:00-09:00)					
		2025 Base (No infrastructure & no development)		2025 Proposed (No development, including infrastructure)		2025 Proposed with Development	
		Maximum Vehicle Flow	Ave. Gap in Seconds	Maximum Vehicle Flow	Ave. Gap in Seconds	Maximum Vehicle Flow	Ave. Gap in Seconds
14	Stenson Road (north of Blagreaves Lane)	2265	2	1739	2	1745	2
15	Warwick Avenue	2489	1	2670	1	2670	1
16	Kenilworth Avenue	2265	2	2422	1	2476	1
17	Osmaston Park Road	2273	2	2450	1	2481	1

Table D21: Assessment of Pedestrian Delay during 2030

Highway Link		Average Pedestrian Delay (08:00-09:00)							
		2030 Base (no infrastructure)		2030 Proposed (No development, including infrastructure)		2030 Proposed (No employment)		2030 Proposed (All development)	
		Maximum Vehicle Flow	Ave. Gap in Seconds	Maximum Vehicle Flow	Ave. Gap in Seconds	Maximum Vehicle Flow	Ave. Gap in Seconds	Maximum Vehicle Flow	Ave. Gap in Seconds
1	Deep Dale Lane (south)	384	9	2099	2	346	10	404	9
2	Deep Dale Lane (north)	325	11	723	5	341	11	341	11
3	Wragley Way (west of Deep Dale Lane)	401	9	1485	2	163	22	221	16
4	Arleston Lane	309	12	245	15	415	9	519	7
5	Wragley Way (west of Arleston Lane)	317	11	1434	3	1138	3	1259	3
6	Stenson Road (south of Wragley Way)	714	5	753	5	817	4	815	4
7	Stenson Road (north of Wragley Way)	625	6	1902	2	1897	2	2099	2
8	Grampian Way (east of Stenson Road)	1353	3	1547	2	1500	2	1555	2

Highway Link		Average Pedestrian Delay (08:00-09:00)							
		2030 Base (no infrastructure)		2030 Proposed (No development, including infrastructure)		2030 Proposed (No employment)		2030 Proposed (All development)	
		Maximum Vehicle Flow	Ave. Gap in Seconds	Maximum Vehicle Flow	Ave. Gap in Seconds	Maximum Vehicle Flow	Ave. Gap in Seconds	Maximum Vehicle Flow	Ave. Gap in Seconds
9	Stenson Road (north of Grampian Way)	1353	3	1928	2	1971	2	2118	2
10	Grampian Way (west of Sinfin Lane)	1365	3	1319	3	1923	2	2089	2
11	Sinfin Lane (north of Grampian Way)	1446	2	1534	2	1875	2	1981	2
12	Wilmore Road	1254	3	1375	3	1484	2	1489	2
13	Sinfin Lane (north of Wilmore Road)	2365	2	2515	1	1823	2	1955	2
14	Stenson Road (north of Blagreaves Lane)	2357	2	1761	2	2863	1	2922	1
15	Warwick Avenue	2590	1	2728	1	2876	1	2905	1
16	Kenilworth Avenue	2357	2	2511	1	2674	1	2688	1
17	Osmaston Park Road	2365	2	2539	1	2603	1	2574	1

5.29 The results shown in Tables D20 – D21 review the ability for pedestrians to be able to cross a road which shows that there is no material change with the proposed development traffic. The links that show less than 6 seconds gap have been reviewed further in the table below. The level of 6 seconds has been reviewed on the basis that during the AM peak period, the majority of pedestrians will be able bodied. Outside of this peak period, traffic volumes reduce and as such longer haps are made available for all users.

Table D22: Assessment of Pedestrian Crossing Provision

		Period when gap is less than 6 seconds	Is a crossing provided on link?	Type of crossing provided	New / upgrading of crossing needed?
1	Deep Dale Lane (south)	Base 2025 & 2025 Proposed	No	-	No
2	Deep Dale Lane (north)		No	-	No
3	Wragley Way (west of Deep Dale Lane)		No	-	Yes
5	Wragley Way (west of Arleston Lane)	Base 2025, 2025 Proposed, Base 2030, 2030 Proposed (No	No	-	Yes
6	Stenson Road (south of Wragley Way)		No	-	No

		Period when gap is less than 6 seconds	Is a crossing provided on link?	Type of crossing provided	New / upgrading of crossing needed?
7	Stenson Road (north of Wragley Way)	employment) & 2030 Proposed (All development)	Yes	Informal pedestrian crossing at mini-roundabout	No
8	Grampian Way (east of Stenson Road)		Yes	Informal pedestrian crossing	No
9	Stenson Road (north of Grampian Way)		No	-	No
10	Grampian Way (west of Sinfin Lane)		Yes	Informal pedestrian crossing	No
11	Sinfin Lane (north of Grampian Way)		Yes	Formal signalised crossing	No
12	Wilmore Road		Yes	Signalised crossing	No
13	Sinfin Lane (north of Wilmore Road)		Yes	Formal signalised crossing	No
14	Stenson Road (north of Blagreaves Lane)		Yes	Informal and formal signalised pedestrian crossing	No
15	Warwick Avenue		Yes	Formal signalised crossing	No
16	Kenilworth Avenue		Yes	Formal signalised crossing	No
17	Osmaston Park Road		Yes	Formal signalised crossing	No

5.30 Of the above links, new pedestrian crossing facilities will be provided on the new link road at the key locations by the Local Centre & Primary School as well as at the junction near the proposed Public House and PFS.

5.31 Further details of these proposals are included in the TA.

Pedestrian Amenity

5.32 This section reviews pedestrian amenity during the Opening Year and Future Year Scenarios. The term pedestrian amenity is included in MEA (Manual of

Environmental Appraisal – DfT 1983). It is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width / separation from traffic.

5.33 The IEMA Guidelines suggest that a tentative threshold for judging the significance of changes in pedestrian amenity would be where traffic (or its Heavy Goods Vehicle (HGV) component) is halved or doubled.

5.34 Tables D14 to D16 identify that the Proposed Development will not result in a significant increase in the level of HGV's in the assessment area as part of the development traffic, although there will be an increase along some local routes due to the change in the highway layout. During the construction phase there will be an increase in HGV movements on the local roads which likely to double the existing level of HGV movements along some routes, although in absolute terms this is only likely to be an increase of 1 or 2 HGV's per hour.

5.35 In terms of vehicle movements, the HGV traffic along Wragley Way West will increase to more than double the base 2025 HGV flows although this not related to the development but related to the change in road geometry. This level will be less in the 2030 scenario. All other roads will not see a doubling of HGV traffic movements when compared to the without development scenarios.

5.36 The footways along the proposed link road will be 2m wide on the northern side and a 3m wide footway/cycleway will be provided along the southern side. Along the link road the footways will be separated from the road by a 1m wide verge. Along Stenson Road north of the site, the footways are in part separated from the road by a verge or 2m+ in width, Stenson Road south of the site has a single footway along most of its length which is approximately 2m in width. It is therefore considered that the 'pleasantness' of a pedestrian's journey along these routes will not be adversely affected by the development traffic or the construction traffic flows. The overall impact is considered negligible.

Cyclist Impact

5.37 There are no existing cycle routes within close proximity to the site, however as part of the development proposal a new footway/cycleway will be provided along the main link road as well as through the development site. Other local residential roads are considered to be suitable for on road cycling due to low traffic flows.

5.38 It is considered with the measures being provided that the impact on cyclists will be minor and beneficial.

Fear and Intimidation

5.39 To assess the levels of fear and intimidation, the thresholds in the IEMA Guidelines have been used. These are set out in Table D23 below.

Table D23: Example of Fear and Intimidation

Degree of Hazard	Average traffic flow over 18hr day (veh/hr)	Total 18-hour HGV flow	Average speed over 18-hour day (mph)
Extreme	1800+	3000+	20+
Great	1200-1800	2000-3000	15-20
Moderate	600-1200	1000-2000	10-15
Low	0-600	0-1000	0-10

5.40 By applying the above criteria to the base and predicted traffic flows within the study area identified, all routes will see an average speed in excess of 20mph over an 18 hour day, as such the review focuses on the increase in vehicle movements over an 18 hour day along routes with pedestrian footways. The potential impacts are shown in Tables D24 to D25 below.

5.41 Tables D24 and D25 assess the degree of hazard in terms of fear and intimidation for the assessment year 2025 and 2030 scenarios.

Table D24: Levels of Fear and Intimidation – 2025 Scenario

Highway Links		Degree of Hazard without Development or A50 infrastructure		Degree of Hazard without Development (including infrastructure)		Degree of Hazard with Development (phase 1, 2 and committed)	
		Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow
1	Deep Dale Lane (south)	243	8	1057	8	1096	8
	Degree of Hazard	Low	Low	Moderate	Low	Moderate	Low
2	Deep Dale Lane (north)	229	0	435	0	450	0
	Degree of Hazard	Low	Low	Low	Low	Low	Low
3	Wragley Way (west of Deep Dale Lane)	278	38	905	38	910	98
	Degree of Hazard	Low	Low	Moderate	Low	Moderate	Low

Highway Links		Degree of Hazard without Development or A50 infrastructure		Degree of Hazard without Development (including infrastructure)		Degree of Hazard with Development (phase 1, 2 and committed)	
		Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow
4	Arleston Lane	245	94	161	94	200	98
	Degree of Hazard	Low	Low	Low	Low	Low	Low
5	Wragley Way (west of Arleston Lane)	270	107	885	107	940	95
	Degree of Hazard	Low	Low	Moderate	Low	Moderate	Low
6	Stenson Road (south of Wragley Way)	418	16	446	16	459	17
	Degree of Hazard	Low	Low	Low	Low	Low	Low
7	Stenson Road (north of Wragley Way)	512	124	1106	124	1118	123
	Degree of Hazard	Low	Low	Moderate	Low	Moderate	Low
8	Grampian Way (east of Stenson Road)	917	113	979	113	984	117
	Degree of Hazard	Moderate	Low	Moderate	Low	Moderate	Low
9	Stenson Road (north of Grampian Way)	867	98	1146	98	1154	102
	Degree of Hazard	Moderate	Low	Moderate	Low	Moderate	Low
10	Grampian Way (west of Sinfin Lane)	954	376	874	376	974	392
	Degree of Hazard	Moderate	Low	Moderate	Low	Moderate	Low
11	Sinfin Lane (north of Grampian Way)	988	141	981	141	1026	131
	Degree of Hazard	Moderate	Low	Moderate	Low	Moderate	Low
12	Wilmore Road	883	386	900	386	908	401
	Degree of Hazard	Moderate	Low	Moderate	Low	Moderate	Low
13	Sinfin Lane (north of Wilmore Road)	1607	1232	1683	1232	1007	1111
	Degree of Hazard	Great	Moderate	Great	Moderate	Moderate	Moderate
14	Stenson Road (north of Blagreaves Lane)	1411	937	1142	937	1164	1004
	Degree of Hazard	Great	Low	Moderate	Low	Moderate	Moderate
15	Warwick Avenue	1721	872	1856	872	1764	907
	Degree of Hazard	Great	Low	Extreme	Low	Great	Low

Highway Links		Degree of Hazard without Development or A50 infrastructure		Degree of Hazard without Development (including infrastructure)		Degree of Hazard with Development (phase 1, 2 and committed)	
		Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow
16	Kenilworth Avenue	1411	937	1498	937	1527	975
	Degree of Hazard	Great	Low	Great	Low	Great	Low
17	Osmaston Park Road	1519	1067	1622	1067	1643	1111
	Degree of Hazard	Great	Moderate	Great	Moderate	Great	Moderate

Table D25: Levels of Fear and Intimidation – 2030

Highway Links		Degree of Hazard without Development or Infrastructure		Degree of Hazard without Development (including infrastructure)		Degree of Hazard with Development (no employment)		Degree of Hazard with Development (all development)	
		Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow
1	Deep Dale Lane (south)	253	8	1185	8	217	8	250	8
	Degree of Hazard	Low	Low	Moderate	Low	Low	Low	Low	Low
2	Deep Dale Lane (north)	238	0	485	0	234	0	234	0
	Degree of Hazard	Low	Low	Low	Low	Low	Low	Low	Low
3	Wragley Way (west of Deep Dale Lane)	289	39	1008	39	99	39	139	98
	Degree of Hazard	Low	Low	Moderate	Low	Low	Low	Low	Low
4	Arleston Lane	255	98	171	98	362	98	429	98
	Degree of Hazard	Low	Low	Low	Low	Low	Low	Low	Low
5	Wragley Way (west of Arleston Lane)	281	112	998	112	977	95	1042	95
	Degree of Hazard	Low	Low	Moderate	Low	Moderate	Low	Moderate	Low

Highway Links		Degree of Hazard without Development or Infrastructure		Degree of Hazard without Development (including infrastructure)		Degree of Hazard with Development (no employment)		Degree of Hazard with Development (all development)	
		Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow
6	Stenson Road (south of Wragley Way)	435	17	462	17	494	17	493	17
	Degree of Hazard	Low	Low	Low	Low	Low	Low	Low	Low
7	Stenson Road (north of Wragley Way)	533	129	1222	129	1403	113	1518	113
	Degree of Hazard	Low	Low	Great	Low	Great	Low	Great	Low
8	Grampian Way (east of Stenson Road)	955	118	1046	117	1087	117	1116	117
	Degree of Hazard	Moderate	Low	Moderate	Low	Moderate	Low	Moderate	Low
9	Stenson Road (north of Grampian Way)	903	102	1233	112	1376	102	1454	102
	Degree of Hazard	Moderate	Low	Great	Low	Great	Low	Great	Low
10	Grampian Way (west of Sinfin Lane)	993	392	926	392	1380	392	1473	392
	Degree of Hazard	Moderate	Low	Moderate	Low	Great	Low	Great	Low
11	Sinfin Lane (north of Grampian Way)	1029	147	1035	147	1355	147	1424	141
	Degree of Hazard	Moderate	Low	Moderate	Low	Great	Low	Great	Low
12	Wilmore Road	919	402	946	401	1012	401	1023	401
	Degree of Hazard	Moderate	Low	Moderate	Low	Moderate	Low	Moderate	Low
13	Sinfin Lane (north of Wilmore Road)	1673	1283	1742	1282	1282	1282	1343	1282
	Degree of Hazard	Great	Moderate	Great	Moderate	Great	Moderate	Great	Moderate
14	Stenson Road (north of	1490	1005	1169	1004	1827	1004	1974	1004

Highway Links		Degree of Hazard without Development or Infrastructure		Degree of Hazard without Development (including infrastructure)		Degree of Hazard with Development (no employment)		Degree of Hazard with Development (all development)	
		Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow	Average traffic Flow 18 hour day (veh/hr)	Total 18 hour HGV flow
	Blagreaves Lane)								
	Degree of Hazard	Great	Moderate	Moderate	Moderate	Extreme	Moderate	Extreme	Moderate
15	Warwick Avenue	1792	908	1908	907	1985	907	2006	907
	Degree of Hazard	Great	Low	Extreme	Low	Extreme	Low	Extreme	Low
16	Kenilworth Avenue	1469	976	1551	975	1587	975	1591	975
	Degree of Hazard	Great	Low	Great	Low	Great	Low	Great	Low
17	Osmaston Park Road	1582	1111	1680	1111	1716	1111	1710	1111
	Degree of Hazard	Great	Moderate	Great	Moderate	Great	Moderate	Great	Moderate

5.42 The above tables show that during the first phase of development, the levels of fear and intimidation remain comparative with the 'without development' scenarios. In the 2030 scenario, the degree of hazard changes with the development in place on some routes to a degree less than the base scenario with only three links (10, 11 & 14) Grampian Way, Sinfin Lane and Stenson Road seeing an increase in the degree of change. Whilst the degree of hazard has changed on some links, it is considered that the footways along these routes are of sufficient width and distance from the carriageway to ensure that pedestrians are not adversely affected by the increased traffic flows.

Accidents and Safety

5.43 Road collision data has been obtained from Derbyshire Constabulary and covers the period 1st February 2014 to 31st January 2018, a review of Crashmap has been carried out for 2018. Below is a review of the data for Deep Dale Lane, Wragley Way and Stenson Road. The details of these accidents are reviewed below, and full details are included in the Transport Assessment.

Deep Dale Lane

5.44 There have been four recorded incidents along Deep Dale Lane over the five year period, three of which were recorded as 'Slight' in terms of severity and one as serious. All accidents occurred on the section of Deep Dale Lane to the south of the A50. The Serious accident occurred in 2016 with a vehicle turning right and a motorcycle overtaking. This level and type of incidents occurring on Deep Dale Lane does not indicate any reoccurring pattern which would suggest a highway layout issue, as such it is considered that the accidents that have occurred are as a result of driver error.

Wragley Way

5.45 There have been three recorded incidents along Wragley Way over the five year period, two of which have been recorded as slight in terms of severity and one as serious. The serious accident occurred at the junction with Arleston Lane with a vehicle turning right colliding with a vehicle travelling ahead. The level of visibility along Wragley Way is very good, as such it is considered that these incidents are likely to be as a result of driver error rather than highway design or layout.

Stenson Road

5.46 A cluster of six serious accidents occurred on Stenson Road (full length). One serious accident occurred at the junction between Oaklands Avenue and Stenson Road and was resulted from a collision between two vehicles. The weather condition was dry without high winds. Two serious accident occurred at the junction between Sunnyhill Avenue and Stenson Road near a pedestrian crossing. One resulted from a collision between a vehicle going ahead and a pedestrian. The weather condition was dry without high winds and another one that occurred in the daytime resulted from a collision between a vehicle and a cyclist. The weather condition was dry without high winds.

Summary

5.47 A review of the above incidents confirms that the incidents that have occurred are down to driver / pedestrian error and not related to the existing highway layout.

Impact Interactions

5.48 Transport and Access has influenced a number of other topic areas. Those interactions are detailed in Table D26 below.

Table D26: Impact Interactions

Topic Area	Interaction
Design Development and Consideration of Alternatives	An understanding of the variety of 'audiences' that have views towards the Proposed Development and traffic movements which are associated with the application site, has been inputted into the design of the access arrangements to the Proposed Development. Consideration has been given to: 1) The volume and type of vehicle movements accessing the site; 2) The directions in which these movements are to be made and the enforcements of such movements; 3) Pedestrian and cycle movements and accessibility to the site by these modes; 4) Improvements to existing pedestrian and cycle facilities linkages to surrounding area.
Ecology and Nature Conservation	Transport and access have informed the production of a 'Landscape and Ecological Strategy', based upon the proposed new road alignment and predicted vehicle movements associated with the Proposed Development. The strategy considers the impact on wildlife with regard to noise, air quality and traffic movements.
Noise	The noise modelling has been based upon traffic movements predicted as part of the transport assessment work. This has allowed a noise model to be produced of the local highway network and access road identifying the levels of increased noise associated with the project.
Air Quality	The Air Quality modelling has also been based upon the traffic movements predicted as part of the transport assessment work. This has allowed an assessment to be made in relation to the pollution levels on roads used to access the site.
Landscape and Visual Impacts	The Traffic and Access has informed the LVIA in terms of its assessment of the setting of the proposed development as the visual impact considers the traffic activity likely to be associated with the proposed development.

5.49 The TA reviews the impact of the proposed development on the local highway network during 2025 and 2030 providing future year assessments which is in accordance with predicted delivery of the development and agreed with the local highway authorities.

D6.0 Mitigation and Monitoring

6.1 To mitigate the impact of the proposed development, the following mitigation measures are proposed.

Traffic Movement Control

6.2 As part of the construction phases of the works, a lorry routing plan will be produced and conditioned as part of a s106 planning agreement. This is to be provided to minimise the impact of HGVs associated with the construction phase of the surrounding area.

Physical Measures

6.3 The proposed development will include the provision of a new link road which will connect to the Infinity Park link road and the proposed A50 junction. Along the link road a number of new access points will be provided which will be primarily simple priority junction arrangements with the exception for three key junctions which include:

- A new five arm roundabout at the Wragley Way/ Stenson Road junction
- A new staggered signalised junction at the new Link Road/ Arleston Lane junction; and
- A new signalised junction on the new link road approximately west of the new A50 junction arrangement.

6.4 The development proposal will also include a new 2 form entry Primary School and Local Centre which will be situated central to the development site, with vehicular access being made via the Arleston Lane/ new Link Road (SDITL) junction.

6.5 New footway and cycleway routes will be provided along the proposed link road and throughout the development site and incorporate new controlled crossing points at key locations.

6.6 Off-site junction improvements will include:

- Stenson Road/ Warwick Avenue (Junction Ref.A) – new signalised junction arrangement.
- Grampian Way/ Arleston Lane/ Asda (Junction Ref. B) – widening on both the Arleston Lane and Grampian Way north arms.
- Grampian Way/ Lynwood Road (Junction Ref.C) – widening on the Sinfin Lane (north) and Grampian Way arms.

- Stenson Road/ Grampian Way (Junction Ref. G) – widening of all arms at the junction.

Accessibility Improvement Measures

6.7 In order to encourage residents and visitors to the site to use more sustainable modes of transport, the development proposed will include contribution towards:

- Diversion of existing bus services to the site & new bus routes to link with the City Centre
- Site Wide Travel Plan
- New footway/cycleway links to connect the development area to the local facilities and employment areas as well as linking with the existing footway network.

6.8 The proposed road and access arrangements are illustrated on the plan attached as Figure D1 and Appendix D1, and are provided in greater detail in the TA. The above measures will be secured through the S106/S278/S38 agreements.

D7.0 Residual Effects

7.1 The assessment undertaken in this chapter demonstrates that with mitigation there will be no residual impact as a result of the proposed development.

7.2 The analysis undertaken within this chapter shows that in terms of Severance, the change in flows are predominantly below the thresholds identified in the IEMA guidelines, with the exception of the following in 2025:

- 3 - Wragley Way (west of Deep Dale Lane);
- 4 - Arleston Lane;
- 7 - Stenson Road (north of Wragley Way);
- 9 - Stenson Road (north of Grampian Way);
- 10 - Grampian Way (west of Sinfin Lane); and
- 14 - Stenson Road (north of Blagreaves Lane).

7.3 In 2030 the following are above the thresholds identified in the IEMA:

- 4 - Arleston Lane;
- 7 - Stenson Road (north of Wragley Way);
- 9 - Stenson Road (north of Grampian Way);
- 10 - Grampian Way (west of Sinfin Lane);
- 11 – Sinfin Lane (north of Grampian Way); and
- 14 - Stenson Road (north of Blagreaves Lane).

7.4 The degree of change is primarily due to the low volumes of traffic that currently use these routes and any increase will result in a higher degree of change than will be actually perceived. The main change will be along Wragley Way which will be related to the SDITL route and the new A50 junction. The volume of traffic is still considered low in relative terms to the road type and will be subject to a 40mph speed limit (or lower) with wide footway routes separated from the carriageway by a 1m verge, as such the level of severance is still considered to be low.

7.5 Under 'Fear and Intimidation' there is a doubling of HGV movements on Wragley Way in 2025, although this is identified as moderate and is primarily related to the change in highway layout rather than relating to the development proposal and will reduce to levels similar to the existing HGV levels in the 2030 scenario. The majority of routes will remain similar to the 'without' development scenario, with the exception of the following:

- 10 - Grampian Way (west of Sinfin Lane);
- 11 – Sinfin Lane (north of Grampian Way); and
- 14 - Stenson Road (north of Blagreaves Lane).

7.6 Whilst the degree of hazard has changed on these routes, it is considered that the footways along these routes are of sufficient width and distance from the carriageway to ensure that pedestrians are not adversely affected by the increased traffic flows. The vehicle movements along these roads will not materially change from the level likely to be experienced without the development ensuring that on the routes currently considered for on-road cycling there is no material impact to cyclists. New cycle routes will be provided as part of the development proposal. Overall there will be a minor impact with this proposal.

7.7 Table D27 below identifies the residual effects associated with the different phases of the proposed development from short term to long term.

Table D27: Residual Effects

Impact	Description of Impact	Mitigation Measures	Residual Impact
Severance – Moderate increase in traffic to and from the Proposed Development during both the short-term construction phase and long-term operational phase.	Minimal impact by short term increase in HGV movements associated with the construction of the new development. Minor delay to traffic on Wragley Way and Stenson Road during the construction period. Increase in vehicles on the local road network accessing the proposed development.	A Travel Plan will be provided to reduce residents /visitor's private car movements. Offsite junction improvements to mitigate the development's impact reducing delay. New and improved footway/cycleway routes. Extension of bus services into the Site. New link road reducing traffic through Derby and connection to Infinity Park and A50. A HGV Routing Plan will be agreed with DCC as part of a S106 agreement.	Moderate increase in HGV movements resulting from the construction process and Moderate increase in vehicle movements resulting from the development. Improved accessibility for pedestrians and cyclists, strengthening linkages with existing footway links and existing residential areas. The Residual impact will be Minor - Beneficial.
Fear and Intimidation – HGV Construction vehicle movements during the short term construction phase.	Additional HGV movements along Stenson Road in the short initial phase of development and along other roads in the area.	A HGV routing plan will be implemented as part of the Proposed Development.	Upon completion of the A50 junction and associated highway infrastructure the HGV's associated with the construction of the site will be

Impact	Description of Impact	Mitigation Measures	Residual Impact
			directed to use this junction reducing trips along Stenson Road; however, during the initial phases of construction of development the Residual impact on the local area will be Minor – adverse.

Assessment of Cumulative Effects

7.8 When considered in isolation, the environmental effects of any single project upon any single receptor / resource may not be significant. However, when individual effects are considered in combination, the resulting cumulation effect may be significant.

7.9 The assessment carried out as part of this Chapter demonstrates that the roads within the assessment area will not be adversely affected by the proposed development or cumulatively with other developments; as such there will be no significance in terms of Cumulative Effects.

D8.0 Summary & Conclusions

8.1 The assessment undertaken within this chapter identifies a number of positive and moderate negative changes resulting from the proposed development, although with mitigation provided the negative changes are considered to be positive / minor. This chapter has been carried out in accordance with the IEMA guidance for Road Traffic and the DMRB Volume 11, Environmental Assessment.

8.2 The assessment in terms of severance is based upon the percentage change in vehicle movements which is identified in this chapter as no change on the majority of routes and only a moderate change on six roads assessed. The degree of change along some routes is primarily due to the existing low traffic movements currently experienced resulting in a higher degree of change than will actually be perceived. The overall degree of severance is considered to be moderate locally to the site and low elsewhere.

8.3 In terms of Driver Delay the junctions assessed with the TA show that the majority of junctions will operate within their design capacity resulting in no material change in terms of the proposed development traffic. However, there are also 6 key junctions that require improvements to be undertaken to reduce the level of impact and driver delay. The results of this analysis show that there will be no material increase in delay with the mitigation in place.

8.4 As part of the proposed development, new road infrastructure will be provided forming part of the South Derby Integrated Transport Link (SDITL). New junction arrangements will be provided onto this route at Stenson Road, Arleston Lane and elsewhere within the site. The new roads as part of the development proposal will be designed to accord to the relevant design standards and include new footway/cycleway links.

8.5 This chapter summarises that the cumulative impact of road traffic generated by the proposed development over the short term will be Minor - adverse and Minor - beneficial over the long term with measures being put in place to assist in mitigating any likely impact.

D9.0 Abbreviations & Definitions

1.	ATC	Automatic Traffic Counters
2.	DCC	Derbyshire County Council
3.	DCityC	Derby City Council
4.	DFD	Development Framework Document
5.	DMRB	Design Manual for Roads and Bridges
6.	CTMP	Construction Traffic Management Plan
7.	EIA	Environmental Impact Assessment
8.	ES	Environmental Statement
9.	HGV	Heavy Goods Vehicle
10.	IEMA	Institute of Environment Assessment
11.	IGV	Infinity Garden Village
12.	NPPF	National Planning Policy Framework
13.	SDDC	South Derbyshire District Council
14.	SDITL	South Derby Integrated Transport Link
15.	TA	Transport Assessment

D10.0 References

1. Design Manual for Roads and Bridges (DMRB), Volume 11, Environmental Assessment
2. Environmental Assessment of Road Traffic (1993) Institute of Environmental Assessment (now IMEA)

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter E: Water Environment

June 2019

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E1.0 Introduction

1.1 This Chapter of the Environmental Statement ("ES") has been prepared by BWB Consulting on behalf of Hallam Land Management ("the Applicant"). This Chapter assesses the potential impacts on the water environment (including in relation to flooding, drainage and water quality) of the Proposed Development, and the likely significance of such impacts during its operational and construction phases.

About the Author

1.2 Josephine Green is Assistant Engineer within the Water team, Environment Group BWB Consulting Ltd and has over six years' experience within the flood risk and engineering consultancy sector. Her qualifications are BA (hons)/BEng (Hons) and she is an EngTech Member of the Institute of Civil Engineering.

E2.0 Policy Context

Legislative and Policy Framework

Water Framework Directive

2.1 Water Framework Directive 2000/60/EC (enacted into English law through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003): The overall requirement of the Water Framework Directive (WFD) is that all river basins must achieve 'good ecological status' by 2015, or by 2021 if there are grounds for derogation (essentially if it can be proven that it is not possible to achieve it by 2015). The WFD, for the first time, combines water quantity and quality issues together and, as an umbrella Directive, effectively incorporates and/or supersedes all water related legislation that drives the existing consenting framework.

Groundwater Directive

2.2 Groundwater Directive 80/68/EEC (enacted into English law through the Groundwater (England and Wales) Regulations 2009): Aims to protect groundwater against pollution by 'List 1 and 2' Dangerous Substances.

Water Resources Act 2003

2.3 This Act implements changes to the water abstraction management system and regulatory arrangements to make water use more sustainable.

Environment Act 1995

2.4 Sets out the roles and responsibilities of the Environment Agency.

Flood and Water Management Act 2010

2.5 The Flood and Water Management Act 2010 is largely aimed at delivering the recommendations of the Pitt Review following the 2007 floods. The Flood and Water Management Act makes the following recommendations, amongst others: Sustainable Drainage Systems (SuDS) must be the first choice for drainage for all new developments, and the Lead Local Flood Authority (LLFA), which is either the Unitary Authority or the County Council, have a duty to adopt the SuDS (subject to approval).

National Planning Policy Framework

2.6 Prepared by the Department for Communities and Local Government, the National Planning Policy Framework (NPPF) outlines the Government's planning policies for England (2018).

2.7 Within the context of water quality, climate change, flooding and coastal change, the Government's objective set out in the NPPF is that planning should fully support the transition to a low carbon economy in a changing climate, taking full account of flood risk and coastal change.

2.8 NPPF Section 10 (Paragraphs 91-108) outlines how planning policy should meet the challenges of climate change, flooding and coastal change. It retains the ethos of steering new development to be located in areas at lowest risk of flooding.

2.9 The NPPF specifies that planning applications should demonstrate through production of a site-specific flood risk assessment that development in flood prone areas can be made safe and will not increase flood risk elsewhere.

South Derbyshire District Council Flood Risk Assessment

2.10 South Derbyshire District Council Preliminary Flood Risk Assessment was undertaken by Scott Wilson in November 2008. It includes information on all sources of flooding-fluvial, sewer, surface water, groundwater and flooding from artificial sources.

2.11 The document was written in-line with the Planning Policy Statement 25 (PPS25). Although this has since been superseded, information within the document is still relevant under the National Planning Policy Framework (NPPF) and is referenced where applicable.

Derby City Council Preliminary Flood Risk Assessment

2.12 Derby City Council (as a unitary authority) is designated as one of two Lead Local Flood Authorities for the area. As such, it has completed a Preliminary Flood Risk Assessment (PFRA). The PFRA includes information on flood risk from ordinary watercourses, surface water flows, harmful consequences of historic flooding, and future floods, groundwater, canals and anticipated effects of climate change.

Derby City Council Preliminary Flood Risk Assessment

2.13 The Derbyshire County Council & Derby City Council SFRA issued in August 2012 has been reviewed to inform planning decision making and consider the nature and scale of flood risk.

2.14 A key aim of the SFRA is to guide development to the appropriate Flood Zone using the Sequential Test. This document provides information required to apply the Sequential Test for identification of land suitable for development.

This SFRA provides a strategic overview of flood risk throughout the county and city.

Derby City Council Local Plan

2.15 Derby City Council Local Plan, Core Strategy, January 2017 indicates the following relevant objectives in terms of flood risk and surface water management in response to climate change:

- To ensure that development takes account of the need to provide access to watercourses.
- To apply the sequential test when considering proposals for development in areas at risk of flooding. Where a development is proposed in an area at risk, it should demonstrated why the use cannot be located in an area at lower risk of flooding. When considering compliance with the sequential test, the Council will take account of the availability and suitability of alternative sites and where appropriate, apply the exception test in line with national policy.
- To ensure that development is flood resilient and resistant, that unacceptable harm would not be caused to people or property through flooding and that development will not lead to an increased risk of flooding elsewhere.
- To ensure that where appropriate, development meets the objectives of the Water Framework Directive.
- To encourage the use of Sustainable Drainage Systems (SuDS) in all new developments and require developments of 10 dwellings or more and major commercial development to be designed and laid out to incorporate SuDS, unless it is demonstrated to be inappropriate to do so. The Council will seek to ensure that water run-off is directed to areas where it does not cause harm to people or property. All new developments in areas at risk of flooding should give priority to the use of Sustainable Drainage Systems.

E3.0 Assessment Methodology & Significance Criteria

Assessment Methodology

3.1 The Proposed Development will comprise two components, referred to as the 'residential component' and the 'employment component'. Full descriptions are provided in **Chapter C** but are summarised here for context.

3.2 The 'residential component' of the Proposed Development involves the construction of up to 1,850 dwellings, a 2 form entry primary school, a local centre, various leisure and retail units, strategic road links, green infrastructure and public open space. It is located south of Wragley Way, east of Deep Dale Lane and extends to the existing railway line to the west.

3.3 The 'employment component' includes the development of employment uses and related landscaping and infrastructure on land to the east of Deep Dale Lane.

3.4 The sensitive receptors that could be affected by the Proposed Development have been identified and are summarised in Table E1. These all apply to both the 'residential component' and 'employment component'.

Table E1: Local Flood Risk & Drainage Environmental Receptors

Receptor	Key Designations
Surface Water Features	
Local unnamed watercourses	Limited floodplain extents
Barrow Drain	Flood Zone 2, 3a and 3b
Cuttle Brook	WFD 'Moderate' Overall Status*
Groundwater Features	
Lower Trent Erewash Secondary Combined	WFD 'Poor' Overall Status
Bedrock Aquifer	Secondary B Aquifer Designation
Drainage Infrastructure	
Public Sewer Network	Locally relevant to the wider foul and surface water drainage catchment

***NB: Other drains listed fall within the WFD Catchment extent of the Cuttle Brook**

Significance Criteria

3.5 The significance of an effect will be defined by the sensitivity of the receptor (defined in Table E2) in relation to the magnitude of impact (defined in Table E3). The sensitivity of a receptor is defined through its geographical importance or scale and it's quality.

Table E2: Receptor Sensitivity Definitions

Receptor Sensitivity	Measures	Definition & Geographical Importance
High	High Overall WFD Classification Good Overall WFD Classification Principal Aquifer Source Protection Zone 1 Local human population Flood Zone 3b Flood Zone 3a	High quality and/or rarity on a national or international scale
Medium	Moderate Overall WFD Classification Poor Overall WFD Classification Secondary A Aquifer Source Protection Zone II Existing residential properties Flood Zone 2	High to Medium quality receptor of regional or county importance or scale
Low	Bad Overall WFD Classification Secondary B Aquifer Secondary B (undifferentiated) Aquifer Source Protection Zone III Existing commercial or retail properties	Low quality receptor of local or district importance
Negligible	Flood Zone 1 Unproductive Aquifer Source Protection Zone of Special Interest	Receptor of low importance or quality

Table E3: Impact Magnitude Definitions

Magnitude	Measures	Definition & Geographical Importance
High Adverse	• Reduction in WFD Classification or compromised ability to achieve targets • High risk of contamination of aquifer • High potential for change in groundwater quantity and/or aquifer recharge • Loss of floodplain without compensation • Threat to individuals or potential loss of life from flooding • Increased flood risk to existing properties • Compromised ability of existing drainage infrastructure	Significant loss of, or damage to, receptor without ability for repair or replacement

Magnitude	Measures	Definition & Geographical Importance
Medium Adverse	• Reduction in WFD Quality element without affecting overall status • Medium risk of contamination of aquifer • Medium potential for reduction in groundwater quantity and/or aquifer recharge • Increased residual flooding frequency • Increase in flood risk to third party land (undeveloped) • Increase in flood frequency to existing drainage infrastructure	Damage to key elements, or loss in part of receptor that may be substituted or replaced.
Low Adverse	• Low risk of contamination of aquifer from accidents or spillages • Low potential for reduction in groundwater quantity and/or aquifer recharge • Increased flood risk within application site	Detectable change to receptor but no loss nor compromised integrity
Negligible	• Little to no impact on WFD quality elements • Little to no potential of contamination from accidents or spillages • Little to no potential impact on groundwater quantity and/or aquifer recharge • No change to floodplain extent or flood frequency • No increase in risk from additional structures or flood defences	No discernible impact on receptor
Low Beneficial	• Contribution towards WFD quality element without changing status • Reduction in point and/or diffuse pollution sources • Potential improvement in groundwater quantity and/or aquifer recharge	Quantifiable benefit to extent or quality of receptor
Medium Beneficial	• Measured improvement in WFD quality element • Confirmed removal of point and/or diffuse pollution sources • Removal or termination of abstraction from groundwater/Aquifer • Reduced flood risk to third-party land (undeveloped) • Reduced residual flood risk from blockage to existing structure or defence failure • Reduced flood risk from existing drainage infrastructure	Measured improvement in the extent and/or quality of the receptor

Magnitude	Measures	Definition & Geographical Importance
High Beneficial	• Increase in overall WFD Classification and/or resilience applied against future changes • Reduced flood risk to existing properties • Strategic management of flood risk issues • Significant removal of various pollution sources	Significant improvement in extent and quality of receptor

3.6 The scale is derived from the interaction of the receptor sensitivity and magnitude of change of effect as detailed in the matrix set out in Table E4.

Table E4 Significance Matrix

Magnitude of Change	Sensitivity of Receptor			
	High	**Medium**	**Low**	**Negligible**
High	Substantial	Substantial	Moderate	Neutral/ Negligible
Medium	Substantial	Moderate	Minor to Moderate	Neutral/ Negligible
Low	Moderate	Minor to Moderate	Minor	Neutral/ Negligible
Negligible	Neutral/ Negligible	Neutral/ Negligible	Neutral/ Negligible	Neutral/ Negligible

Consultation

3.7 The proposed development area and wider site stradles the unitary boundary between South Derbyshire District Council and Derby City Council. Derbyshire County Council are also consultees as Lead Local Flood Authority (LLFA) alongside Derby City Council in regards flood risk matters for the site.

3.8 Consultation with the regulatory bodies, along with the sewerage undertaker Severn Trent Water, has been undertaken in response to the Proposed Development and other proposals across The Infinity Garden Village/Southern Derby Growth Zone.

3.9 Correspondence with South Derbyshire District Council (SDDC) has currently been in terms of a land drainage capacity, observing the Cuttle Brook's classification in the River Basin Management Plan as an assessed water body. Water quality is of importance. Therefore, the impacts associated with the proposed development will be scoped in and assessed in line with the classification of the downstream water body.

3.10 Derbyshire County Council (DCC) and Derby City Council (DCityC) have made specific reference to surface water flood risk issues within the application boundary. The potential impact of this on the development is considered fully within the FRA, and potential impacts will be assessed in terms of the construction and operational phase impacts.

3.11 Specific reference is made to the inclusion of SuDS within the scheme to treat and manage surface water runoff effectively. The impact of runoff and associated water quality assessment is scoped in.

3.12 The supporting FRA refers to groundwater being relatively shallow (less than 3m bgl) and therefore susceptible to contamination from pollutants from the proposed development and associated infrastructure. These impacts and receptors have been scoped into the assessment.

3.13 Seven Trent Water have been consulted in regards the foul drainage to determine the impact that the development will have on the existing public sewerage infrastructure. This has been scoped into the assessment.

3.14 In response to the wider site and nearby applications it is considered that the Environment Agency would expect to see specific flood risk issues addressed as part of the application. As such, flood risk issues during the construction and operational phase are fully scoped into this assessment.

3.15 Accordingly, the Flood Risk and Drainage assessment considers the following potential effects:

- Construction Phase – impact on floodplain and risk of flooding;
- Construction Phase – potential mobilisation of sediment and pollution risks;
- Construction Phase – impact on the public sewer network;
- Operational Phase – management of flood risk;
- Operational Phase – appropriate treatment of runoff;
- Operational Phase – management of surface water runoff;
- Operational Phase – long term impacts on groundwater quantity and quality;
- Operational Phase – impact on the public sewer network.

Assumptions and Limitations

3.16 The supporting hydraulic modelling assessment is a theoretical simulation of potential flood events and is based upon the available cross-sectional survey and ground elevation data derived from LiDAR. There are accuracy limitations

associated with this data as LiDAR is reported to have a +/-15cm (root mean square error) vertical accuracy across a 2m cell size.

3.17 Cross sections provide a representative section taken at the time of the survey at available locations and may therefore not pick up isolated low spots and step changes in elevations along the watercourses surveyed.

3.18 Hydrological estimation has been undertaken based upon best practice methodologies, and sensitivity tests undertaken on appropriate parameters. The study catchments themselves are ungauged and therefore flows cannot be validated with known data.

3.19 The assessments nevertheless remain robust and have been peer reviewed and approved for use by the appropriate authorities as part of the application for the new A50 junction and link road.

E4.0 Baseline Conditions

Existing Conditions

Site Description & Context

4.1 This section will outline the Application Site description and context from a flood risk and drainage perspective.

4.2 There are several unnamed watercourses which intersect or are located close to both the 'Residential Component' and the 'Employment Component'. These include; the Barrow Drain, Main Drain and Ashlea Farm Drain. There are also other ephemeral ditches and agricultural drains within the vicinity.

4.3 There are elements of the fluvial floodplain and areas susceptible to surface water flooding within and near the development components that are discussed within the relevant sections below.

4.4 The watercourses in the area are typical of low-lying agricultural areas, with nominal gradient along their length, maintained primarily for irrigation purposes and land drainage features. The Barrow Drain in particular is susceptible to high sediment loading in its base, with terrestrial vegetation extending down much of the channel banks.

4.5 It is understood that regular maintenance is carried out by the tenant farmers, comprising of dredging of the sediment that is deposited on the nearby banks. Vegetation is also cut short regularly to assist conveyance and reduce blockage although this deters any valuable habitat to establish.

Surface Water Bodies

4.6 Of the nearby watercourses, only the Cuttle Brook is classified in the Humber River Basin Management Plan (waterbody ID: GB104028053130). All other local watercourses and those at the Application Site inherently form part of the catchment of the Cuttle Brook. Current RBMP Cycle 2 classifications are summarised within Table E5.

Table E5 Cuttle Brook Water Body Classification (Cycle 2)

Classification Item	2013	2014	2015	2016
Overall Water Body	Moderate	Moderate	Moderate	Moderate
Ecological	Moderate	Moderate	Moderate	Moderate

Classification Item	2013	2014	2015	2016
Supporting elements (Surface Water)	Moderate	Moderate	Moderate	Moderate
Biological quality elements	Moderate	-	Poor	Poor
Hydro-morphological Supporting Elements	Supports Good	Supports Good	Supports Good	Supports Good
Physico-chemical quality elements	Moderate	Moderate	Moderate	Moderate
Specific pollutants	Moderate	Moderate	High	High
Chemical	Fail	Fail	Good	Good
Priority substances	Good	Good	Does not require assessment	Does not require assessment
Other Pollutants	Does not require assessment	Does not require assessment	Does not require assessment	Does not require assessment
Priority hazardous substances	Fail	Fail	Good	Good

4.7 The River Trent is located approximately 1.3km south of the proposed Development. It is topographically removed from the site by the substantial infrastructure of the A50 and the Trent and Mersey Canal.

4.8 A site visit was undertaken on the 07/05/19 by engineers and competent professionals to assess the condition and connectivity of the watercourses within and surrounding the Proposed Development. Photographs of the findings are included for reference within the Flood Risk Assessment (BWB report reference: WRA-BWB-ZZ-XX-RP-YE-0002_FRA).

Ground Water Bodies

4.9 The Proposed Development is indicated to overlay the WFD ground water body defined as the 'Lower Trent Erewash - Secondary Combined' (GB40402G990300), with an overall WFD classification of Poor. Primarily in relation to two individual point source pollution sources related to abandoned coal mines within the catchment area. Whilst the Proposed Development is unlikely to influence these, the fact that the water body is dependent on chemical quality is relevant to the scope of the assessment.

4.10 The Proposed Development is shown by Environment Agency mapping not to lie within a Source Protection Zone. The closest is identified as being approximately 3.2km southeast of the Proposed Development near to Stanton by Bridge.

4.11 The bedrock geology beneath the Application Site is shown to be designated a Secondary B bedrock aquifer. With a thin band of superficial deposits to the southwest of the Proposed Development boundary designated as a Secondary (undifferentiated) aquifer.

4.12 As part of the Level 1 SFRA, Derby City Council have quantified the susceptibility to flooding from groundwater sources and the Proposed Development is shown to be within an area to be at low risk (<25%).

Fluvial Extents

4.13 The Environment Agency's Flood Map for Planning identifies the 'Residential Component' to lie predominantly within Flood Zone 1 (Low Probability), with a small extents of Flood Zone 2 (Medium Probability) at the eastern extent.

4.14 The 'Employment Component' is also located predominantly in Flood Zone 1 (Low Probability). Where the boundary crosses the Barrow Drain and extends northwards, small areas within the boundary are shown to be affected by Flood Zone 2 (Medium Probability) and Flood Zone 3 (High Probability).

4.15 To accurately reflect the localised flood risk posed to the Proposed Development from the network of smaller ditches and watercourses within the boundary, a bespoke hydraulic model was constructed to better define the floodplain extents.

4.16 The hydraulic modelling completed for the watercourses around the Proposed Development has provided a baseline floodplain extents and depths for a range of return periods. Mapped outputs are included within the Flood Risk Assessment (FRA) BWB reference: WRA-BWB-ZZ-XX-RP-YE-0002_FRA.

4.17 There are several small, restrictive culverts on the watercourses associated with informal farm crossing points and more formal crossing under highways. More specifically the culverts under Stenson Road, Arleston Lane and Deep Dale Lane. These all present a potential flood risk due to the residual risk of a blockage scenario and this has been considered and quantified as part of the FRA.

Surface Water Flooding

4.18 Areas within the Proposed Development are generally considered to be at low risk of flooding from surface water. Isolated areas of ponding, however, do exist, and this has been identified in consultation with Derby City Council.

4.19 The mapping prepared by the Environment Agency generally highlights the routes of the smaller unnamed watercourses, but also areas along existing field boundaries and lower lying depressions within the site boundary. The risk is fully assessed as part of the FRA, with the conclusions drawn from that informing this chapter.

Drainage

4.20 Severn Trent Water sewer records indicate the presence of both surface and foul water sewers within the residential area to the north of the site of varying sizes. Two surface water sewers have outfalls into the unnamed watercourse within the site at the upstream face of the Arleston Lane culvert.

4.21 Evidence from recent site visits also identifies the presence of outfalls from the highway drainage network of Wragley Way into sections of the watercourse.

4.22 As the area to the north is generally higher than the site, there is the potential within an extreme flood event that overland flows associated with sewer flooding may be conveyed towards the site.

4.23 There are no known capacity issues at the receiving sewage treatment works for the catchment. However, given the scale of the potential development Severn Trent Water has advised that a sewer capacity assessment would be required to understand the impact of the Proposed Development and any reinforcement works that would be required.

Future Baseline

Flood Risk

4.24 The hydraulic modelling prepared as part of the flood Risk Assessment includes an allowance for the potential effects associated with climate change. Local and national policy makes provision for assessing sites against a suitable climate change allowance to define a future baseline.

4.25 It was witnessed during a recent site visit that upgrade works to the culverts under Deep Dale Lane were currently being constructed in line with adjacent application requirements. The consented design of these culverts was

included as part of the current baseline hydraulic modelling in advance of the works being finalised.

Drainage Infrastructure

4.26 A separate application for construction of a new junction on the A50 and part of the South Derby Integrated Transport Link has been submitted by Derbyshire County Council (see Chapter C). Those proposals fall within the area assessed by this E.S.

4.27 If approved, it is considered that these proposals would come forward to serve the development therefore should be included as part of a Future Baseline.

4.28 Runoff from the catchment associated with the proposed link road will drain to the watercourses flowing north parallel to Deep Dale Lane and this will be dealt with in a sustainable manner in accordance with local and national guidance. Drainage for the link road will incorporate above ground sustainable drainage features as part of the proposals to afford suitable storage and treat surface water prior to outfall into the existing surface water network.

4.29 Severn Trent Water regularly undergo periods of review, maintenance and upgrade of their assets in line with set Asset management Periods (AMP). Therefore, a future baseline may include programmed or proposed upgrades to the existing sewerage infrastructure.

E5.0 Potential Effects

5.1 The assessment section begins by confirming the local receptors and their potential sensitivity, then goes onto review the likely significance of effects of the Proposed Development during both the construction and operational phases.

5.2 The significance of these effects will be reviewed considering the significance scale to determine whether suitable mitigation is necessary.

5.3 Following the outline methodology and characterisation of the baseline scenario, the potential receptors have been identified and will be assessed to the defined sensitivity outlined in Table E6.

Table E6: Local Receptors and Defined Sensitivity

Local Receptor	Type of Impact	Definition or Quantification	Sensitivity
Barrow Drain	Water Quality	Overall Moderate WFD Status	Medium
	Flood Risk	Flood Zone 1, 2, 3a and 3b	Negligible, Medium & High
Main Drain	Water Quality	Overall Moderate WFD Status	Medium
	Flood Risk	Flood Zone 1, 2, 3a & 3b	Negligible, Medium & High
Cuttle Brook	Water Quality	Overall Moderate WFD Status	Medium
	Flood Risk	Flood Zone 1, 2, 3a & 3b	Negligible, Medium & High
Local Land Drains	Water Quality	Overall Moderate WFD Status	Medium
	Flood Risk	Flood Zone 1, 2 and 3a	Negligible, Medium & High
Groundwater	Water Quality & Quantity	Secondary B aquifer Overall Poor WFD Status	Low, Medium
Construction Workers	Flood Risk	Human Life	High
Existing residents	Flood Risk	Human Life	High
Existing Land owners	Flood Risk	Existing residential and commercial or retail property	Low, Medium

Local Receptor	Type of Impact	Definition or Quantification	Sensitivity
STW Public Sewer Network	Flood Risk	Existing residential and commercial or retail property	Low, Medium

During Construction

Flood Risk

5.4 The construction extent of both the 'Residential Component' and 'Employment Component' are mostly within Flood Zone 1, at 'Low Probability' of fluvial flooding. Areas of Flood Zone 2 'Medium Probability' are indicated to the eastern site extents.

5.5 The hydraulic modelling has also identified additional areas, particularly around the individual road crossings, that may be susceptible to flooding during the equivalent event for Flood Zone 3a.

5.6 Areas indicated to lie within Flood Zone 3a would be classified as a **high sensitivity** receptor. Construction activities within the floodplain have the potential to displace areas of floodplain from the current agricultural fields towards existing properties, potentially increasing flood risk to existing properties and loss of fluvial floodplain without compensation both of which are a **high adverse magnitude** impact.

5.7 Therefore prior to any mitigation the potential for construction activity within the floodplain has the potential to be of **major adverse significance.** The direct effect would be long-term and permanent for the lifetime of the formation within the floodplain.

5.8 The presence of a construction workforce within areas of the floodplain means that a vulnerable population is put within an area at risk of flooding. The risk to human life is considered to have a **high magnitude** impact on a **high sensitivity** receptor and so to be of **major adverse significance** prior to any mitigation. This would be a temporary direct effect experienced in the short term while workers are on site.

Mobilisation of sediment & pollution risk

5.9 As part of the construction phase for both the 'Residential Component' and 'Employment Component', there is likely to be significant mobilisation of sediment through construction traffic movements, topsoil strips and earthworks activities.

5.10 This will give rise to a volume of unconsolidated material at the surface that has the potential to be mobilised into the local watercourses by wind, vehicle tracking and surface water runoff.

5.11 The local watercourses are considered a **medium sensitivity** receptor due to their contribution to the classified Cuttle Brook catchment.

5.12 Mobilisation of sediment into these receptors would be considered a **medium adverse magnitude** effect due to the potential contribution towards increased flood risk from blockage to the systems, and potential reduction in the WFD physico-chemical quality elements.

5.13 Therefore, mobilisation of sediment into the local water environment from the construction phase is of **moderate adverse significance**.

5.14 Tracking and parking of vehicles through the construction site means there is potential for leaks and spillages of hazardous substances including fuel, oil and lubricants that may make their way into the watercourse, drainage infrastructure and groundwater through infiltration.

5.15 Other processes related to the construction phase including cement mixing, tarmac laying etc. or storage of chemicals and other pollutants would also give rise to potential pollution sources.

5.16 Release of pollutants and other contaminants into the local water environment is considered to have a **medium adverse magnitude** impact on a **medium to low sensitivity** receptor. The effects would be both direct and indirect, potentially impacting over the medium term and so of **minor to moderate negative significance**.

Sewerage Infrastructure

5.17 Due to the size of the development there could be a large presence of construction staff during the development phases. Staff on-site will require welfare facilities which may have an impact on the existing public sewer network.

5.18 The demand required by the construction activity is likely to be a fraction of that required for the operational period therefore the magnitude can be considered a **low adverse** impact.

5.19 This would likely have a short term, temporary, direct impact. The likely significance of effects can be considered as **minor adverse**.

During Operation

Management of Flood Risk

5.20 Once operational, the 'Residential Component' and 'Employment Component' will be considered not to be at significant flood risk.

5.21 As part of development proposals there are proposed upgrades to the culverts beneath Stenson Road and Arleston Lane which will alleviate the exiting flood risks associated with their restriction and potential for blockage. Further mitigation measures are recommended to ensure the residential dwellings are elevated above the modelled flood levels for the appropriate design event, including a suitable allowance for climate change.

5.22 Proposals for a significant blue-green infrastructure corridor through the site, orientated east-west along the route of the unnamed drain through the site affords the opportunity for expanding the floodplain and maintaining floodplain connectivity to the watercourse. It also affords ecological benefits, outlined in Chapter I.

5.23 Overall, Proposed Development is considered to have a **medium beneficial** impact on a **medium sensitivity** receptor and so is of **moderate beneficial significance.**

Appropriate treatment of runoff (water quality)

5.24 The proposed surface water drainage strategy for the Proposed Development incorporates a sustainable drainage philosophy by utilising SuDS throughout its design, including detention basins and swales.

5.25 The Cuttle Brook has quality elements that are particularly sensitive to pollution therefore it is imperative that the surface water runoff leaving the proposed drainage system is of suitable quality.

5.26 Surface water runoff from the 'Residential Component' is likely to contain a low level of contaminants as it is primarily collected from rooftops and associated footpaths therefore a singular level of treatment is suitable in this instance. Within the 'Employment Component' an additional level of treatment will be required in line with Environment Agency Pollution Prevention Guidelines (PPG3).

5.27 As part of the operational phase, there will be significant areas of currently worked arable farmland that will no longer be used for that purpose. As such, there will be a net reduction in diffuse pollution sources from the site from agri-chemicals (fertiliser, pesticides etc) that in turn would support an improvement in water quality in the receiving watercourses.

5.28 One of the reasons for the Cuttle Brook not achieving good status by the original deadline was diffuse source pollution from poor soil management associated with agriculture and rural land management. Any reduction or action associated with this would seek to support improvement of the ecological classification element in relation to invertebrates.

5.29 This impact would be of **low beneficial magnitude** on a **medium sensitivity** receptor, equating to a **minor to moderate beneficial significance**. This impact would be direct, permanent improvement over the long-term.

Management of surface water runoff (flood risk)

5.30 As mentioned above, part of adopting a sustainable approach to surface water management includes the restriction of flow rates to an equivalent greenfield runoff rate (QBAR) and provision of storage to hold the additional volume of water before releasing it at the controlled rate.

5.31 Details on the surface water drainage strategy are included within the Sustainable Drainage Statement (SDS) but in short, the solution ensures a reduction in the surface water runoff rate at which water enters the local environment compared to the pre-developed condition.

5.32 Due to the reduction and limitation of flows entering the watercourse there will be a **low beneficial magnitude** impact on the **medium sensitivity** receptor resulting in a **minor to moderate beneficial significance**. This would be a permanent, direct impact experienced over the long-term.

Changes to groundwater quantity and quality

5.33 The proposed surface water drainage solution does not intend to use infiltration as a means of discharge, rather route runoff via gravity to surface water bodies. The existing site is subject to limited infiltration potential given the underlying geology and low productivity aquifer designations.

5.34 Therefore, the impact on groundwater quantity is **negligible**.

5.35 A reduction in the net worked arable farmland will result in a reduction in diffuse pollution sources that could potentially enter shallow groundwater reserves. The impact would be **low beneficial magnitude** by contributing to a reduction in contaminants the **low sensitivity** ground water body is currently failing on. This would result in a **minor beneficial significance** over the long term, considered a direct permanent impact.

5.36 The potential seepage or accidental spillages of pollutants related to the traffic within the new Proposed Development would be minimal, relevant oil and petrol interceptors included within the drainage infrastructure in addition to the levels of treatment offered.

5.37 The impact from accidental spillages during the operational phase on groundwater quality would be a **negligible impact**.

During Decommissioning

5.38 There is not considered to be any elements of the Proposed Development that would be decommissioned from a flood risk and drainage perspective that would have a bearing on significant environmental effects.

Cumulative Impacts

5.39 The NPPF, Planning Practice Guidance and Non-Statutory Technical Standards for Sustainable Drainage ensure all new developments are upheld to the same standards with regard to flood risk, in that risk is not increased to third parties and where possible betterment is sought. Therefore, only positive cumulative effects will be encountered when assessing other schemes in the locality.

E6.0 Mitigation and Monitoring

During Construction

Flood Risk Mitigation

6.1 It is recommended that any site offices, welfare facilities and other temporary structures related to the construction activity are located in Flood Zone 1 wherever possible. This will avoid areas at risk of flooding thereby eliminating the risk posed to those activities.

6.2 As part of a Construction Environment Management Plan (CEMP), a section on Flood Management and Evacuation will be prepared. To include site supervisors signing up to the Environment Agency's FloodLine Warnings service to receive early alerts of the potential flooding to occur and providing appropriate actions for workers to take on receipt of a flood warning, or realisation of flooding on site.

Water Quality

6.3 Appropriate site management will ensure the significance is reduced to as low as reasonably possible. Providing haul roads or key routes through the site to track vehicles and heavy plant will minimise the mobilisation of sediment reducing the potential for it to enter the water environment.

6.4 Damping down the site of any soil stripping or earthworks will limit mobilisation by wind, but appropriate bunding should be provided as appropriate to deter the resulting runoff from entering sewers, drains or the watercourses.

6.5 A suitable method statement will be required for any works in or near the watercourses to support the appropriate Land Drainage Consent application(s). This should include specific measures for managing sediment mobilisation.

During Operation

Management of Flood Risk

6.6 As part of the revised hydraulic modelling, it was considered that upgrades to the culverts beneath Stenson Road and Arleston Lane are proposed to alleviate flood risk posed to the development. Potential options, including the blockage scenarios and have been undertaken and are detailed within the

supporting Flood Risk Assessment Report BWB reference: WRA-BWB-ZZ-XX-RP-YE-0002_FRA.

6.7 Any new culvert crossings have been designed to minimise the potential risk associated with blockage, ensuring future resilience by accounting for climate change. Suitable mitigation measures are recommended as part of the FRA to ensure built development is made safe from the impacts of flooding, including these blockage scenarios.

Management of surface water runoff (flood risk)

6.8 There is inherent mitigation by design as part of the proposed surface water drainage strategy. Inclusion of a network of sustainable drainage systems, a proposed restriction on low and allowance for blue-green infrastructure will ensure flood risk is managed while also improving the water quality of any associated discharge.

During Decommissioning

6.9 Decommissioning activities are not considered applicable in respect of flood risk and drainage and the proposed development.

E7.0 Residual Effects

During Construction

7.1 The construction period of the development is relatively short when compared to the overall life of the proposed development and as such any residual impact would be considered to be short-lived.

7.2 During the construction phase some sediment would inevitably escape the installed containment measures, but the volume of sediment entering the water environment would be minimal and would have a **minor adverse** impact on the watercourse and nearby sewerage infrastructure.

7.3 In the event of an accidental spillage or leak of hydrocarbons or other hazardous substances were to occur, mitigation should limit the impact. Measures should be in place as part of the CEMP to deal with such eventualities, and so the impact would be **minor adverse**.

During Operation

7.4 The operational period in its nature is long term and with the submitted design will incorporate SuDS designed to reduce surface water run-off rates and provide surface water treatment and channel pluvial flows towards positively drained areas. Betterment will be provided on the current situation therefore residual effect on water quality or surface water runoff will be considered **minor beneficial.**

7.5 Any impact on the foul sewer network will need to be addressed in consultation with Severn Trent Water under a S106 agreement. Connection may need to be made with the proviso of network improvements and enabling works subject to the undertaking of sewer modelling of the existing network.

7.6 As the regulatory water authority, it is their prerogative to ensure that an appropriate connection can be established any residual effect on the foul network can be therefore be considered to be negligible.

During Decommissioning

7.7 Decommissioning activities are not considered applicable in respect of flood risk and drainage and the Proposed Development.

E8.0 Summary & Conclusions

8.1 The Proposed Development may proceed with the suggested mitigation in place without any significant adverse effects in terms of flood risk and drainage.

8.2 The Proposed Development provides beneficial effects through integration of a surface water drainage strategy based on sustainable drainage principles, which seeks to provide a network of interconnected SuDS to provide numerous stages of treatment to surface water runoff, prior to discharging it at a rate less than existing, which will also provide flood risk benefits.

8.3 Flood risk mitigation also recommends upgrading existing culverts under highway crossings that are currently expected to flood in extreme events. It therefore provides flood risk improvements to the existing infrastructure.

8.4 The table below provides a summary of the effects assessed, their potential mitigation and any residual effects.

Table E7: Summary of Effects

Receptor	Effects	Mitigation	Residual Effects
During Construction			
Barrow Drain	Impact on floodplain and risk of flooding	Placing site offices, compounds etc. in areas of Flood Zone 1. CEMP to include Flood Management & Evacuation plans to detail measures to be taken on receipt of flood warning, or realisation of flooding to manage risk.	Negligible
Barrow Drain & Cuttle Brook	Mobilisation of sediment and pollution risks	Dedicated haul roads to limit mobilisation potential. CEMP to include measures to damp down sediments and provide containment in areas of high risk of mobilisation.	Minor adverse
Public Sewer Network	Impact from temporary welfare facilities	Limited demand and loading, which may be taken offsite and managed appropriately.	Negligible

During Operation			
Barrow Drain & minor watercourses	Management of flood risk	Provision of a range of mitigation measures to ensure development is not at risk of flooding. Potential upgrade to existing culverts under Stenson Road and Arleston Lane.	Minor beneficial
Barrow Drain & Cuttle Brook	Management and treatment of surface water runoff	Use of SuDS throughout scheme, restricting runoff to equivalent greenfield rate.	Minor beneficial
Groundwater bodies	Impacts on groundwater quantity and quality	Limited potential for impact measure mitigation is not required.	Negligible.
Public Sewer Network	Impact of Proposed Development	Severn Trent Water as regulatory water company to provide necessary improvement works to ensure development has no detrimental impact.	Negligible
During Decommissioning			
N/A	N/A	N/A	N/A

E9.0 Abbreviations & Definitions

1. Baseline Environment/Conditions - The physical, chemical, biological, social, economic and cultural setting in which the proposed project is to be located and where local impacts (both positive and negative) might be expected to occur.
2. Biodiversity - The variety of plant and animal life in a particular habitat.
3. Climate Change Allowance - Climate change allowances are predictions of anticipated change for; peak river flow by river basin district; peak rainfall intensity and sea level rise based due to greenhouse gas emissions and global warming.
4. Flood Risk Management Plan - Highlights hazards and risks of flooding from rivers, sea, surface water, groundwater and reservoirs and sets out how the risk management authorities (RMAs) work together with communities to manage flood risk.
5. NPPF - National Planning Framework Policy: Sets out the governments planning policies for England and how these are expected to be applied
6. Non-statutory Technical Standards for SuDS - Standards for the design, maintenance and operation of sustainable drainage systems to drain surface water.
7. Mitigation - Measure to avoid reduce or offset significant adverse effects.
8. Sediment Interceptors - Intercept unwanted sediment, sand and gravel and keep it from blocking drains.
9. SuDS - Sustainable Drainage Systems – Drainage solutions that provide an alternative to the direct channel of surface water through networks of pipes and sewers to nearby watercourse.
10. Town and Country Planning Act - Legislation regulating the development of land in England and Wales.

E10.0 References

1. B. Woods-Ballard, R. Kellagher, P. Martin, C. Jefferies, R. Bray & P. Shaffer, 2007. The SuDS Manual (C753). Construction Industry Research & Information Association (CIRIA).
2. BWB Consulting Ltd Ground Investigation Infinity Park Phase 2 – Plot A and Plot B - South Derby Growth Zone - Factual Report (December 2017). BWB Ltd.
3. BWB Consulting Ltd, May 2019, Flood Risk Assessment. BWB Ltd.
4. Department for Communities and Local Government, 2018. National Planning Policy Framework (NPPF).
5. Department of Communities and Local Government, 2012: Technical Guidance to the National Planning Policy Framework.
6. Derby City Council Level 1 Strategic Flood Risk Assessment. DCC.
7. Derbyshire County Council Preliminary Flood Risk Assessment. DCC.
8. Derbyshire County Council Local Flood Risk Management Strategy. AECOM.
9. Derby City Council Local Flood Risk Management Strategy. DCC.
10. Derby City Council Local Plan Core Strategy & South Derbyshire Local Plan. DCC & SDDC.
11. Environment Agency, December 2009. River Nene Catchment Flood Management Plan.
12. Environment Agency, 2004. Pollution prevention guidance (PPG). Environment Agency.
13. European Commission, 2000, Water Framework Directive (2000/60/EC). OOPEC.
14. HMSO, 1991, Environment Act. HMSO, Norwich
15. HMSO, 1995, Land Drainage Act. HMSO, Norwich
16. J. W Lancaster, M Preene & C T Marshall, 2004. Development and Flood Risk - Guidance for the Construction Industry. Construction Industry Research & Information Association (CIRIA).
17. Scott Wilson. November 2008. South Derbyshire District Council Preliminary Flood Risk Assessment. Scott Wilson.

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter F: Ground Conditions

June 2019

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F1.0 Introduction

1.1 This Chapter of the Environmental Statement ("ES") has been prepared by BWB Consulting on behalf of Hallam Land Management ("the Applicant"). This Chapter assesses the potential Ground Conditions and Contamination environmental impacts of the Proposed Development, and the likely significance of such impacts during its operational and construction Phases. About the

Author

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F2.0 Policy Context

National Policy

Environmental Protection Act

2.1 Part IIA of the Environmental Protection Act (1990) describes a regulatory role for Local Authorities in dealing with contaminated land.

Environment Act

2.2 The Environment Act (1995) creates a system whereby Local Authorities must identify and if necessary, arrange for the remediation of contaminated sites. The provisions are set out in Section 7, which inserts Part IIA into the Environmental Protection Act, 1990. In addition to these requirements, the operation of the regime is subject to regulation and statutory guidance.

Contaminated Land Regulations

2.3 Contaminated Land (England) (Amendment) Regulations (2012) provide a definition of what constitutes 'contaminated land' and sets out the responsibilities of the Local Authority (LA) and the Environment Agency (EA) in the identification and management of contaminated land. Under the Regulations, contaminated land is defined as:

"land which is in the opinion of the Local Authority to be in such a condition by reason of substances in or under the land that:

- *Significant harm is being caused or there is significant possibility of significant harm being caused; and*
- *Significant pollution of controlled waters is being caused or there is significant possibility of significant pollution of controlled waters being caused."*

2.4 Harm is defined in relation to harm to the health of living organisms or other interference with the ecological systems of which they form a part, and in the case of man includes harm to property. The potential for harm to occur requires three conditions to be satisfied:

- *Presence of substances (potential contamination/pollutants) that may cause harm (source of pollution);*
- *The presence of a receptor which may be harmed e.g. the water environment or humans, buildings, fauna and flora (the receptor); and*
- *The existence of a linkage between the source and receptor (the pathway).*

2.5 Therefore, the presence of measurable concentrations of contaminants within the ground and subsurface environment does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm.

2.6 The nature and importance of both pathways and receptors which are relevant to a particular site will vary according to the intended use of the site, its characteristics and surroundings.

Other Guidance

2.7 Alongside the legislation listed above, there is a range of non-statutory guidance material and British Standards which, where relevant, have been taken into account in this assessment, including:

- British Standards Institute (BSI): BS 10175:2011+A2:2017, (2017), Investigation of Potentially Contaminated Sites, Code of Practice;
- British Standards Institute (BSI): BS 5930:2015, (2015), Code of Practice for Ground Investigations;
- British Standards Institute (BSI): BS 8485:2015+A1:2019, (2019), Code of Practice for the Characterization and Remediation from Ground Gas in Affected Developments;
- British Standards Institute (BSI): BS 8576:2013, (2013), Guidance on Investigations for Ground Gas – Permanent Gases and Volatile Organic Compounds (VOCs);
- British Standards Institute (BSI): BS EN 1997-1:2004, (2004), Eurocode 7: Geotechnical Design – Part 1: General Rules;
- British Standards Institute (BSI): BS EN 1997-2:2007, (2007), Eurocode 7 Geotechnical Design – Part 2: Ground Investigation and Testing;
- Environment Agency Contaminated Land Report (CLR11, 2004), Model Procedures for the Management of Land Contamination;
- Construction Industry Research and Information Association (CIRIA) Report C665, (2007), Assessing Risk Posed by Hazardous Ground Gases to Buildings;
- Construction Industry Research and Information Association (CIRIA) Report C741, (2015), Environmental Good Practice on Site 4th Edition;
- Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Development Industry Code of Practice Version 2, (2011);
- Environment Agency Science Report SC050021/SR2, (2009), Human Health Toxicological Assessment of Contaminants in Soil;

- Environment Agency Science Report SC050021/SR3, (2009), Updated Technical Background to the CLEA Model, 2009;
- Environment Agency Science Report SC050021/SR4, (2009), CLEA Software (Version 1.06) Handbook; and
- Environment Agency, The Environment Agency's approach to groundwater protection February 2018 Version 1.2.

Planning Policy

National Planning Policy Framework

2.8 The National Planning Policy Framework, (NPPF) (2019) is a key part of the reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth. There is an overarching presumption in favour of sustainable development that should be the basis of every plan and every decision.

2.9 The NPPF consolidates all previous Planning Policy Statements (PPSs) and Planning Policy Guidance Notes (PPGs) into one document.

2.10 The NPPF contains the following paragraphs which are considered relevant to the Site:

- Paragraph 178/179 - The site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential 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.

F3.0 Assessment Methodology & Significance Criteria

Assessment Methodology

3.1 The potential for effects relating to ground conditions and contamination have been examined as part of the assessment using a source-pathway-receptor based conceptual site model (CSM). The CSM identifies links between potential sources of contamination and sensitive receptors, resulting in potential significant negative environmental effects. The CSM within the Geo-Environmental Assessment (Appendix F1) has been produced in line with current best practice, including CLR11.

3.2 The EIA Regulations (2017) stipulate that an Environmental Statement should, where possible, identify, describe and assess the likely significant effects of the development on the environment. The assessment methodology sets out three stages to identify the significant effects:

- Identification of sensitive Receptors;
- Assessment of potential Environmental effects; and
- Assessment of the potential Significance of the effects.

3.3 The assessment should identify the potential effects of the Proposed Development during the construction and operational phases.

Significance Criteria

Receptors

3.4 The significance of an effect is relative to the sensitivity or quality of a receptor. Receptors are set out in accordance with the magnitude of their importance. The following receptors, together with their designation (Table F1), have been identified as potentially being impacted by the Proposed Development:

Table F1: Potential Receptors and Sensitivity

Sensitivity Designation	Explanation	Identified Receptors
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or is of national importance.	Future Site Users; and Ground and construction workers.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.	Sinfin Moor Regionally Important Geological Site (RIGS); Main Drain, Barrow Drain and other secondary and tertiary surface water features; and Underlying on and off-site Secondary A, B and Undifferentiated aquifers.
Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance.	Underlying on and off-site Unproductive Strata. Site-won soils/topsoil.
Negligible	The receptor is resistant to change and is of little environmental value.	-

Effects

3.5 Effects have been assessed for the Construction Phase and Operational Phase of the Proposed Development. Where possible, effects have been assessed using site specific data from the Phase 1 reports. Where no specific site information is available effects have been assessed qualitatively using professional judgement.

3.6 The assessment of the environmental effects has been developed giving due regard to the following:

- Beneficial and adverse effects;
- Short, medium and long-term effects;
- Direct and indirect effects;
- Permanent and temporary effects; and
- Cumulative effects.

3.7 Each of the effects assessed will be categorised as being:

- Negligible;
- Minor;
- Moderate;
- High; or
- Substantial.

3.8 These effects can be classified as being either positive or negative.

3.9 The process for the management of contaminated land is set out in EA Report CLR11 "Model Procedures for the Management of Contaminated Land". The definitions of the magnitude criteria are set out below (Table F2).

Table F2: Magnitude of Impact

Magnitude of Impact	Descriptor
Major	A fundamental change to a location, environment or species.
Moderate	A material, but non-fundamental change to a location, environment or species.
Minor	A detectable but non-material change to a location, environment or species.
Not Significant	No detectable or material change to a location, environment or species.

Significance

3.10 By considering the importance of the receptor with the scale of the effect the 'significance' of the effect can be assessed by using the matrix in Table F3.

Table F3: Effect Significance Matrix

Resource Value	Magnitude of Effect upon Receptor				
	Feature is significantly lost or damaged	Some adverse effect	No discernible effect	Some beneficial effect	Feature is significantly improved
High	Major adverse	Major adverse	Negligible	Moderate beneficial	Major beneficial
Medium	Major adverse	Moderate adverse	Negligible	Minor beneficial	Major beneficial
Low	Moderate adverse	Minor Adverse	Negligible	Minor beneficial	Moderate beneficial

Assumptions and Limitations

3.11 This assessment has been undertaken based on information and reports that were available at the time of assessment.

3.12 Intrusive ground investigation has not been undertaken at the site, therefore this assessment is based on qualitative, desk based information rather than quantitative data.

F4.0 Baseline Conditions

Existing Conditions

4.1 The following sources have been utilised to inform the baseline conditions at the Application Site, represented in Appendix F1 – F6 respectively:

- 'Phase II Geo-Environmental Assessment Report – Land West of Deep Dale Lane, Derby' by BWB Consulting for Hallam Land Management Ltd, Ref NTH2136/02/V1/WEST, dated February 2014;
- 'Phase II Geo-Environmental Assessment Report – Land East of Deep Dale Lane, Derby' by BWB Consulting for Hallam Land Management Ltd, Ref NTH2136/02E/V1/EAST, dated February 2014;
- 'Ground Investigation – Factual Report, Infinity Park Phase 2 – Plot A and B, South Derby Growth Zone, Chellaston, Derby' by BWB Consulting for Wilson Bowden Developments Ltd, reference IFI-BWB-ZZ-XX-YE-RP-0002_FR_P1, dated December 2017;
- 'Ground Investigation Report, South Derby Growth Zone, Chellaston, Derby' by BWB Consulting for Wilson Bowden Developments Ltd, reference SDGZ-BWB-XX-XX-RP-CE-0001_GIR, dated December 2018;
- 'Minerals Assessment, A50 Junction and Link Road, Derby' by BWB Consulting for Derby County Council, reference IPI-BWB-ZZ-XX-RP-YE-0004_MA_P1, dated January 2019; and
- 'Phase 1 Geo-Environmental Assessment – South Derby Growth Zone' by BWB Consulting Ltd for Hallam Land Management Ltd, Ref. SDGZ-BWB-XX-00-YE-RP-0001_Ph1_P1 dated May 2019.

Site Description and Context

4.2 The site is located between the A50 (southern boundary) and Wragley Way (northern boundary). The site comprises numerous arable fields with Ashlea Farm located to the east of the site which is made up of a farm house, yard, numerous barns, a small livestock pen and four chicken sheds with associated feed silos. Three overhead electricity lines and two gas mains are known to be present on site.

4.3 A housing estate is present o the north of the site beyond Wragley Way, with the second phase of the housing development currently being constructed immediately north of the site at the corner of Deep Dale Lane and Wragley Way.

Site History

4.4 Historical mapping dating from 1881 to 2014 has been reviewed as part of this assessment. Throughout this period of history the site has remained undeveloped agricultural land.

Geology

4.5 Information published by the BGS indicates that the north-central and eastern area of the site is underlain by the Lacustrine Deposits (clay, silt and occasionally sand), with Head deposits (clay, silt, sand and gravel) mapped across the south-central area. No superficial deposits are mapped across the west and southern area of the site.

4.6 Made Ground is mapped in numerous small areas across the site, typically near roads and the housing development to the north of the site.

4.7 Bedrock geology is mapped to comprise the Gunthorpe Member (Mudstone) across the central and western area of site, with the Branscombe Mudstone Formation (mudstone & siltstone), Edwalton Member (Mudstone) and the Cotgrave Member (Sandstone) mapped beneath the far east of the site. A fault is indicated to cut north west to south east across the east of the site.

4.8 Numerous historical BGS logs are located on site, most of which are associated with the construction of the A50. A selection of boreholes are summarised below:

- Ref: SK33SW337 located to the west of site recorded topsoil to 0.5m over stiff friable red brown clay with grey green mottling (Gunthorpe Member);
- Ref: SK33SW197 located centrally recorded topsoil to 0.8m over yellow brown silty sandy clay (Lacustrine Deposits) to 1.2m overlying firm to stiff red brown mottled green silty clay (Gunthorpe Member) to 2.3m with weak weathered siltstone beneath (possibly Branscombe Member).
- Ref: SK33SW202 located to the east of site recorded topsoil to 0.9m overlying soft to firm mottled grey and light brown sandy clay (Lacustrine Deposits) to 2.0m overlying firm to stiff red brown mottled green silty clay (Gunthorpe Member).

4.9 Previous investigation works conducted in the eastern edge of the site, and upon land to the north of the site have recorded ground conditions to be similar to published geology, with varying thickness of topsoil overlying locally absent Lacustrine Deposits over the mudstone deposits of the Gunthorpe Member or Branscome Member. The investigation completed in December

2018 recorded deposits of the Cropwell Bishop Formation along the south east boundary running along the A50. This material was noted to be too weak to recover solid cores from rotary drilled boreholes and recommended that the material could be excavated via conventional methods.

4.10 A large portion of the eastern area of the site is indicated to be located within Sinfin Moor Regionally Important Geological Site (RIGS). This part of the Application Site has been designated a RIGS due to the presence of a glacial lake underlain by lacustrine clays with molluscan fossil assemblages.

Hydrogeology

4.11 The EA classifies the Lacustrine Deposits as an unproductive stratum, with the Head deposits as a Secondary Undifferentiated Aquifer. The bedrock geology beneath the site is classified as Secondary B Aquifers, with the exception of the Cotgrave Sandstone which is a Secondary A Aquifer.

4.12 The Application Site is not located within an EA Source Protection Zone (SPZ). No active groundwater abstraction wells are located on site or within 1km of the site boundary.

Hydrology

4.13 There are numerous secondary and tertiary surface water features mapped on site, commonly named as Barrow Drain or Main Drain. The Trent and Mersey Canal and Stenson Marina are located approximately 210m south of the site.

4.14 The north east area of site is located within a Zone 2 and 3 flood area.

4.15 There are no licenced surface water abstractions within 500m of the site.

Minerals

4.16 The Minerals Assessment presented as Appendix F5 has indicated that there is limited potential for deposits of the Beeston Sand and Gravel Member to extend into the southern extent of the Application Site area. However, any deposit is likely to be minor and extraction would not be economically viable.

Ground Gas

4.17 The site is not within a Radon affected area.

4.18 The limited thicknesses of Made Ground is not considered a significant source of ground gas generation. The natural deposits beneath the site is considered as having a low potential to generate ground gases.

Future Baseline

4.19 Based on continued use, the Application Site is considered to represent a low potential contamination risk to the identified receptors based on the likely localised nature of any contamination that may be present, resulting from limited current development and the current and historical agricultural usage.

F5.0 Potential Effects

5.1 The potential environmental effects associated with ground conditions are the same for both the Residential and Employment application sites, these are summarised below.

During Construction

5.2 During the construction phase, enabling works to strip vegetation and Topsoil from the Application Site has the potential to lead to a permanent, direct, minor adverse effect through damage to soil structure and potential loss of Topsoil. This is reflective of a minor impact to a low sensitivity receptor. There is also the potential for a permanent, direct, minor, adverse effect through compaction of shallow soils by construction traffic.

5.3 There is a potential short term, direct, minor, adverse effect from removal of vegetation which will lead to increased erosion and potential short term, direct, moderate adverse effects through migration of particulate loaded runoff into the surface drainage system and surface water courses.

5.4 Unanticipated contamination in soils may be present in areas of the Application Site not previously investigated, which may represent a potential risk to human health and controlled waters receptors.

5.5 Due to the predominantly Greenfield and agricultural nature of the Application Site, currently and historically, it is considered unlikely that there will be widespread soil and/or groundwater contamination present that could represent a risk to human health or controlled waters receptors.

5.6 Limited ground investigation has not identified any sources of contamination which could represent a risk to human health. Elevated concentrations of contaminants were not recorded in soil samples tested as part of the ground investigation.

5.7 Disturbance of the ground during the construction phase may release or increase the mobility of localised contamination present, this may present a low risk to construction workers, but will be dependent on the type and nature of any contamination present. The length of exposure will depend on the amount of time users spend on the Application Site but could extend to the full assumed extent of the construction phase of the Proposed Development.

5.8 The sensitivity of construction workers is high and controlled waters receptors is medium and the impact magnitude, prior to mitigation, is low. There is likely to be a direct, adverse temporary effect of minor significance to human

health and controlled waters receptors prior to the implementation of mitigation measures.

5.9 The use of machinery and plant associated with earthworks and construction activities (including the establishment of a construction compound) could give rise to risk to soils, groundwater and surface water features from contaminants through accidental fuel/oil spills and leaks, storage of chemicals or fuels.

5.10 Construction methods and earthworks undertaken within the Application Site could have a permanent moderate adverse effect on the RIGS site, through capping of the strata by permanent hard cover or through excavation as part of earthworks.

During Operation

5.11 Based on the assessment methodology described above the following potential effects have been identified during the operational phase of the development.

5.12 It is assumed that as part of the construction phase, any known contamination, or unanticipated contamination encountered as part of the works, will have been mitigated and remediated in line with the Proposed Development of the Application Site. Widespread contamination is not expected to be encountered during the construction phase and it is anticipated that materials will not require disposal off-site as waste.

5.13 The sensitivity of future site users is high and controlled waters receptors is medium and the impact magnitude, prior to mitigation, is low. There is likely to be a direct or indirect, temporary minor negative effect on future users prior to the implementation of mitigation measures.

5.14 There is a potential long term, direct, major adverse effect to future site users associated with the potential accumulation and inhalation of hazardous ground gasses within buildings. However, the source area is likely to be limited to areas of Made Ground.

5.15 Covering of a part of the RIGS site will lead to a permanent minor adverse effect through sealing of the strata from future investigation and study.

During Decommissioning

5.16 Decommissioning activities are not considered applicable in respect of ground conditions and the proposed development.

Cumulative Impacts

5.17 The Proposed Development forms part of the wider Infinity Garden Village (IGV) across Sinfin Moor.

5.18 It is considered that there will be minimal cumulative effects on ground conditions and contamination resulting from the Proposed Development and cumulative schemes related to the IGV considered as part of the assessment, as each development will incorporate appropriate mitigation measures.

F6.0 Mitigation and Monitoring

6.1 The potential mitigation/monitoring approaches associated with ground conditions are the same for both the Residential and Employment application sites, these are summarised below.

During Construction

6.2 During the construction phase, the Proposed Development includes earthworks related to site levelling and bunding, soil stockpiling, and the exposure of other new areas of ground, such as site compounds. Measures will be undertaken in these areas as appropriate, in line with CIRIA C741 Good Practice on Site (4th edition 2015) and with a Construction Environment Management Plan (CEMP), so as to minimise the potential for the movement of sediments into surface watercourses.

6.3 It is highly unlikely that a pollutant linkage associated with the Proposed Development would impact upon surface water receptors due to the lack of contamination present on Site.

6.4 Lubricants and refuelling facilities will be positioned away from the most sensitive receptors at the Site (surface watercourses) and stored in an appropriate manner, with secondary containment and contingency/emergency procedures (such as spill kits) in place should leaks or spillages occur. Guidance within EA PPG2: Above Ground Oil Storage Tanks should be adhered to with respect to any on site oil storage during the construction phase. This shall limit the potential for effects to occur and limit the magnitude should effects occur.

6.5 There will be an increased potential for direct human exposure to contamination identified in shallow soils through ingestion, direct contact or inhalation of contaminated soil or dust by construction workers in the short term during construction works. To mitigate against such risks construction workers and services personnel shall follow guidance stated in 'HSG 66 Protection of Workers and the General Public during Development of Contaminated Land' and CIRIA Report C670, Site health handbook during construction works. Adequate standard personal protective equipment and the development of basic hygiene measures will be undertaken.

6.6 To mitigate the risks associated with the generation of contaminated dusts during remediation works (unlikely to be required) and earthworks being undertaken on the Site, exposed areas will be dampened down during the construction work in order to reduce the amount of dust generated. In

addition, the levels of dust generated will be monitored throughout the works. This would be set out within the CEMP.

6.7 In the event that previously unanticipated contamination is identified, advice from a specialist should be sought immediately. Suspected contaminated materials should be stockpiled separately for subsequent analysis, and if necessary, off-site disposal under appropriate Duty of Care.

6.8 In order to reduce the impact upon the RIGS site, it is recommended that prior to development or during earthworks, the opportunity is taken take a detailed record of the underlying geology in areas that will be sterilised by the presence of buildings. Additionally, where cut and fill exercises are required, it is recommended that these are kept as small as possible, with a watching brief during excavation works in order to record the sedimentary sequences and fossil assemblages.

During Operation

6.9 Significant sources of contamination are unlikely to be present at the Site, however there is a possibility that contaminants are present within the localised Made Ground deposits which could represent a risk to future site users. In areas of proposed gardens or soft landscaping, a clean capping topsoil layer would sever the pathway to human health receptors. Subject to testing, this could be sourced from the existing topsoil at the Site that would be stripped from under the development footprint.

6.10 Potentially elevated ground gases could be present in localised areas of Made Ground. Where ground gasses are present, the risk could be mitigated via installation of appropriate levels of gas protection measures.

During Decommissioning

6.11 Decommissioning activities are not considered applicable in respect of ground conditions and the proposed development.

F7.0 Residual Effects

During Construction

4.1 For both the Residential and Employment Planning Sites, there is likely to be a direct, temporary short-term residual negligible effect on receptors following the implementation of mitigation measures.

During Operation

4.2 For both the Residential and Employment Planning Sites, no significant residual effects are anticipated as it is assumed that sufficient mitigation will have been completed during the construction phase.

During Decommissioning

4.3 Decommissioning activities are not considered applicable in respect of ground conditions and the proposed development.

F8.0 Summary & Conclusions

8.1 The potential effects and mitigation approaches associated with ground conditions are the same for both the Residential and Employment application sites.

8.2 Based on the information available as detailed herein, and following the implementation of applicable impact avoidance and mitigation measures, all potential geological and soil related effects associated with the construction and operation of the Proposed Development are assessed as being not significant.

Table F4 provides a summary of effects, mitigation and residual effects.

Table F4: Summary of Effects

Receptor	Effects	Mitigation	Residual Effects
During Construction			
Construction Workers	Exposure to previously unforeseen contaminants	Construction workers being provided with adequate training and personal protective equipment in line with HSG 66 Protection of Workers and the General Public during Development of Contaminated Land and CIRIA Report C670 Site Health Handbook should mitigate the risk to negligible levels.	Negligible
Surface Water Courses	Increased particulate loaded run-off drainage network	Conducting earthworks in line with CIRIA C741 Good Practice on Site (4th edition 2015) and with a Construction Environment Management Plan (CEMP) should mitigate the Topsoil damage and soil particulate run-off to negligible effect levels.	Negligible
Soil Quality	Damage to soil structure during enabling and construction works	Conducting earthworks in line with CIRIA C741 Good Practice on Site	Negligible

Receptor	Effects	Mitigation	Residual Effects
		(4th edition 2015) and with a Construction Environment Management Plan (CEMP) should mitigate the Topsoil damage and soil particulate run-off to negligible effect levels.	
	Localised impact from fuel/ lubricant storage	Storing fuels in accordance with EA PPG2: Above Ground Oil Storage Tanks should mitigate the effect of spillages impacting upon local soil and groundwater quality to negligible levels.	Negligible
Groundwater Quality	Localised impact from fuel/ lubricant storage	Storing fuels in accordance with EA PPG2: Above Ground Oil Storage Tanks should mitigate the effect of spillages impacting upon local soil and groundwater quality to negligible levels.	Negligible
Sinfin Moor Regionally Important Geological Site (RIGS)	Loss of geodiversity	In order to reduce the effect to the RIGS in the south of the Application Site area, it is recommended that prior to development or during earthworks, the opportunity is taken to complete a detailed record of the underlying geology in areas that will be sterilised by the presence of buildings. Additionally, where cut and fill exercises are required, it is recommended that these are kept as small as possible, with a watching brief during excavation works in order to record the sedimentary sequences and fossil assemblages.	Negligible

Receptor	Effects	Mitigation	Residual Effects
During Operation			
Future Site Users	Ingestion, inhalation or direct contact with soils	Clean Topsoil capping in areas of soft landscaping should mitigate the risk to human health associated with contaminants in Made Ground by severing the pathway.	Negligible
	Exposure to hazardous ground gases.	Where elevated hazardous ground gasses are identified by ground gas monitoring, gas protection measures would mitigate the risk.	Negligible

F9.0 Abbreviations & Definitions

1. ES – Environmental Statement
2. EA – Environment Agency
3. IGV – Infinity Garden Village
4. CEMP - Construction Environment Management Plan

F10.0 References

1. There are no references additional to those highlighted in the chapter

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter G: Heritage and Archaeology

June 2019

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G1.0 Introduction

1.1 This Chapter of the Environmental Statement ("ES") has been prepared by Orion Heritage on behalf of Hallam Land Management ("the Applicant"). This Chapter assesses the impact of the Proposed Development upon the significance of designated and non-designated heritage assets (above and below ground) and their settings within the development boundary and surrounding areas. It sets out how the proposal can be delivered in a way that meets the objectives of the NPPF and local plan policy as these relate to the historic environment.

1.2 The historic environment includes a wide range of features resulting from human intervention in the landscape, varying in scope from buried archaeological remains to late 20th century industrial and military structures. It can be divided into the following two categories - archaeology, which comprises: Scheduled Monuments and non-designated heritage assets; and built heritage, which includes: Listed Buildings (all grades), Registered Parks and Gardens (all grades), Conservation Areas, Registered Battlefields and World Heritage Sites.

1.3 This chapter describes the assessment methodology, the baseline conditions at the site and its surroundings, the potential environmental effects, the mitigation measures required to prevent, reduce or offset any potential adverse effects, and the likely residual effects after mitigation measures have been employed.

About the Author

1.4 This assessment and chapter have been prepared by Dr Robert Smith of Orion Heritage Ltd. Dr Smith has a BA(Hons) in Geography, an MSc in Wetland Archaeological Science and Management, and a PhD in Archaeological and Environmental Science. He is a Chartered Environmentalist, Chartered Geographer, Chartered Scientist, Chartered Water and Environmental Manager, Fellow of the Royal Geographical Society, a Member of the Chartered Institute for Archaeologists and Member of the Chartered Institute of Water and Environmental Management.

1.5 Robert is a Director and co-founder of Orion Heritage Ltd. He has dealt with a broad spectrum of work, providing archaeological and heritage planning related advice and support to Nationally Significant Infrastructure Projects and large-scale mixed-use urban extensions, renewable energy projects, leisure parks and villages, retail developments and residential schemes, through to small-scale sensitive developments. Robert has an in depth understanding of historic environment planning policy and guidance across

all parts of the UK, and acts as an expert witness at planning inquiries and hearings.

G2.0 Policy Context

National Planning Policy

National Planning Policy Framework

2.1 Government policy in relation to the historic environment is outlined in section 12 of the National Planning Policy Framework (NPPF), entitled 'Conserving and Enhancing the Historic Environment'. This 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.*

2.2 Section 16 of the NPPF recognises that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term.

2.3 Paragraph 189 states that planning decisions should be based on the significance of the heritage asset and that 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.

2.4 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 asset includes designated heritage assets and assets identified by the local planning authority (including local listing)*.

2.5 Designated Heritage Assets comprise: *World Heritage Sites, Scheduled Monuments, Listed Buildings, Protected Wreck Sites, Registered Park and Gardens, Registered Battlefields and Conservation Areas*.

2.6 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*.

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*.

2.7 The NPPF is supported by the National Planning Policy Guidance (NPPG). In relation to the historic environment, paragraph 18a-001 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'.

2.8 Paragraph 18a-002 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.

2.9 Paragraph 18a-013 outlines that the assessment of the impact of a proposed development on the setting of a heritage asset needs to take into account and be proportionate to the significance of the asset being considered and the degree to which the proposed development enhances or detracts from the significance of the asset and the ability to appreciate the significance.

2.10 The NPPG outlines that although the extent and importance of setting is often expressed in visual terms, it can also be influenced by other factors such as noise, dust and vibration. Historic relationships between places can also be an important factor stressing ties between places that may have limited or no intervisibility with each other. This may be historic as well as aesthetic connections that contribute or enhance the significance of one or more of the heritage assets.

Paragraph 18a-013 concludes:

'The contribution that setting makes to the significance of the heritage asset does not depend on there being public rights or an ability to access or experience that setting. This will vary over time and according to circumstance. When assessing any application for development which may affect the setting of a heritage asset, local planning authorities may need to consider the implications of cumulative change. They may also need to consider the fact that developments which materially detract from the asset's

significance may also damage its economic viability now, or in the future, thereby threatening its on-going conservation'.

2.11 The key test in NPPF paragraphs 194-196 is whether a proposed development will result in substantial harm or less than substantial harm. However, substantial harm is not defined in the NPPF. Paragraph 18a-017 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'.

2.12 Paragraph 196 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 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'.

2.13 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.

2.14 Paragraph 197 states that the effect on the significance of a non-designated heritage asset should be taken into account in determining an application and that in weighing applications that directly or indirectly impact on non-

designated heritage assets, a balanced judgment will be required having regard to the scale of any harm or loss and the significance of the heritage asset.

Planning (Listed Building and Conservation Areas) Act 1990

2.15 The Planning (Listed Building and Conservation Areas) Act 1990 sets out broad policies and obligations relevant to the protection of Listed Buildings and Conservation Areas and their settings.

Section 66(1) states:

'In considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses'.

Ancient Monuments and Archaeological Areas Act 1979

2.16 The Ancient Monuments and Archaeological Areas Act 1979 (as amended) protects the fabric of Scheduled Monuments but does not afford statutory protection to their settings.

Local Planning Policy

2.17 The majority of the site is located within the boundaries of South Derbyshire District. A portion of the site falls within Derby City. Planning policy from both authorities is therefore of relevance.

Derby City

2.18 The Derby City Council Local Plan Core Strategy (2017) Policy CP20 is relevant to heritage:

Policy CP20 - Historic Environment

The Council recognises the historic environment as one of Derby's greatest resources and will protect it through the preservation, enhancement, restoration and repair of heritage assets.

2.19 Designated and non-designated heritage assets of importance within Derby include:

- *The Derwent Valley Mills World Heritage Site;*

- *Statutory and Locally Listed Buildings;*
- *Conservation Areas;*
- *Scheduled Monuments, Archaeological Alert Areas and other archaeological remains; and*
- *Historic Parks and Gardens.*

2.20 *Development proposals that would detrimentally impact upon the significance of a heritage asset will be resisted. The Council will:*

a) Require that where proposals have the potential to impact upon heritage assets, a statement of significance and an impact assessment are submitted to ensure that the importance of the asset and the extent of any impact are fully understood. Heritage assets will be conserved in a manner appropriate to their significance.

b) Require proposals for new development, located within Archaeological Alert Areas, or other areas of archaeological potential to be accompanied by an assessment of available evidence and where appropriate an archaeological evaluation. This should be submitted before the planning application is determined in order to enable an informed and reasonable planning decision.

c) Require proposals for new development that have the potential to impact upon the significance of heritage assets (including through development affecting the setting) to be of the highest design quality to preserve and enhance their special character and significance through appropriate siting, alignment, use of materials, mass and scale and take account of best practice guidance.

d) Require appropriate recording of heritage assets where necessary, but particularly where development will lead to a loss of significance.

e) Support the sensitive re-use of under-utilised assets consistent with their conservation, whilst also recognising that managed change may sometimes be necessary if heritage assets are to be maintained in the long term.

f) Ensure that development within the city does not adversely affect the significance of heritage assets located outside of the city boundary, within adjoining local authority areas, particularly through impacts upon the setting of assets.

g) Encourage opportunities to enhance the tourism potential of heritage assets, particularly within the City Centre and the Derwent Valley Mills World Heritage Site (DVMWHS) as part of the Our City Our River programme. Opportunities to adapt heritage assets to make them more resilient to climate change will also be supported in principle, provided they do not impact upon the significance of the asset.

h) Support the reinstatement of historic and well-designed new shop fronts within the City Centre and Local Centres.
i) Continue to prepare, monitor and review conservation area appraisals and management plans for existing and potential conservation areas.
j) Continue to review, update and introduce Article 4 Directions, where appropriate.
k) Continue to record and monitor heritage assets that are at risk and take action where necessary. The Council will support re-use and change where necessary to preserve the assets for the future.

2.21 Within regeneration priority areas and areas of significant change, particular efforts will be made to ensure that heritage assets are positively integrated into regeneration proposals, through constructive conservation. Additional guidance relating to development and the historic environment will be set out in a design guidance document to be prepared by the Council.

2.22 The City of Derby Local Plan Review has the following relevant 'saved' heritage policies (there are no Conservation Areas or Historic Parks and Gardens near the site so the policies relating to these heritage assets will not be reproduced here):

Policy E18 – Conservation Areas

The City Council is committed to the preservation and enhancement of areas of special architectural or historical interest and will continue to review the boundaries of existing Conservation Areas and designate new ones. The City Council will take into account the special architectural or historic interest of the area concerned, the character and appearance of which it is desirable to preserve or enhance. Assessments will include specific local factors and any unlisted buildings which contribute to the special interest of the area.

2.23 Within Conservation areas, development proposals, including changes of use and conversions, should meet the following objectives:

a) Preserve or enhance the special character of the Conservation Area;
b) Encourage the physical and economic revitalisation of the Conservation Area; and
c) Ensure that the new buildings enhance the Conservation Area in terms of the siting and alignment of the buildings, the materials used and the mass, scale and design of buildings.

2.24 Planning permission will not be granted for development which would be detrimental to the special character of Conservation Areas, including views into and out of them. Proposals for development and applications for

Conservation Area Consent will not be approved where they would result in the demolition, or substantial demolition, of buildings that make a positive contribution to the character and appearance of a Conservation Area.

2.25 Conservation Area Consent will be subject to conditions or a planning obligation to ensure that demolition does not take place until a contract for carrying out an approved detailed redevelopment scheme has been awarded. Where Conservation Area Consent is granted for the demolition of structures of historic interest, the Council will seek to ensure that provision is made for an appropriate level of building recording to take place prior to demolition.

Policy E19 - Listed Buildings and Buildings of Local Importance

2.26 Proposals for development, and applications for Listed Building Consent, will not be approved where they would result in the demolition of statutory listed buildings. Proposals will also not be approved where they would have a detrimental effect on the special architectural or historic interest of a statutory listed building, its character or setting. Exceptions will only be made where there is a convincing case for demolition or alteration.

2.27 The City Council will also seek to ensure the conservation of locally important buildings and structures, including those on its Local List, by encouraging their retention, maintenance, appropriate use and restoration. The Council will therefore not normally approve development proposals that would have a detrimental effect on locally important buildings or structures as a result of:

a) Demolition or part demolition,
b) Inappropriate alteration or extension,
c) Impact on its setting or context.

2.28 In the case of buildings of local importance, applicants will be expected to demonstrate that all reasonable alternatives to demolition have been considered and found to be unrealistic.

2.29 Where proposals for alteration, extension or demolition would affect a listed building, or a locally important building or structure, and could involve a significant impact on the historic plan form or significant loss of historic fabric, applicants will be required to undertake an impact assessment before the application is determined. This should clarify the impact of the proposals on the building's historic fabric, character, appearance and setting as well as inform the design process.

2.30 Where development proposals are approved that would involve the demolition or alteration of a listed building, or locally important building or

structure, which would result in the loss of historic fabric, the Council will ensure that provision is made for an appropriate level of building recording to take place prior to the commencement of works.

E21 - Archaeology

2.31 Planning permission will not be granted for development which is likely to adversely affect nationally important archaeological remains, whether scheduled or unscheduled, or their settings.

2.32 Where archaeological sites or monuments of more local importance, and their settings, are likely to be adversely affected by development, physical preservation in situ will be the preferred option and applications may be refused.

2.33 Within the Archaeological Alert Areas, or other areas of archaeological potential where the City Council considers that a proposed development will affect remains of archaeological significance, applicants will be required to provide the results of an archaeological evaluation before the planning application is determined in order to enable an informed and reasonable planning decision to be made.

2.34 The evaluation should comprise:

a) An archaeological assessment of the archaeological impact of the proposed development, which may include a field evaluation of the site, undertaken in accordance with a written specification agreed with the city Council; and
b) A written mitigation strategy prepared to the satisfaction of the City Council demonstrating how the impact of the proposed development on archaeological remains will be alleviated.

2.35 Where, following an archaeological assessment, the Council considers that the need for development outweighs the need for preservation in situ of the archaeological remains, conditions will be attached to planning permissions, or developers required to enter into legally binding agreements with the City Council, to secure an appropriate programme for the investigation and recording of archaeological remains prior to and during development, and for the subsequent analysis and publication of results.

2.36 Where appropriate, the City Council will seek to secure the enhanced management and preservation of archaeological sites and their settings.

Policy E22 – Historic Parks and Gardens

2.37 Development will not be permitted which harms the character or setting of registered historic parks or gardens, within or close to the City, or their relationship with any buildings with which they are historically linked. The City Council will also seek to secure the retention, restoration, maintenance and continued use of locally important historic parks and gardens.

2.38 Where the City Council considers it necessary, it will require planning applications for development affecting either registered or locally important historic parks or gardens to be accompanied by an analysis of impact. Planning permissions may also require development to be carried out in a particular way, or for other measures to be taken to limit effects. Where the need for development is considered to outweigh the need to preserve the feature, developers will be required to ensure that any effects are minimised and that proper recording takes place.

2.39 The South Derbyshire District Local Plan Part 1 (adopted June 2016) has the following relevant heritage policy:

Policy BNE2: Heritage Assets

A. Development that affects South Derbyshire's heritage assets will be expected to protect, conserve and enhance the assets and their settings in accordance with national guidance and supplementary planning documents which the authority may produce from time to time.

These assets include:

1) Conservation Areas;
2) Scheduled Monuments;
3) Listed buildings;
4) Registered historic parks and gardens; and
5) Undesignated heritage assets on the local list.

B. Particular attention will be paid to:

1) The heritage of the Trent Valley, including its prehistoric remains, ancient crossing points and the transport heritage of the Trent Navigation, Trent and Mersey Canal, and the railways;
2) The complementary relationship that exists in many cases between estate parklands and villages. Often they are integral parts of a conservation area, or form part of a conservation area setting. The

management and care of these landscaped grounds is material to the character of the adjacent villages; and

3) The industrial heritage of Melbourne, Shardlow, Swadlincote and Ticknall. Most of this historic industry has now gone, but the surviving structures and landscape evidence continue to exert a huge influence on the character of these places.

C. The Council will promote the respect for, and protection and care of, the historic environment by:

1) Developing a local list of undesignated heritage assets, covering the same categories as the designated assets in the national list, in accordance with the best practice guidance issued by English Heritage.
2) Considering the further use of Article 4 directions, reinforced through grant schemes where possible and enforcement action where necessary.
3) Periodic production and updating of conservation area appraisals and management plans.
4) Measures to tackle heritage "at risk", including service of urgent works and repairs notices where necessary.
5) The District Council will work with private owners and developers to bring forward opportunities to secure the long-term future, sensitive use or re-use of under-utilised buildings, and the development of gap sites in conservation areas where development is beneficial to the character and appearance of the area. The District Council will also seek opportunities to improve public access to existing heritage features associated with new development schemes.

South Derbyshire

2.40 The South Derbyshire District Local Plan Part 2 (adopted November 2017) has the following relevant heritage policy:

Policy BNE210: Heritage

Applications for development that affects heritage assets, as defined in Policy BNE2, will be determined in accordance with national policy for conserving and enhancing the historic environment. In particular the following will apply:

- All applications should be accompanied by a heritage assessment, prepared with the appropriate expertise, to a level of detail proportionate to the asset's significance. The assessment should describe the asset's significance, identify the impact of the proposed development and provide clear justification for the works. Where

appropriate, the Council may also require historical research and archaeological recording to be undertaken before works to a heritage asset commence;

- Developments affecting a heritage asset or its setting, including alterations and extensions to existing buildings, will be required to demonstrate how the proposal has taken account of design, form, scale, mass, siting and setting of the heritage asset, in order to ensure that the proposed design is sympathetic and minimises harm to the asset;
- The loss of buildings and features which make a positive contribution to the character or heritage of an area should be avoided through preservation or appropriate reuse, including enabling development;
- Any proposed development which impacts on archaeological remains will be required to be accompanied by an archaeological evaluation of the site and a statement demonstrating how it is intended to overcome the archaeological constraints of the site. Development will be resisted which would result in the loss of or substantial harm to Scheduled Ancient Monuments or other archaeological sites of equivalent significance. Development affecting non-designated archaeological sites will be assessed having regard to the scale of any harm and the significance of the site. In all cases measures will be undertaken to minimise impact and, where possible, to preserve the site in situ. The District Council will require public display and interpretation where appropriate;
- Development that will lead to substantial harm to or loss of significance of any other designated heritage asset will be refused, unless it can be demonstrated that the development is necessary to achieve substantial public benefits that outweigh that harm or loss. Where less than substantial harm would result this will be considered against the public benefits of the proposal; and
- Effects of the development on the significance of other non-designated heritage assets on the local list will be assessed having regard to the scale of any harm and the significance of the asset.

Other Relevant Policy, Standards and Guidance

Historic Environment Good Practice Advice in Planning Note 2 Managing Significance in Decision-Taking in the Historic Environment (Historic England 2015)

2.41 The purpose of this document is to provide information to assist local authorities, planning and other consultants, owners, applicants and other interested parties in implementing historic environment policy in the NPPF and NPPG. It outlines a six-stage process to the assembly and analysis of

relevant information relating to heritage assets potentially affected by a proposed development.

- Understand the significance of the affected assets;
- Understand the impact of the proposal on that significance;
- Avoid, minimise and mitigate impact in a way that meets the objectives of the NPPF;
- Look for opportunities to better reveal or enhance significance;
- Justify any harmful impacts in terms of the sustainable development objective of conserving significance and the need for change; and
- Offset negative impacts on aspects of significance by enhancing others through recording, disseminating and archiving archaeological and historical interest of the important elements of the heritage assets affected.

Historic Environment Good Practice Advice in Planning Note 3 The Setting of Heritage Assets (Historic England 2017)

2.42 Historic England's Historic Environment Good Practice Advice in Planning Note 3 provides guidance on the management of change within the setting of heritage assets.

2.43 The document restates the definition of setting as outlined in Annex 2 of the NPPF. Setting is also described as being a separate term to curtilage, character and context; while it is largely a visual term, setting, and thus the way in which an asset is experienced, can also be affected by noise, vibration, odour and other factors. The document makes it clear that setting is not a heritage asset, nor is it a heritage designation, though land within a setting may itself be designated. Its importance lies in what the setting contributes to the significance of a heritage asset.

2.44 The Good Practice Advice Note sets out a five-stage process for assessing the implications of proposed developments on setting:

- Identification of heritage assets which are likely to be affected by proposals;
- Assessment of whether and what contribution the setting makes to the significance of a heritage asset;
- Assessing the effects of proposed development on the significance of a heritage asset;
- Maximising enhancement and reduction of harm on the setting of heritage assets; and
- Making and documenting the decision and monitoring outcomes.

2.45 The guidance reiterates the NPPF in stating that where developments affecting the setting of heritage assets results in a level of harm to significance, this harm, whether substantial or less then substantial, should be weighed against the public benefits of the scheme.

G3.0 Assessment Methodology & Significance Criteria

Assessment Methodology

Consultation and Study Area

3.1 The assessment was based upon an approximate search radius of 1.5 km around the perimeter of the site (i.e. the study area); this was an appropriate study area to assess relevant non-designated and designated heritage assets. This search radius was undertaken through consultation and agreed with the Derbyshire Historic Environment Record (HER).

Survey and Data Sources

3.2 The historic context of the site heritage assets under consideration have been identified and researched by means of a review of the following resources:

- Derbyshire Historic Environment Record (HER);
- Local studies and record office research; and
- Cartographic sources and available grey literature.

Significance Criteria

3.3 The criteria for assessing the magnitude of predicted change are shown below in Table G1.

Table G1: Criteria for Assessing Magnitude of Change on Historic Environment Receptors.

Change	Magnitude
Major Adverse	Total or substantial loss of the significance of a heritage asset. 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). These effects are likely to be important considerations at a regional or borough level.

Moderate Adverse	Partial loss or alteration of the significance of a heritage asset. 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. These effects, if adverse, while important at a local scale, are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.
Minor Adverse	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). Some harm to the heritage asset's setting, but not to the degree that it would materially compromise the significance of the heritage asset. Level of harm perceivable, but insubstantial relative to the overall interest of the heritage asset. These effects may be raised as local issues but are unlikely to be of importance in the decision-making process.
Negligible to None	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. Very minor change to a heritage asset's setting such that there is a slight impact not materially affecting the heritage asset's significance.
Minor Beneficial	A very slight change to a heritage asset which will enhance and better reveal significance. A very slight beneficial change to the setting of a heritage asset which will enhance the significance of the heritage asset.
Moderate Beneficial	A moderate change to a heritage asset which will enhance and better reveal significance. A moderate beneficial change to the setting of a heritage asset which will enhance the significance of the heritage asset.
Major Beneficial	A major change to a heritage asset which will enhance and better reveal significance. A major beneficial change to the setting of a heritage asset which will enhance the significance of the heritage asset.

3.4 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. Table G2 below sets out the criteria for assessing sensitivity.

Table G2: Criteria for Assessing Sensitivity of Receptors.

Sensitivity	Receptor
High	World Heritage Sites Scheduled Monuments and Areas of Archaeological Importance Archaeological sites of schedulable quality and 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) Non-designated 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 Locally Listed Buildings or non-designated built heritage assets
Negligible to None	Non-designated archaeological sites or buildings where little or no significance remains (i.e. most of the asset is no longer extant, with little or no contextual associations)

3.5 The sensitivity of the receiving environment, together with the magnitude of change, defines the significance of the impact (Table G3). Impacts of 'major' or 'moderate' significance in relation to the historic environment are considered to equate to significant impacts highlighted in the context of the EIA Regulations. The impacts could potentially be adverse, negligible or beneficial.

Table G3: Matrix for Determining the Significance of Effects.

Sensitivity of Receptor/ Receiving Environment to Change/ Effect	Major Adverse	Moderate Adverse	Minor Adverse	Negligible to None	Minor Beneficial
High	Major to Moderate	Major to Moderate	Moderate to Minor	Negligible to None	Moderate to Minor
Medium	Major to Moderate	Moderate	Minor	Negligible to None	Minor
Low	Moderate to Minor	Minor	Negligible to None	Negligible to None	Minor to Negligible
Negligible to None	Negligible to None	Negligible to None	Negligible to None	Negligible to None	Negligible to None

3.6 The significance of heritage assets takes into consideration the following variables:

- The sensitivity of archaeology/heritage assets - i.e. its value and susceptibility to change;
- The magnitude of effect experienced - i.e. the degree of alteration from the baseline;
- The scale at which any effect will be felt - i.e. site level, at the immediate setting of the site, at the scale of the study area;
- The duration of any effect (short-term, long-term, permanent etc.); and
- The changes that will occur over time with the development in place, including the cumulative impact of other development coming forward.

3.7 The significance of archaeological and heritage assets is identified by, as set out in the Annexe 2: Glossary, National Planning Framework:

'The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting'.

3.8 Historic England's Conservation Principles, Policy and Guidance for the Sustainable Management of the Historic Environment (2008) has also informed the assessment of significance in terms of the document, stating that significance embraces the heritage values that people associate with it: evidential, historical, aesthetic and communal.

Assumptions and Limitations

3.9 The assessment is reliant on available data; all reasonable measures have been taken to make sure that the data is accurate and up to date. The baseline data is, however, based on desk-based assessment and visual inspection. The primary sources of information list all known sites and finds; however, databases are limited in their ability to identify all sites or buildings of historic interest or predict new sites.

3.10 The impact of the proposal in built heritage terms is limited by the outline proposal which covers massing, floorspace and overall layout; detailed design will follow. The walkover survey sought to assess the historic values of designated and non-designated heritage assets within the study area; however, it is noted that there are some limitations to assessing potential impact on setting by the inherent limitations of assessing predicted impacts on historic context based on plans and modelling, as opposed to the form of development as built.

G4.0 Baseline Conditions

Existing Conditions

Non-Designated Heritage Assets

Prehistoric

3.1 There is only one record of prehistoric activity within the site.

3.2 Within the surroundings of the site, late prehistoric cropmarks are recorded (14481 on Figure 2), two Neolithic flint axes (4584 and 4598 on Figure 2), possible cropmarks of a prehistoric pit alignment (4330 on Figure 2) and possible late prehistoric cropmarks of a pit alignment, enclosure and ring ditch (4326 on Figure 2).

3.3 An Iron Age/Roman-British settlement is recorded west of Lowes Lane (4371 on Figure 2) and Bronze Age beakers sherds are also recorded (4589 on Figure 2).

3.4 A geophysical survey and evaluation trenching of the centre and east of the site failed to reveal any prehistoric remains.

3.5 Therefore, due to the scarcity of prehistoric remains within the site and the wider study area, it is considered to have low potential for prehistoric remains.

Roman

3.6 There are no Roman remains recorded within the site.

3.7 Within the surroundings of the site, an Iron Age/Roman-British settlement is recorded west of Lowes Lane (4371 on Figure 2).

3.8 A geophysical survey and evaluation trenching of the centre and east of the site failed to reveal any Roman remains.

3.9 Therefore, due to the scarcity of remains of this period, the site is considered to have low potential for remains of this period.

Saxon

3.10 There are no Saxon remains recorded within the study site or the wider study area.

4.11 A geophysical survey and evaluation trenching of the centre and east of the site failed to reveal any Saxon remains. Due to the site being located away from the historic cores of nearby settlements and the general lack of recorded remains of this period, the site is considered to have low potential for Saxon remains.

Medieval

4.12 There are no Medieval remains recorded within the site.

4.13 A geophysical survey and evaluation trenching of the centre and east of the site failed to reveal any significant Medieval remains, but the trenching did reveal several furrows from ploughed out ridge and furrow.

4.14 Within the surroundings of the site, areas of Medieval ridge and furrow are recorded (4605, 4606, 8090, 8092, 8093, 10469, 14629, 14634, and 16521 on Figure 2).

4.15 The Deserted Medieval Village (DMV) of Arleston lies c. 400 m to the south-west of the site (4296 on Figure 2). Although all that survives of the DMV is Arleston House Farm, at Doomsday, the village comprised two manors and was known as "Erlestune" and had 7 villagers. The Derbyshire HER records that there are signs of possible ‘disturbance’ within the area of the DMV on aerial photographs which could be traces of the DMV or former quarrying. Building material has been recorded in the area during ploughing.

4.16 A bi-partite enclosure has been recorded on aerial photographs at Arleston House Farm which is thought to be part of the DMV (8093 on Figure 2). A Medieval field system (4332 on Figure 2) and fishpond are also recorded (4588 on Figure 2).

4.17 A second DMV known at Sinfin, is located c. 500 m to the north of the site (4591 on Figure 2). There are no visible remains of this DMV, as the site was destroyed in the 1950s by the construction of a waste factory.

4.18 A third DMV known as Codetune is located c. 400 m north-east of the site (10471 on Figure 2).

4.19 The site would have lain within the fields of the nearby Medieval villages throughout the Medieval period. Therefore, the site is considered to have low potential for Medieval remains.

Post-Medieval/Modern

4.20 There are no archaeological assets of Post-Medieval date within the site.

4.21 Most of the Post-Medieval HER records within the surroundings of the site relate to buildings or structures associated with the development of the town; none of which are particularly relevant to assessing the archaeological potential of the site.

4.22 The site is therefore considered to have low archaeological potential for remains of Post-Medieval date.

Map Regression

4.23 The earliest map which shows any detail of the site is the Ordnance Survey Map of 1885-6 (Figure 5). The railway line bounds the west of the site. Two access tracks lie within the west of the site; one of which is denoted as Stenston Road on later maps. The west of the site comprises 16 fields. The centre and east of the site which is divided into numerous fields. An access track (denoted as Deep Dale Lane on later maps) bisects the east of the site. Trees demarcate some field boundaries in the north of the site.

4.24 There is no change between the Ordnance Survey Map of 1885-6 (Figure 5) and the 1901 Ordnance Survey Map (Figure 6), except for the removal of trees along some of the field boundaries.

4.25 There is no change between the 1901 Ordnance Survey Map (Figure 6), and the Ordnance Survey Maps of 1919-24 (Figure 7), 1955 (Figure 8) and 1970-78 (Figure 9), except for the presence of Ashlea Farm, its outbuildings and tanks located in the south-east corner of the site.

4.26 The 2000 Ordnance Survey Map (Figure 10) shows the removal of some field boundaries in the west of the site.

4.27 There is no change between the 2000 Ordnance Survey Map (Figure 10), and the 2006 (Figure 11) and 2018 (Figure 12) Ordnance Survey Maps.

Unknown Date

4.28 There are a number of HER records of unknown date; these comprise cropmarks, ring ditches and linear features (4320, 4321, 4331, 4594 and 14486 on Figure 2).

Summary of Archaeological Potential and Assessment of Significance

4.29 This assessment has identified that there is low potential for archaeological remains from the prehistoric, Roman, Saxon, Medieval and Post-Medieval periods. Any such remains are of no more than local significance.

Designated Heritage Assets

Listed Buildings

4.30 There are no Listed Buildings located within the site nor is it located within a Conservation Area (Figure 4).

4.31 There are a number of Listed Buildings located in the wider vicinity of the site, and these, for-the-most-part, form clusters within the Swarkestone, Barrow upon Trent and Twyford Conservation Areas, to the south-east, south and south-west of the site, respectively. Several listed bridges are also located along the Trent and Mersey Canal.

Conservation Areas

4.32 The Swarkestone, Barrow upon Trent and Twyford Conservation Areas lie to the south-east, south and south-west of the site, respectively. These include a number of Listed Buildings at their core (noted in paragraph 3.34 above). The Trent and Mersey Canal Conservation Area is situated to the south of the site

Registered Parks and Gardens

4.33 There are no Registered Parks and Gardens either within the site or in close proximity. The Grade II* registered Swarkestone Hall (1000685 on Figure 4) is located a considerable distance to the south-east (over 2 km).

Scheduled Monuments

4.34 There are no Scheduled Monuments either within the site or in close proximity. Swarkestone Lows Round Barrow Cemetery Scheduled Monument

(1019060 on Figure 4), Twyford Henge and Round Hill Bowl Barrow Scheduled Monument (1011436 on Figure 4) and Settlement Site and Enclosures Scheduled Monument (1007028 on Figure 4) are located between over 1.5 km and 2 km to the south-east, south-west and west of the site, respectively.

Non-Designated Heritage Assets

4.35 The site does not contain nor is it located in the vicinity of any Locally Listed buildings, which are non-designated heritage assets.

Future Baseline

4.36 It is assumed that the future baseline of the archaeological and heritage assets in the study area will be the same as present, providing there are no additional impacts upon them.

G5.0 Potential Effects

During Construction

Non-Designated Archaeological Assets

5.1 The evidence currently available indicates that the archaeological potential and significance of the site is not sufficient to prevent or constrain the development. The potential for as yet unknown archaeological activity pre-dating the Post-Medieval period is low.

5.2 A geophysical survey and evaluation trenching of the centre and east of the site failed to reveal any archaeological remains, beyond some Medieval ridge and furrow. An undated palaeochannel was revealed, the deposits of which contained no anthropogenic remains.

5.3 There is no evidence to suggest that the site has any higher potential for archaeological remains than the evaluated areas.

5.4 Any development within the site has the potential to damage or destroy as yet unidentified archaeological deposits, however, the significance of any surviving deposits is likely to be very low, and as such, would not prevent development.

5.5 Considering the above information, the magnitude of change to any as yet unknown below ground remains from the proposed development will be substantial, resulting in their likely loss. These assets would be of local significance. Therefore, prior to any mitigation measures, there will be major adverse magnitude of change to archaeological assets of low value, resulting in a **moderate** to **minor** effect, on non-designated archaeological assets during construction, which is **not significant.**

Designated Heritage Assets

5.6 In terms of heritage impacts, the effects on designated heritage assets during construction is very similar to that during operation.

During Operation

Non-Designated Archaeological Assets

5.7 The construction phase will have dealt with the archaeological interest of the site. Therefore, there will be no additional impacts on completion of the development to those identified during operation.

Designated Heritage Assets

5.8 There are no listed buildings located within the site nor is it located within a Conservation Area. There are a number of listed buildings located in the wider vicinity of the site; these are discussed below.

Listed Buildings in the Wider Vicinity of the Site

5.9 By virtue of their designation as listed buildings, those identified in the wider vicinity of the site are a nationally important component of the historic environment resource. In this context, they are good examples of building typologies within this part of the Derby local government area, which retain much of their architectural integrity. There is also historical significance attached to them in terms of the part they played in the early development that took place within the area. They mainly form the core of the Swarkestone, Barrow upon Trent and Twyford Conservation Areas, and are centrally placed within these designations (discussed further below).

5.10 In order to understand how any new development could affect the significance of these heritage assets, it is important to understand the specific heritage values which combine to inform that significance. An understanding of the contribution setting makes to its significance is also considered.

5.11 The development proposal involves the construction of up to 1,850 dwellings, a 2 form entry primary school, a local centre (including community hall, retail and other local services and facilities), public house, drive-through restaurant, petrol filling station, strategic highway infrastructure including new junction on the A50 and associated road links, public open space including children's play provision, surface water drainage infrastructure, landscaping, earthworks and ancillary supporting infrastructure. Given the location of the site, a sufficient distance from the listed buildings identified above, and the screening offered by the A50, there will be negligible to none magnitude of change to these designated heritage assets resulting in **negligible** effect, which is **not significant**.

Conservation Areas

5.12 The site is located a sufficient distance from Swarkestone, Barrow upon Trent, Twyford and the Trent and Mersey Canal Conservation Areas. Given the separation between the proposed development and the Conservation Areas there will be no impact on their setting and significance.

5.13 The site is separated from the Conservation Areas by the A50 which provides a buffer between them and the site, ensuring that there is negligible to no intervisibility between them. The placement of the proposed buildings and vegetation buffer have also been carefully considered to ensure that they are responsive to the important qualities and setting of the Conservation Areas. This will ensure that the proposed buildings will not impede key views of the Conservation Areas.

5.14 Overall, it is considered on balance that there would be negligible to none magnitude of change to the setting or significance of the Conservation Areas for the reasons outlined above; resulting in **negligible** effect, which is **not significant**.

Registered Parks and Gardens

5.15 The Grade II* registered Swarkestone Hall (1000685 on Figure 4) is located a considerable distance to the south-east (over 2 km) of the site. Given the separation between the site and this designated heritage asset, the proposal will cause no harm to its setting nor significance; resulting in **negligible** effect, which is **not significant**.

Scheduled Monuments

5.16 Swarkestone Lows Round Barrow Cemetery Scheduled Monument (1019060 on Figure 4), Twyford Henge and Round Hill Bowl Barrow Scheduled Monument (1011436 on Figure 4) and Settlement Site and Enclosures Scheduled Monument (1007028 on Figure 4) are located between over 1.5 km and 2 km to the south-east, south-west and west of the site, respectively. Given the separation between the site and these designated heritage assets, the proposal will cause no harm to their setting nor significance: resulting in **negligible** effect, which is **not significant**.

Non-Designated Heritage Assets

5.17 The site does not contain nor is it located in the vicinity of any Locally Listed buildings, which are non-designated heritage assets.

During Decommissioning

Non-Designated Archaeological Assets

5.18 The construction phase will have dealt with the archaeological interest of the site. Therefore, there will be no additional impacts on completion of the development to those identified during construction.

Designated Heritage Assets

5.19 In terms of heritage impacts, the effects on designated heritage assets during decommissioning is very similar to that during construction.

Cumulative Impacts

During Construction

Non-Designated Archaeological Assets

5.20 The proposed development will destroy any below ground archaeological assets within the sites. Therefore, there will be no cumulative effects with other sites or developments elsewhere.

Designated Heritage Assets

5.21 It is not considered that there will be any cumulative impacts on designated heritage assets of the proposed development in conjunction with other developments in the area or in combination with other impacts from the proposed development (synergistic impacts).

During Operation

Non-Designated Archaeological Assets

5.22 As stated above, there will be no cumulative effects with other sites or developments elsewhere.

Designated Heritage Assets

5.23 As stated above, it is not considered that there will be any cumulative impacts on designated heritage assets of the proposed development in conjunction with other developments in the area or in combination with other impacts from the proposed development (synergistic impacts).

During Operation

Non-Designated Archaeological Assets

5.24 As stated above, there will be no cumulative effects with other sites or developments elsewhere.

Designated Heritage Assets

5.25 As stated above, it is not considered that there will be any cumulative impacts on designated heritage assets of the proposed development in conjunction with other developments in the area or in combination with other impacts from the proposed development (synergistic impacts).

G6.0 Mitigation and Monitoring

During Construction

Non-Designated Archaeological Assets

6.1 The assessment has established that the site has low potential for archaeological remains of prehistoric, Saxon, Early Medieval, Medieval and Post-Medieval date.

6.2 There is some limited potential for the as yet unknown below ground remains within the site. Any surviving below ground remains are of local significance.

6.3 Based on the known information, the archaeological potential of the site is not considered to be sufficient to preclude or constrain the proposed development.

6.4 It is anticipated that a limited programme of archaeological works will be required to mitigate archaeology within the site. This may, in the first instance, take the form of a programme of trial trenching.

6.5 The archaeological mitigation strategy will be discussed and agreed with the archaeological advisor to Derby City Council prior to any ground works commencing on site.

Designated Heritage Assets

6.6 There are no mitigation measures required during construction.

During Operation

Non-Designated Archaeological Assets

6.7 The archaeological potential of the site will have been assessed and recorded prior to construction. Therefore, no mitigation measures are required during operation.

Designated Heritage Assets

6.8 There are no mitigation measures required during operation.

During Decommissioning

Non-Designated Archaeological Assets

6.9 The archaeological potential of the site will have been assessed and recorded prior to construction. Therefore, no mitigation measures are required during decommissioning.

Designated Heritage Assets

6.10 There are no mitigation measures required during decommissioning.

G7.0 Residual Effects

During Construction

Non-Designated Archaeological Assets

7.1 Once the mitigation measures outlined above have been implemented, no further archaeological work will be required. The residual impacts on any as yet unknown below ground remains are shown in Table G.4 below. There will be a **negligible** residual effect in the **long-term** at the **local** level, which is **not significant**.

7.2 **Designated Heritage Assets**

7.3 As described above, there are a number of Listed Buildings, Conservation Areas, Registered Park and Garden and Scheduled Monuments within the surroundings of the site. However, given the separation between the site and these designated heritage assets, the proposed development will cause no harm to their setting nor significance; resulting in **negligible** effect, which is **not significant**. The residual impact is set out in Table G4 below.

Table G4: Summary of Effects

Description of Effect	Potential impact including significance	Mitigation	Residual Effect including significance
During Construction			
Impact on as yet unknown below ground archaeological remains	**Moderate** to **minor** effect which is **not significant**	Targeted trial trenching	**Negligible** effect in the **long-term** at the **local** level which is **not significant**
Impact on designated heritage assets (Listed Buildings, Conservation Areas, Registered Park and Garden and Scheduled Monuments)	**Negligible** effect, which is **not significant**	**None**	**Negligible** effect in the **short-term** at the **national** level, which is **not significant**
During Operation			
Impact on as yet unknown below ground	No impact	N/A	N/A

archaeological remains			
Impact on designated heritage assets (Listed Buildings, Conservation Areas, Registered Park and Garden and Scheduled Monuments)	**Negligible** effect, which is **not significant**	**None**	**Negligible** effect in the **short-term** at the **national** level, which is **not significant**
During Decommissioning			
Impact on as yet unknown below ground archaeological remains	No impact	N/A	N/A
Impact on designated heritage assets (Listed Buildings, Conservation Areas, Registered Park and Garden and Scheduled Monuments)	**Negligible** effect, which is **not significant**	**None**	**Negligible** effect in the **short-term** at the **national** level, which is **not significant**

During Operation

Non-Designated Heritage Assets

7.4 No impacts are identified (as shown above in Table G.4) and are not significant.

Designated Heritage Assets

7.5 In terms of heritage impacts, the effects on designated heritage assets during construction is very similar to that during operation.

During Decommissioning

Non-Designated Heritage Assets

7.6 No impacts are identified (as shown above in Table G4) and are not significant.

Designated Heritage Assets

7.7 In terms of heritage impacts, the effects on designated heritage assets during construction is very similar to that during operation.

G8.0 Summary & Conclusions

Non-Designated Heritage Assets

8.1 The assessment has established that the site has low potential for archaeological remains of prehistoric, Saxon, Early Medieval, Medieval and Post-Medieval date.

8.2 There is some limited potential for the as yet unknown below ground remains within the site. Any surviving below ground remains are of local significance.

8.3 Based on the known information, the archaeological potential of the site is not considered to be sufficient to preclude or constrain the proposed development.

8.4 Considering the above information, the magnitude of change to any as yet unknown below ground remains from the proposed development will be substantial, resulting in their likely loss. These assets would be of local significance. Therefore, prior to any mitigation measures, there will be major adverse magnitude of change to archaeological assets of low value, resulting in a **moderate** to **minor** effect, on non-designated archaeological assets, which is **not significant.**

8.5 It is anticipated that a limited programme of archaeological works will be required to mitigate archaeology within the site. This may, in the first instance, take the form of a programme of trial trenching.

8.6 The archaeological mitigation strategy will be discussed and agreed with the archaeological advisor to Derby City Council prior to any ground works commencing on site.

8.7 Once the mitigation measures outlined in the archaeological mitigation strategy have been implemented, no further archaeological work will be required. This will result in a **negligible** effect in the **long-term** at the **local** level, which is **not significant**.

Designated Heritage Assets

8.8 There are no listed buildings located within the site nor is it located within a Conservation Area. There are a number of listed buildings located in the wider vicinity of the site.

8.9 Given the location of the site, a sufficient distance from the listed buildings, and the screening offered by the A50, there will be negligible to none

magnitude of change to these designated heritage assets, resulting in a **negligible** effect in the **short-term** at the **national** level, which is **not significant**.

8.10 The site is located in the locality of Swarkestone, Barrow upon Trent, Twyford and the Trent and Mersey Canal Conservation Areas. Given the separation between the proposed development and the Conservation Areas there will be no impact on their setting and significance.

8.11 Overall, it is considered on balance that there would be negligible to none magnitude of change to the setting or significance of the Conservation Areas, resulting in a **negligible** effect in the **short-term** at the **national** level, which is **not significant**.

8.12 The Grade II* registered Swarkestone Hall is located a considerable distance to the south-east (over 2 km) of the site. Given the separation between the site and this designated heritage asset, the proposal will cause no harm to its setting nor significance, resulting in a **negligible** effect in the **short-term** at the **national** level, which is **not significant**.

8.13 Swarkestone Lows Round Barrow Cemetery Scheduled Monument, Twyford Henge and Round Hill Bowl Barrow Scheduled Monument, and Settlement Site and Enclosures Scheduled Monument are located between over 1.5 km and 2 km to the south-east, south-west and west of the site, respectively. Given the separation between the site and these designated heritage assets, the proposal will cause no harm to their setting nor significance, resulting in a **negligible** effect in the **short-term** at the **national** level, which is **not significant**.

8.14 The site does not contain nor is it located in the vicinity of any Locally Listed buildings, which are non-designated heritage assets.

G9.0 Abbreviations & Definitions

1. ES – Environmental Statement
2. HER - Derbyshire Historic Environment Record

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter H: Landscape and Visual Impact

June 2019

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H1.0 Introduction

1.0 This Chapter of the Environmental Statement ("ES") has been prepared by FPCR Environment & Design Ltd on behalf of Hallam Land Management ("the Applicant"). This Chapter form a Landscape & Visual Impact Assessment (LVIA). It assesses the potential landscape and visual effects of the Proposed Development, and the likely significance of such effects during its construction and operational phases.

1.1 The project comprises two components: 'residential' and 'employment'.

Competency Statement

1.2 The ES chapter has been carried out by competent experts, comprising Chartered Members of the Landscape Institute, and is in accordance with the professional institution, 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 2013.

1.3 FPCR are a multi-disciplinary environmental and design consultancy with over 60 years' experience of architecture, landscape, ecology, urban design, masterplanning and environmental impact assessment. The practice is a member of the Landscape Institute as well as the Institute of Environmental Management and Assessment and is frequently called upon to provide expert evidence on landscape and visual issues at Public and Local Plan Inquiries.

H2.0 Policy Context

National Policy

National Planning Policy Framework (NPPF)

2.1 The National Planning Policy Framework, published on the 19 February 2019, sets out Government planning policies for England and how these are expected to be applied. The core planning principles include the following:

"always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings";

take account of the different roles and character of different areas, promoting the vitality of our main urban areas, protecting the Green Belts around them, recognising the intrinsic character and beauty of the countryside and supporting thriving rural communities within it" (§ 17)

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

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

National Planning Policy Guidance (PPG)

2.3 The PPG is an online planning resource which provides guidance on the NPPF. It is part of the Government's reforms to make the planning system more accessible, although the NPPF continues to be the primary document for decision making. With regard to landscape issues, the PPG records within the Natural Environment chapter that:

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

Local Planning Policy

2.4 The Proposed Development lies within two local authorities: South Derbyshire District and Derby City. The majority of the site lies within South Derbyshire District.

South Derbyshire Local Plan (Part 1, Adopted 2016) & South Derbyshire Local Plan (Part 2, Adopted 2017)

2.5 From a landscape perspective, the development plan includes the following policies: BNE1 Design Excellence; BNE2 Heritage Assets; BNE3 Biodiversity; BNE4 Landscape Character and Local Distinctiveness; BNE7 Trees, Woodland and Hedgerow; and INF7 Green Infrastructure.

BNE4 Landscape Character and Local Distinctiveness

2.6 Of particular relevance to landscape character matters is Policy BNE4, and more generally for the Application Site, sections A-C. This states that:

"A - The character, local distinctiveness, and quality of South Derbyshire's landscape and soilscape will be protected and enhanced through the careful design and sensitive implementation of new development.

B - Developers will be expected to retain key valued landscape components such as mature trees, established hedgerows and topographical features within development sites unless it can be demonstrated that the loss of features will not give rise to unacceptable effects on local landscape character. Development that will have an unacceptable impact on landscape character (including historic character), visual amenity and sensitivity and cannot be satisfactorily mitigated will not be permitted.

C - In bringing forward proposals developers will be expected to demonstrate that close regard has been paid to the landscape types and landscape character areas identified in The Landscape Character of Derbyshire. Proposals should have regard to the woodland and tree planting, landscape management and habitat guidance set out in this document and demonstrate that mitigation proposals are appropriate to the character of the landscape"

H15 Wragley Way (South Derby)

2.7 The site is largely allocated for housing development in the Local Plan, Policy H15. In term of landscape matters, it notes the following measures:

"*viii) The east, south and west of the site will require a green buffer and landscaping from the railway line and the A50 and enhancements to a defensible boundary along Sinfin Moor;*

ix) Improvements to existing green infrastructure shall be made, along with the provision of new green infrastructure on site."

Derby City Local Plan Part 1-Core Strategy (2017)

2.8 From a landscape perspective, the Derby City Local Plan, includes CP4 Character & context; CP16 Green Infrastructure; CP18 Green Wedges; CP19 Biodiversity; CP20 Historic Environment and AC15- Land south of Wilmore Road, Sinfin, (Infinity Garden Village)

CP18 Green Wedges

2.9 The north eastern part of the site lies within the Sinfin Moor Green Wedge (see Figure 3). The Green Wedge extends to the north and includes the recreational areas of Sinfin Golf Course and Sinfin Moor Park & Local Nature Reserve .As explained by the Core Strategy Green Wedge Review (2012):

"Green Wedges (GWs) are areas of predominantly open land that penetrate the city from the surrounding countryside, providing separation between the different neighbourhoods and land uses within the city. They are a distinctive part of Derby's character and are a long standing local policy objective".

H3.0 Assessment Methodology & Significance Criteria

Assessment Methodology

3.1 The assessment has been carried out with regard to best practice, as outlined in the published guidance:

- Guidelines for Landscape and Visual Impact Assessment (3rd edition) - Landscape Institute/ Institute of Environmental Management and Assessment (2013).
- GLVIA3 Statement of Clarification 1/13 - Landscape Institute (2013).
- An Approach to Landscape Character Assessment - Natural England, October 2014.
- The Guidelines for Environmental Impact Assessment - (2004) Institute for Environmental Management and Assessment.
- The State of Environmental Impact Assessment Practice in the UK - (2011) Institute for Environmental Management and Assessment; and
- Photography and Photomontage Technical Guidance Note -Interim Statement (November 2018)

3.2 The Study Area for the purposes of the assessment has been defined through field work and by desk based assessment. The Study Area is judged to be the area of the landscape where there could be degrees of change, and effects on landscape and visual receptors as a result of the Proposed Development. The Study Area broadly comprises a 3km radius from the site and covers the mapping extents identified in the Site Location Plan (Figure 1).

3.3 The assessment methodology is contained in full in Appendix A. The following is a summary.

3.4 The methodology that has been used has been developed through the Guidelines for Landscape and Visual Impact Assessment, Third Edition, GLVIA3 (2013). GLVIA states that:

"Landscape and Visual Impact Assessment (LVIA), is a tool used to identify and assess the significance of, and the effects of, change resulting from development on both landscape as an environmental resource in its own right and on people's views and visual amenity". (§ 1.1)

3.5 There are two components that are described separately within this report:

"Assessment of landscape effects; assessing effects on the landscape as a resource in its own right; and

Assessment of visual effects; assessing effects on specific views and on the general visual amenity experienced by people". (GLVIA 3, § 2.11)

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

Assessment of Landscape Effects

3.7 GLVIA3 states that: "An assessment of landscape effects deals with the effects of change and development on landscape as a resource". (§ 5.1)

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

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

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

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

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

Landscape Sensitivity

3.12 Landscape receptors are assessed in terms of their 'Landscape Sensitivity'. This combines judgements on the value to be attached to the landscape and the susceptibility to change of the landscape from the type of change or

development proposed. The definition and criteria adopted for these contributory factors is detailed below.

3.13 There can be complex relationships between the value attached to landscape receptors and their susceptibility to change which can be especially important when considering change within or close to designated landscapes. For example, an internationally, nationally or locally valued landscape does not automatically or by definition have a high susceptibility to all types of change. The type of change or development proposed may not compromise the specific basis for the value attached to the landscape.

Landscape Value

3.14 Value can apply to a landscape area as a whole, or to the individual elements, features and aesthetic or perceptual dimensions which contribute to the character of the landscape. The following criteria have been used to categorise landscape value. Where there is no clear existing evidence on landscape value, an assessment is made based on the criteria/ factors identified below (based on the guidance in GLVIA3, Box 5.1 Page 84):

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

Landscape Susceptibility to Change

3.15 This means the ability of the landscape receptor (overall character type/ area or individual element/ feature) to accommodate the change (i.e. the proposed development) without undue consequences for the maintenance of the baseline position and/ or the achievement of landscape planning policies and strategies.

Magnitude of Landscape Effects

3.16 The magnitude of landscape effects is the degree of change to the landscape receptor in terms of its size or scale of change, the geographical extent of the area influenced and its duration and reversibility. The table below sets out the categories and criteria adopted in respect of the separate considerations of Scale or Size of the Degree of Change and Reversibility. The geographical

extent and duration of change are described where relevant in the assessment.

Assessment of Visual Effects

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

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

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

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

The degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of form, scale and mass, line height, colour and texture; and

The nature of the view of the proposed development, in terms of the relative amount of time over which it will be experienced and whether views will be full, partial or glimpses.

The geographical extent of the visual effect in each viewpoint is likely to reflect:
The angle of view in relation to the main activity of the receptor;
The distance of the viewpoint from the proposed development; and
The extent of the area over which the changes would be visible" (GLVIA3 § 6.39- 6.40)

Sensitivity of Visual Receptors

3.20 Visual sensitivity assesses each visual receptor in terms of their susceptibility to change in views and visual amenity and also the value attached to particular views. The definition and criteria adopted for these contributory factors is detailed below.

Visual Susceptibility to Change

3.21 The susceptibility of different visual receptors to changes in views and visual amenity is mainly a function of; firstly, the occupation or activity of people experiencing the view at particular locations; and secondly, the extent to which their attention or interest may therefore be focussed on the views and visual amenity they experience.

Value of Views

3.22 The value attached to a view takes account of any recognition attached to a particular view and/ or any indicators of the value attached to views, for example through guidebooks or defined viewpoints or references in literature or art.

Magnitude of Visual Effects

3.23 Magnitude of Visual Effects evaluates each of the visual effects in terms of its size or scale, the geographical extent of the area influenced and its duration and reversibility. The distance and nature of the view and whether the view will be permanent or temporary are also detailed in the Visual Effects Table. (Appendix 6.2).

Overall Landscape and Visual Effects

3.24 Conclusions on the level of effects, and whether these are adverse or beneficial, are drawn from separate judgements on the sensitivity of the receptors and the magnitude of the effects alongside qualitive judgment. GLVIA3 observes that it is not essential to establish a series of thresholds for the different levels of effects, although the distinction between levels can be helpfully defined by using a word scale such as substantial, moderate, minor and negligible. The following descriptive thresholds have been used for this chapter in terms of levels of significance.

Substantial[1] A Substantial landscape or visual effect based on an evaluation of the susceptibility and value of the receptor, combined with the magnitude of change;

Moderate: A Moderate landscape or visual effect based on an evaluation of the susceptibility and value of the receptor, combined with the magnitude of change;

Minor: A Minor landscape or visual effect based on an evaluation of the susceptibility and value of the receptor, combined with the magnitude of change;

Negligible: A Negligible landscape or visual effect based on an evaluation of the susceptibility and value of the receptor, combined with the magnitude of change.

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

Significance Criteria
Judging Overall Significance

3.26 With regard to significance, the EIA process does not discuss significance in absolute terms. Instead, the findings are shown through different levels of significance (e.g. substantial, moderate, minor etc.). Within the ES, therefore, the issue is one of degree and the *level* of significance. Notwithstanding, GLVIA3 Statement of Clarification 1/13 (2013) makes it clear that:

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

3.27 Those degrees of change and effects that are considered to be 'significant' by the assessor, for this ES Chapter, are judged to be effects that are either

[1] The FPCR methodology (Appendix X) uses the term 'Major' for the highest level of effect, whether it is adverse or beneficial. In *this* ES, all environmental topics use the word 'Substantial' for the highest level of effect. 'Substantial' and 'Major' are thus the same degree of effect.

Substantial or Substantial-Moderate. Where this occurs, this is identified within the chapter.

3.28 In terms of what constitutes a *'significant'* landscape effect, GLVIA3 is implicit in that:

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

major loss or irreversible negative effects, over an extensive area, on elements and/or aesthetic and perceptual aspects that are key to the character of nationally valued landscapes are likely to be of the greatest significance;

reversible negative effects of short duration, over a restricted area, on elements and/or aesthetic and perceptual aspects that contribute to but are not key characteristics of the character of the landscapes of community value are likely to be of the least significance and may, depending on circumstances, be judged as not significant;

where assessments of significance place landscape effects between these extremes, judgements must be made about whether or not they are significant with full explanations of why these conclusions have been reached." (§5.56)

3.29 In relation to what constitutes a *'significant'* visual effect, GLVIA3 states that:

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

Effects on people who are particularly sensitive to changes in views and visual amenity are more likely to be significant.

Effects on people at recognised and important viewpoints or from recognised scenic routes are more likely to be significant.

Large-scale changes which introduce new, non-characteristic or discordant or intrusive elements into the view are more likely to be significant than small changes or changes already involving features already present within the view" (§ 6.4)

Assumptions and Limitations

3.30 The assessment process considers the likely effects of the Proposed Development using the current knowledge of the site and its context; site surveys and investigation; and desktop analysis which includes publicly accessible information. Appropriate regard has been made to national and local planning policy; and relevant legislation, guidance and best practice.

3.31 Every reasonable effort has been made to obtain baseline information and to accurately predict the effects of the Proposed Development.

3.32 It was not possible to obtain photographs views from residential properties as they are private views, although viewpoints have been selected from nearby public vantage points to provide the general context that is experienced for these receptors as they look towards the site. Where this has not been possible reasoned professional judgement has been made on visual amenity based on fieldwork.

3.33 Similarly, photographs from the A50 have been difficult to achieve because of the nature of the road. However, reasoned judgments on visibility for highway users have been made based upon travelling along the route within the context of the site. This same process has been used to determine the effect for railway users.

H4.0 Baseline Conditions

Existing Conditions
Application Site & Context

4.1 The site is allocated for housing development in the South Derbyshire Local Plan (Policy H15). It also forms part of the wider Infinity Garden Village- Policy (INF13).

4.2 The site forms a series of agricultural fields that extend from the built edge of Derby (Stenson Fields and Sinfin) up to the A50 (Derby southern by-pass). The site is comparatively flat, with the southernmost fields very gently rising to the well-treed corridor of the A50. The site is bordered, overlooked and contained by housing to the north which includes Mulberry Place (Davidsons development) which is being completed, and by housing off Wragley Way. The Derby-Birmingham railway line forms the site western boundary. To the east is Ashlea Farm and beyond is a line of tall mature poplar trees.

4.3 The site's landscape includes thick well-established boundary hedgerows, with some associated with wet ditches - which include Barrow Drain - and linear belts of broadleaved woodlands. The hedgerows and fields include mature trees. The site is crossed by the narrow roads of Deep Dale Lane and Arleston Lane and by the wider Stenson Road. Two power lines cross the site.

4.4 The site's landform varies from 40-55m AOD. The site's lowest point is along its northern edge near Wragley Way, with the landform gently rising on its southern fringes near the A50 and Ashlea Farm. The land continues to very gently rise to the south of the A50 at 60-62m AOD, which includes Barrow Hill (62m AOD), before falling towards the Trent & Mersey Canal within the lower lying and broad Trent Valley (40m AOD). There are small rounded rises to the west of the site at Stenson Fields Farm (57m AOD), and near Ash Plantation (55m AOD). To the east of the site, the landform is much flatter in character and forms part of Sinfin Moor (35m AOD).

Landscape Value

4.5 Landscape value can apply to a landscape area as a whole, or to the individual elements, features and aesthetic or perceptual dimensions which contribute to the character of the landscape. In all landscapes there will be variances in the level of landscape value depending on a number of factors.

4.6 GLVIA3 advises that in the first instance: "A review of existing landscape designations is usually the starting point in understanding value…"§ 5.19. The site, and the wider landscape of the Study Area, is not subject to any

landscape quality designation at a national or local level. Whilst landscape designations are not an exclusive indicator of quality, and that the lack of a designation does not render a landscape as having no value, designated landscapes are widely acknowledged as being of particular importance and generally of high susceptibility to change.

4.7 GLVIA3 describes those elements that are generally agreed to influence value as being: landscape quality (condition); scenic quality; rarity; representativeness; conservation interests; recreation value; perceptual aspects; and associations. Each of these is examined below.

Landscape Quality (condition)

4.8 The site's agricultural fields and the surrounding landscape show no significant sign of degradation or dereliction, although the expanding urban edge of Derby - which includes the construction of new housing at on the edge of Sinfin at Mulberry Place - have resulted in some fragmentation of field boundaries and vegetation. In general, it is considered that the landscape fabric of the site and local area is considered to be relatively intact and, overall, in a reasonable to good condition.

Scenic Quality

4.9 The local landscape within which the site is located, is characterised as an urban edge landscape. It is influenced by the main transport corridor of the A50 to the south, the railway line that forms the site's western boundary, and, more particularly, by the existing built-up area of Sinfin and Stenson Field to the north which forms the southern built edge of Derby. The site lies within a landscape of flat and very sloping agricultural fields that extend from the settlement edge. They are defined by hedgerows, mature trees and shelter belts, watercourse and drains, and narrow lanes. It is considered that the local landscape in which the site is located is pleasant, but rather unremarkable in its overall character. The site and the immediate area does not display any pronounced sense of scenic quality such that it is 'out of the ordinary' in landscape terms.

Rarity

4.10 The site does not lie within a rare Landscape Character Area or Type at either a national or local level, and does not contain any unusual landscape features. Whilst the site's mature tree, hedges and drains are features of this landscape, they are, however, common elements within this landscape context.

Representativeness

4.11 The site's character is judged to be broadly representative of the national, regional, and county and local landscape characterisations within which it is located. Landscape Characterisation is explored later within this section.

Conservation

4.12 The ES ecology chapter notes that the site is dominated by intensively managed habitats associated with farming, with smaller areas of more semi-natural habitats, broadleaved woodland, scattered mature trees, hedgerows wet ditches and ponds. None of the hedgerows are considered by the ecology assessment as one of the hedgerows qualify as important under the wildlife and landscape criteria of the Hedgerow Regulations 1997.

4.13 Sinfin Moor Park & Nature Reserve lies to the north east, adjacent to the site. That area is a Local Wildlife Site. The area is designed and managed for nature conservation, as well as informal recreation.

4.14 There are no Scheduled Monuments, Listed Buildings or Conservation Areas within the site, or within its immediate context. The Trent & Mersey Canal lies to the south of the A50 and is covered by a Conservation Area designation. Bridges over the Canal are Grade II Listed as well as buildings within the village of Stenson.

4.15 The villages of Barrow upon Trent (1.2km from the site), Swarkestone (2.2 km) and Twyford (1.5km) contain Conservation Area designations, whilst Swarkestone also includes a Grade II Listed Registered Park and Garden as part of Swarkestone Hall (see Figure 3).

Recreation Value

4.16 Given the location alongside the built-up area of Derby, the site and the adjacent landscape provides some local value for the adjacent community - as is often the case for any farmland/green fields on the edge of settlements. However, the site is not used for any formal recreational functional and does not contain any designated Public Bridleways or Public Footpaths. There are very limited number of public rights of way within the context of the site and surrounding landscape. The nearest routes are the by-way of Sinfin Moor Lane to the north east, a Public Bridleway to the east of Leah Farm and a Public Footpath/towpath along the Canal to the south of the A50.

Perceptual Aspects

4.17 The site's close relationship with the built-up area of Derby, together with the influences of the transport corridors of the A50 and the railway line, results in a landscape that is influenced by urbanising elements. It is concluded that the site and the local landscape does not exhibit any pronounced sense of tranquillity, nor any notion of wildness. Beyond the built influences of Derby and the A50 to the south there are greater levels of tranquillity within the landscape- as would be expected.

Associations

4.18 The site and the immediate landscape is not subject to any specific cultural associations such as notable artists or writers, or prominent events in history.

Landscape Value: Summary

4.19 In conclusion, it is judged that the site and the immediate landscape in which it is located of medium landscape value. It is not considered to be of high landscape value, nor a "valued landscape" in the context of the NPPF.

Landscape Character

National Landscape Character Area

4.20 Landscape character is assessed at a national level by Natural England through the use of National Character Area (NCA) profiles. These profiles describe the general characteristics of these landscape areas, which generally cover substantial areas of the landscape.

NCA 69 Trent Valley Washlands

4.21 The site is located within the extensive Trent Valley Washlands (see Figure xx). The wider landscape to the north west of the site lies within the Needwood & South Derbyshire Claylands.

4.22 The key characteristics of the Trent Valley Washlands Character Area are the following:

- *"Distinctly narrow, linear and low-lying landscape largely comprised of the flat flood plains and gravel terraces of the rivers and defined at its edges by higher ground.*
- *Geology dominated by superficial alluvium and gravel river terrace deposits underpins the contrast in arable and pastoral agricultural use,*

arable crops predominating on the free-draining soils of the river terraces, with grassland more commonly located along the alluvial river flood plains where soils are subject to frequent flooding or are naturally wet.

- *Flood plain pastoral areas where riverside pastures are subdivided by thick, full hedgerows with some trees contrast with arable areas with larger fields divided by low, small hedgerows with few trees.*
- *Limited tree cover, but local concentrations give the impression of a well timbered landscape in many places. Riparian trees, especially willows, provide an important component.*
- *A landscape strongly defined by its rivers and their flood plains with the extensive canal network adding significantly to the watery character and providing major recreational assets for the area.*
- *Diverse range of wetland habitats supporting notable species such as spined loach and bullhead fish, otter, water vole, white-clawed crayfish, shoveler, bittern, lapwing, snipe and redshank.*
- *Rich history of human settlement and activity reflected in the archaeology and historic buildings with a particular focus on river crossing points and the gravel terraces, as well as being significant for early Christianity in the Midlands, and later for its canal and brewing heritage.*
- *Settlement pattern heavily influenced by flood risk, confining villages to the gravel river terraces and to rising ground at the edges of the flood plains. Traditional buildings are characteristically of red brick and clay plain tile with earlier timber frame and grander dwellings and churches typically built from sandstone. Red brick and Welsh slate of 19th- and early 20th-century urban expansion prominent in larger settlements along with modern housing and development.*
- *A landscape heavily used as transport and communication corridors along the rivers and canals, for major roads and railways, and for power lines.*
- *A landscape marked by extensive sand and gravel extraction, power stations and prominent urban-edge industrial and commercial development"*

Regional Landscape Character Assessment

4.23 The East Midlands Regional Landscape Character Assessment (EMRLCA) (2010) is a large-scale assessment that brings together various assessment work undertaken at a County and District level. The report defines a number of Landscape Character Areas (LCAs). Similar to the NCA Profiles, they cover extensive areas of the landscape.

4.24 It is interpreted that site and the local landscape lies within both the Floodplain Valleys Landscape (LCA) and the Village Farmlands Landscape (LCA). (see Figure 5). The vast majority of the site lies within the Village Farmlands Landscape.

Floodplain Valleys

4.25 The key characteristics of the Floodplain Valleys are:

- Deep alluvium and gravel deposits mask underlying bedrock geology to create wide, flat alluvial floodplains surrounded by rising landform of adjacent Landscape Character Types;
- River channels, often along managed courses, bordered by riparian habitat;
- Predominance of pastoral land use, with cereal growing increasing in some areas. 'Warping' areas subject to more intensive cereal growing;
- Limited woodland cover; however, steep riverside bluffs and areas close to settlement or on former gravel extraction sites notable for a higher level of woodland cover
- Regular pattern of medium to large fields defined by hedgerows or post and wire fencing, breaking down and becoming open in some areas;
- Hedgerow and riverside trees important component of landscape. Alder, Willow and Poplar are typical riverside trees;
- Limited settlement and development in rural areas;
- Sewage Treatment Works and power stations common close to larger settlements that fringe the floodplains;
- Roads and communication routes often define the outer edges of the floodplain; and
- Restoration of sand and gravel extraction sites to open water creates new character across many areas.

Village Farmlands Landscape

4.26 The key characteristics of the Village Farmlands Landscape are:

- Gently undulating lowlands, dissected by stream valleys with localised steep slopes and alluvial floodplains;
- Moderately fertile loamy and clayey soils with impeded drainage over extensive till deposits on higher ground and gravel terraces bordering main rivers;
- Mixed agricultural regime, with localised variations but with a predominance of either dairy farming on permanent pastures, or arable cropping;
- Small and moderately sized broadleaved woodlands and copses, often on sloping land; extensive new areas of planting associated with The National Forest;

- Hedgerows and frequent oak and ash trees along hedgelines and streams contribute to well treed character of landscape;
- Moderately sized well maintained hedged fields across rolling landform create patchwork landscape of contrasting colours and textures;
- Extensive ridge and furrow and small historic villages linked by winding lanes contribute to historic and rural character of the landscape; and
- Localised influence of large estates.

County Landscape Character

4.27 Further character assessment has been undertaken through The Landscape Character of Derbyshire (2014). Both South Derbyshire District Council and Derby City Council refer to the Landscape Character of Derbyshire as part of their evidence base for their adopted plans, as there is currently no district or city level landscape characterisation.

4.28 The Landscape Character of Derbyshire subdivides the National Character Areas into a series of large Landscape Character Types (LCTs). The site falls within two of these: the Wet Pasture Meadows LCT and the Lowland Village Farmlands LCT. The majority of the site and the landscape to the south lies within the Lowland Village Farmlands. (see Figure 6).

Wet Pasture Meadows LCT

4.29 The character of the Wet Pasture Meadows LCT is summarised below:

"This is a flat, low-lying landscape associated with irregularly shaped alluvial and lacustrine basins, fringed by low hills and slopes. The soils are poorly draining and prone to flooding. As a result, the landscape has remained largely uninhabited, other than a few sparsely scattered red brick farmsteads. The heavy soils and risk of flooding has led to the development of a mixed farming system. With improvements to drainage, there is a growing emphasis on arable cropping, although because of the difficulty of spring cultivation, these remain restricted to winter cereals.

A key characteristic of this landscape is its enclosure pattern. Much of the agricultural land, having originated from former wasteland, was enclosed as part of the Parliamentary Enclosure Acts. The resultant fields are typically regular to geometric in shape and medium to large in size, usually enclosed by tall hawthorn hedgerows with some elm. Trees are apparent throughout, usually scattered along hedgerows, ditches and minor streams. Pollarded willows are a particularly distinctive feature"

4.30 Distinctive features comprise:

- Flat low-lying irregular shaped basins
- Waterlogged soils
- Mixed farming with patches of unimproved
- Scattered trees along hedgerows and ditches
- Visually prominent willow pollards
- Medium to large regular or geometric shaped fields with hawthorn hedges
- Largely uninhabited with very occasional, large, red brick farmsteads.

Lowland Village Farmlands LCT

4.31 The character of the Lowland Village Farmlands LCT is summarised below:

"The soft rocks of Permo-Triassic Mudstones and Siltstones with drift deposits have weathered away to form a very subdued, gently rolling lowland landscape that has strongly influenced the cultural patterns of the landscape. Soils reflect the geological variation, with heavy seasonally waterlogged soils over mudstone, and more permeable soils over localised drift and river terrace deposits. The resultant land-use is typically mixed, with cropping on the flatter, more cultivable, soils and improved pasture in damper areas.

A key feature of this landscape is its nucleated settlement pattern. Villages like Hatton and Weston-on-Trent are located on relatively high spots or better drained land immediately off the flood plain, in order to reduce the risk of flooding. The enclosure pattern reflects a diverse history. Immediately adjacent to the villages, fields are medium size, semi-regular, with areas of ridge and furrow reflecting the enclosure of medieval open fields. The hedges that enclose these fields are species-rich. Beyond the villages there is a more regular pattern of fields suggesting a period of later enclosure and typically, the hedgerows are single species hawthorn. The more regular fields are most obvious in areas of former common like Etwall Common and Egginton Common.

Much of the original character of this landscape has been seriously impacted upon by modern large scale development. Large power stations dominate views across the landscape as do the many pylons carrying the resultant electricity. The gentle topography above the flood plain has always been attractive for road construction and modern roads, like the A50 and A52, pass through this landscape. The underlying mineral deposits have resulted in sand and gravel extraction, and the restoration of these sites has created areas of immature agricultural land and large water bodies"

4.32 Distinctive features comprise:

- Gently rolling, almost flat, lowland with river terraces.
- Low slopes and summits give a sense of elevation over a broad floodplain
- Mixed farming with arable cropping and improved pasture
- Thinly scattered hedgerow trees including some willow pollards
- Scattered, locally dense, watercourse trees.
- Medium to large regular fields with thorn hedgerows
- Discrete red brick villages with farms and cottages
- Large red brick outlying farms.

Visual Amenity

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

Visual Receptors

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

4.35 The availability of views of the site for visual receptors has been undertaken in parallel with the baseline landscape study. This has determined those receptors within the landscape that have views of the site, taking into account screening and filtering effects that is created by elements such as landform, vegetation and buildings. This assists in understanding the visual envelope of the site, and that of the Proposed Development when in place.

Visibility Mapping

4.36 From an examination of the landscape it is concluded that the combination of the built up area of Derby, landform, and mature tree cover along the A50 means that opportunities in which to view the site are effectively restricted to a localised area of the landscape. This is more or less within the landscape between the edge of Derby and the A50 and within the immediate context of the site.

4.37 The gently rising land at Barrow Hill (62m AOD) and to the north of Stenson (60m AOD), as well the rising land to the east of Findern (60m AOD) effectively contain and screen the site from the wider landscape to the south and west. This landform character, together with the largely continuous corridor of mature trees along the A50 prevent view of the site from Stenson, Twyford and Barrow upon Trent, as well as individual properties south of the A50 within the vicinity of the Canal.

4.38 The containment created by the existing built up area of Derby at Sinfin and Stenson Fields prevents views of the site from the wider landscape to the north. The site's visual envelope is a little more open to the east, extending across the landscape of the lower lying Sinfin Moor between Sinfin and built edge of Chellaston, although a line of tall mature poplar trees near Ashlea Farm, as well as other hedges and trees, provides a good degree of natural containment.

4.39 The field analysis has determined where the site where it is visible. The Visual Appraisal Plan (Figure 7) identifies those visual receptors that have views, to varying degrees, of the site. These being the following:

Residential Properties & Settlements[2]

A) Derby (Sinfin and Stenson Fields, to include Mulberry Place)
B) Arleston Farm
C) Ragley Boat Stop
D) Stenson Fields Farm

Right of Way Users/Recreational Users

E) Sinfin Moor Lane Lane/ Sinfin Moor Park & Nature Reserve)
F) Public Bridleway (section north of Moor Lane)

Highway/Transport Users

G) Deep Dale Lane, Arleston Lane & Stenson Road
H) A50
I) London-Birmingham Railway Line

Photographs

4.40 The Viewpoint Plan (Figure 8) identifies the location of photographs viewpoints. Photographs have been taken for the above visual receptors to demonstrate visibility for receptors and to provide representative views. The field work was undertaken in April 2018 and May 2019. Photographs that

[2] Effects on visual amenity is not assessed for residential receptors of the Ashlea Farm as consent is being sought for these buildings to be demolished as part of A50 Junction and Link Road planning application

are used in the assessment are from April 2018 when the tree were not in full leaf. These photographs provide greater levels of visibility across the landscape, than would normally be the case during the summer months when vegetation would be in full leaf[3].

4.41 The photographs, along with field work and professional judgment, assist in determining the level of impact and the effects on visual receptors. Effects are based upon the Description of Development and the Parameters Plans, which includes green infrastructure and the location of planting. The assessment takes into account the maximum buildings heights as set out in the Description of Development.

4.42 It was not possible to obtain photographs views from residential properties as they are private views (e.g. from Sinfin and Stenson Fields), although viewpoints have been selected from nearby public vantage points to provide the general context that is experienced for these receptors as they look towards the site. Reasoned professional judgements are made on the visibility for residents based upon the fieldwork exercise and by looking out from the site.

4.43 Taking photographs from the A50 has been difficult to achieve because of the nature of the road. However, reasoned judgments on visibility for highway users have been made based upon travelling along the route within the context of the site, and by examining the character of the road from the road bridges over it such as at Stenson Road and Arleston Lane. Judgements have been made on the visibility of the site from the railway line.

Residential Receptors and Settlements

4.44 The built up area of Derby at Stenson Fields and Sinfin, which includes new development being built at Mulberry Place, lies directly adjacent to the site. As a consequence, residents have close range views of the site and the local landscape between the built edge and the A50. Wider and more distant views to the south are restricted by the slight rise in the landform along the southern edge of the site and by mature trees along the A50.

4.45 Viewpoints 1A, 1B, 1C, 1D, 1E, 6A, 6B and 7 (Figures 9, 10, 11, 13, 14) provide a series of representative views from the edge of Stenson Fields and Sinfin looking across the site. Components of the view vary for residents depending on location, orientation of windows and ground floor screening. Most of these residents on the built edge have views of the site to varying degrees. This includes the site's agricultural fields, hedges and mature trees. For those residents to the north of Wragley Way their views include new housing

[3] Photographs for Receptor B (Arleston Farm) were taken in May 2019.

development at Mulberry Place. More open views are afforded of the western part of the site for those residents off Stenson Road.

4.46 There are individual properties of Arleston Farm, Ragley Boat Stop and Stenson Fields Farm that lie in the general vicinity of the site. Views towards the site vary for these receptors. As an example, the well-treed corridor of A50, which lies partly on embankment above Deep Dale Lane, prevents views of the main bulk of the site for receptors at Arleston Farm and the Ragley Boat Stop, whilst from Stenson Fields Farm there are views across the western part of the site as well as that of the built up area of Stenson Fields.

4.47 All of these residential receptors are judged to be of high sensitivity.

4.48 The landform gently rises at Barrow Hill to the south of the A50 (see **Figure 4**). As a result, there are no views of the site for those residents in Stenson, Twyford, and Barrow upon Trent, nor the individual properties and farmsteads within the vicinity of the Canal. Views of the site for residents in Findern are effectively prevented by small rise in the landform to the east of the village, in addition to a network of intervening hedgerows and trees. Aside from the tall buildings at the Chellaston-A50 junction that provide opportunities for elevated views across the landscape, which includes Chellaston and the wider area of Derby to the north, there are no views of the site from the majority of the residential of Chellaston as a consequence of overlapping hedgerows and matures trees within the intervening landscape of Sinfin Moor.

Right of Way Users/Recreational Users

4.49 Sinfin Moor Lane provides a recreational route between Sinfin and Chellaston. A Public Bridleway lies a little way to the east of Leah Farm that connects with Sinfin Moor Lane.

4.50 There is informal recreational access within Sinfin Moor Park & Nature Reserve. However, as a result of its generally wooded character views out across landscape for these receptors tends to be limited in extent. Given its proximity there are some opportunities for localised and close-range views of the very north eastern parts of the site from Sinfin Moor Lane as well as views of the built edge of Sinfin.

4.51 All of these receptors are judged to be of high sensitivity.

4.52 There are no views of the site for recreational users on Trent & Mersey Canal as a result of the screening effects of the intervening rise in the landform in the vicinity of the A50.

Highway Users

4.53 Highway users on Deep Dale Lane, Arleston Lane and Stenson Road have close range views of the site as they move through it. As they head towards the built-up area of Derby, they also have views of residential buildings at Sinfin and Stenson Fields. Hedges along the lanes/roads filter and restrict views of the site to varying degrees.

4.54 Highway users on the A50 are moving at speed and experience transient views of the landscape. Between Deep Dale Lane and the Chellaston junction, the route is primarily within a cutting and is contained by grass banks and matures vegetation. As a result, views out across the wider landscape are restricted. Much of the site to the north of the A50 is effectively hidden save for a few glimpsed occasional views, such as when the A50 bridges Deep Dale Lane.

4.54 These receptors are judged to vary between low-medium sensitivity.

Rail Users

4.55 Train users experience transient and fleeting views as they pass the site. It is reasoned that the overall experience includes views of the built of area of Stenson Fields and Sinfin. These receptors are judged to be of low sensitivity.

Future Baseline

4.56 In the event that the Proposed Development does not come forward it is anticipated that the site would remain in agricultural use, albeit given that the site lies within the context of the built edge of Derby, and that the site and the surrounding land is allocated for development it is likely to come forward for development.

H5.0 Potential Effects

During Construction: Landscape Character

5.1 Construction activities are outlined in ES Chapter C. Without appropriate mitigation measures such as the adherence to a Code of Construction or a Construction & Environmental Management Plan, construction activities would lead to direct impacts and consequential effects on landscape features of the site that are proposed to be retained.

During Operation: Landscape Character

5.2 Without an appropriate design and mitigation strategy that respects and conserves the conservation landscape features of particular value, and provides compensatory landscape features, there could be marked long term effects upon the local landscape character and on localised landscape receptors within the site.

During Construction: Visual Amenity

5.3 Construction activities as outlined in ES Chapter C would lead to potential impacts and effects on visual amenity, primarily those localised receptors that have views of the site such as residents at Sinfin and Stenson Fields. This would include views of construction traffic and on-site demolition and construction activities.

During Operation: Visual Amenity

5.4 On completion of the Proposed Development there would be impacts upon views and effects to varying degrees upon visual amenity and visual receptors.

H6.0 Mitigation and Monitoring

Mitigation

6.1 Mitigation seeks to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects.

Mitigation by Design

6.2 The provision of green infrastructure is an integral part of the Proposed Development and is a primary mitigation measure (i.e. actions undertaken by the EIA process to influence the design and layout of the Proposed Development). Green infrastructure is network of multi-functional green space, which is capable of delivering a wide range of environmental and quality of life benefits.

6.3 For the Proposed Development this includes retained woodland, hedges and mature trees. It also includes new landscape planting, habitat creation and natural green space, as well recreational open space and walking and cycling routes. Landscape features within the site that are retained are identified on the Parameter Plan together with the proposed new green infrastructure. This includes a substantial area of green space, habitats and planting along the southern boundary of the site, and interconnected green corridors within the site.

6.4 The proposals include compensatory planting that seeks to mitigate for the loss and disruption of hedgerows and trees as a result of the Proposed Development. This includes the planting of species rich hedgerows and new broadleaved trees and woodland. This structural landscape framework, which will expand upon the retained hedges and trees, is identified on the Parameter Plan.

Additional Mitigation

6.5 Additional mitigation, or secondary mitigation, is beyond that of the design and layout of the Proposed Development. From a landscape and visual perspective, the following will be implemented.

During Construction: Construction & Environmental Management Plan (CEMP)

6.6 The CEMP will include a variety of measures to minimise impacts of the Proposed Development on the environment. In terms of landscape character this will include the protection of vegetation that is to be retained in accordance with BS 5837 Trees in Construction. With regards to visual amenity this will include the use of site hoardings to screen construction

activities, appropriate locations for site huts and compounds away from sensitive landscape and visual receptors, and strict measures for lighting.

During Operation: Landscape Management

6.7 Through the planning process/S106 agreement, measures will be put in place with regard to the approval and implementation of the new green infrastructure, as well as its on-going management. This includes the approval of reserved matters applications that address landscape design. To ensure that the green infrastructure becomes established and provides long term mitigation and enhancements it will managed in the long term, either by the local authorities or by a private management company. The details of this will be developed through the planning process.

Enhancements

6.8 As well as providing compensatory mitigation measures, the proposed green infrastructure provides long term benefits for landscape character, biodiversity and recreation. New woodland planting, for example, will help to 'soften' and filter views of the built development for visual receptors that have views of the Proposed Development, as well as providing new wildlife habitats and also assisting with climate change. New areas of open space will provide public access and space for recreation.

H7.0 Residual Effects

Assessment of Effects -Landscape Character

Introduction

7.1 The Landscape Effects Table (Appendix B) summarises the effects on landscape receptors as a result of the Proposed Development.

7.2 This chapter evaluates the level of effects during the construction phase and on completion of the Proposed Development (i.e. operation). It also considers the residual longer-term effects, (i.e. 15 years after the opening of the development) with the primary mitigation in the form of green infrastructure established and maturing. The assessment takes into account the susceptibility to change, landscape value and the magnitude of impacts. Effects take into account the Description of Development (ES Chapter C), the Parameters Plan and the application plans.

7.3 The following judgments consider that of the Proposed Development in isolation. Effects on landscape character from the Proposed Development *and* that of the wider Infinity Garden Village are explored later in the cumulative effects section.

Landscape Susceptibility to Change

7.4 The susceptibility to change is the ability of the landscape to accommodate change arising from the specific development proposal. In all landscapes there will be variances in susceptibility to change depending on the type of change that is proposed, and the receiving landscape in which the change would occur.

7.5 Through the baseline process and in evaluation of the change that is proposed it is concluded that this landscape is of medium susceptibility to change and has the ability in which to absorb the Proposed Development as presented by the Parameters Plan and as described by the Description of Development. Through the design and mitigation measures adopted, and the enhancement measures, it is considered that the longer-term effects would not result in an unacceptable harm on landscape character. The Proposed Development would be located within the context of the existing built up area of Derby, which is an inherent component of the landscape in which the site is located. It would also be well contained within the wider landscape such that impact (change) and adverse effects would be localised in extent.

Magnitude of Landscape Impact

7.6 As a consequence of the considerable overall scale of the National Character Area of the Trent Valley Washlands, the level of impact (change) arising from

the Proposed Development upon this landscape receptor is judged to be limited inconsequential and negligible in effect.

7.7 The same conclusions are reached for the extensive regional areas of the Floodplain Valleys LCA and Village Farmlands LCA of the EMLCA.

7.8 At a more localised level, change on the county characterisations of the Wet Pasture Meadows LCT and the Lowland Village Farmlands LCT is judged to be Low-Negligible as a consequence of the comparatively limited visual envelope of the site, and the fact the impact (change) would be restricted to comparatively small areas of these large receptors.

7.9 It is judged that a more pronounced magnitude of change would arise within the landscape of the site and its immediate context, as a result of the change from agricultural fields to built development. Given the general containment of the site with the wider landscape, the change – which is considered to be High-Medium - would be over a comparatively localised area and would be alleviated to some degree by the urban edge landscape setting within which the Proposed Development would occur.

Landscape Effects: During Construction

7.10 Construction works includes demolition, engineering, ground modelling, earthworks, changes in levels, storage of materials, compounds, machinery, vehicles and construction access roads, signage, site huts and lighting. There would be a direct impact upon the site with some indirect impacts on its immediate context. The level of effects would not be permanent. The overall construction programme to complete the Proposed Development is expected to be over at least a ten year period.

National Character: Trent Valley Washlands NCA

7.11 Effects would be localised to a small part of the Trent Valley Washland NCA which covers a substantial area of the landscape. The Proposed Development would be within that part of the NCA that is characterised by urban influences, such that the introduction of new housing, employment and road infrastructure would not be an uncharacteristic element within the context of this NCA. Effects are judged to be Negligible. Extensive areas of these landscapes receptors would not be impacted (i.e. changed). It is judged that there would be negligible effects on the adjacent Needwood & South Derbyshire Claylands NCA.

Regional Character: Floodplain Valleys LCA and Village Farmlands LCA

7.12 Effects on the Floodplain Valleys LCA and the Village Farmlands LCA are assessed as being Negligible. The Proposed Development would be within that part of the LCAs that are characterised by urban influences, such that the introduction of new development would not be an uncharacteristic element within the context of these LCAs. Effects would not be permanent and would be restricted to a comparatively small area of these receptors, that are of some considerable scale. Extensive areas of these landscapes receptors would not be impacted (i.e. changed).

County Character: Wet Pasture Meadows LCT and Lowland Village Farmlands LCT

7.13 Impacts through the construction process includes loss of habitats and disruption in landscape character and landscape features to accommodate infrastructure and built development. Existing landscape component within the site that are of particular value are retained. These would be appropriately and sensitively protected during the construction phases. The overall effects on these receptors is judged to be Moderate Adverse. These effects would be temporary in nature and restricted to a relatively small component of these large Landscape Character Types.

Application Site and Immediate Context

7.14 It is considered that a more marked direct effect would occur on the landscape receptor of the site and its immediate area as a result of the High - Medium magnitude of change (impact) of Proposed Development upon it.

7.15 The Proposed Development would result in change and disruption in local landscape character through the permanent loss of the site's agricultural fields and the disruption in landscape character. Whilst the construction of the Proposed Development would result in the loss of some trees and hedgerows, as well as breaks in the hedgerow network to accommodate the road network and infrastructure, those features that are considered to be of particular value, such as broadleaved woodland and high quality mature trees are retained, alongside a number of the site's hedgerows and wet ditches. Although the setting of these retained feature would inevitably be different, (i.e. they would be located within the setting of a new development as opposed to open fields), they would, nonetheless continue to function as wildlife corridors.

7.16 In order to provide appropriate mitigation during the construction phases, all works would be carried out in accordance with best practice procedures to minimise impacts on landscape character and landscape features. This will take the form of Construction & Environmental Management Plan (CEMP). The CEMP will provide effective, site-specific procedures and mitigation measures to monitor and control environmental impacts throughout the construction phase of the Proposed Development. It will ensure good working practices in line with appropriate standards for landscape character. This will include methods in which to protect landscape features (mature trees, hedgerows, watercourses and drains) during construction and adherence to accepted guidance to include BS 5837 Trees in Relation to Construction. This includes, amongst other things, protective fencing and signage.

7.17 The overall effects at the construction stage on the landscape character of the site and its immediate context is judged to be Substantial-Moderate Adverse. This is considered by the assessor of the chapter to be significant. Whilst there would be a level of harm these would be temporary in nature, and limited to a localised area of the landscape.

Landscape Effects: Operation

National Character: Trent Valley Washlands NCA

7.18 Operation effects on completion (and the residual effects at Year 15 after completion) on the NCA are considered to be Negligible given the overall scale of this receptor and the fact that impacts would be localised in extent to a small part of the wider NCA. The Proposed Development would be within that part of the NCA that is characterised by urban influences, such that the introduction of new development alongside the existing built-up area and the A50 road would not be an uncharacteristic element within the context of this NCA.

Regional Character: Floodplain Valleys LCA and Village Farmlands LCA

7.19 Operation effects on completion (and the residual effects at Year 15 after competition) on the LCAs are considered to be Negligible given the overall scale of these receptors and the fact that impacts would be localised in extent to a small part of these large LCAs. The Proposed Development would be within that part of the LCAs that are characterised by urban influences, such that introduction of new development alongside the built up area and the A50 road corridor would not be an uncharacteristic element within the context of these LCAs.

County Character: Wet Pasture Meadows LCT & Lowland Village Farmlands LCTs

7.20 There would be no impacts and effects on substantial areas of the Wet Pasture Meadows and Lowland Village Farmlands LCTs.

7.21 A relatively small area of these LCTs would be impacted. Effects on these LCTs is judged to be Moderate-Minor Adverse on completion as result of the magnitude of impact, the disruption in the landscape and the loss of vegetation. The residual effects (Year 15 after completion) would reduce to Minor Adverse on account of the benefits being delivered by the maturing green infrastructure framework. The Proposed Development would be within that part of the LCTs that are characterised by urban influences, such that introduction of built development would not be an uncharacteristic element within the context of these LCTs.

Application Site & Immediate Area

7.22 The site and the immediate context site is judged to be of medium landscape value and of medium susceptibility to change. On the basis of a well-planned green infrastructure strategy that includes mitigation through conservation, compensatory planting, and the delivery of enhancement measures, it is assessed effects on landscape character would not result in any unacceptable long-term landscape harm.

7.23 Primary design measures are imbedded in the design and layout of the Proposed Development. The proposals include the retention of the site's woodland, the majority of its hedgerows and mature trees. The site's drains and watercourses are retained, which includes the Barrow Drain. These landscape elements would be contained and protected within areas of green space that will provide appropriate 'buffers' between them and new development. They would form attractive elements of the detailed design.

7.24 To compensate for trees and hedges that are to be removed to facilitate the Proposed Development, the proposals include the planting of new broadleaved species rich hedgerows, woodland and trees, as we as delivery of multifunctional greenspace for biodiversity, recreation and health and well-being. It is considered that these measures provide appropriate mitigation for the disruption in the landscape as consequence of the Proposed Development.

7.25 The site's green infrastructure would be developed through the detailed planning stages, but it is expected to include various new habitats. This includes a substantial area of planting and green space forming a linear park along the southern part of the site. It is considered that the green infrastructure will provide an attractive setting for the development that expands upon the established landscape features.

7.26 A substantial area of Green Wedge is retained between the proposed new Link Road and the built edge of Sinfin. Through the green infrastructure proposals, long term benefits are provided for this part of the Green Wedge in terms of landscape character, biodiversity and recreation. This includes new planting and habitat creation, and ensuring that the Green Wedge is publicly accessible.

7.27 Impacts on landscape character and landscape features have been factored into the overall evaluation, alongside the proposed mitigation measures. It is assessed that effects on landscape character would be minimised by the design and mitigation responses adopted. Given the type and scale of change/impact on the receptor, it is judged that on the completion of the Proposed Development the operation effects would result in a Substantial-Moderate Adverse level of effect and significance upon the site and its immediate context. This is judged to a significant effect by the assessor. Over time, as the green Infrastructure matures and establishes, to include planting that provides compensatory measures, it is assessed that the level of effects and significance would diminish such that the long-term residual effects (15 years after completion) would be Moderate Adverse. These effects (and level of significance) would continue to lessen in the much longer term.

Assessment of Effects -Visual Amenity
Introduction

7.28 The Visual Effects Table (Appendix 6.2) provides an assessment of the visual effects on receptors as a result of the Proposed Development. The chapter evaluates the level of effects during the construction phase and on completion of the Proposed Development. It also explores the residual longer-term effects, (i.e. 15 years after the opening of the development), that takes into account the containment and filtering effects achieved by an establishing and maturing framework of planting.

7.29 The assessment takes into account the susceptibility to change, the value of views and the magnitude of impacts. Effects take into account the Description of Development (ES Chapter C), the Parameter Plan and the application plans.

7.30 The judgments in terms of the construction, operation and long-term residual effects only considers that of the Proposed Development in isolation. It does not take into account the effects on visual amenity resulting from the Proposed Development and the wider Infinity Garden Village. This is assessed later in the cumulative effects section.

Visibility Mapping

7.31 The representative Visual Envelope (VE) (Figure 8), which has been prepared through the fieldwork, identifies the potential area of the landscape in which the Proposed Development (this being the 'residential' and 'employment' development) is likely to be visible for those visual receptors that are within that area. It is recognised that some views of different parts of the Proposed Development may potentially occur outside the VE, although it is assessed that distance and intervening elements of landform, trees, hedges and buildings are likely to reduce the perceptibility of the Proposed Development. Similarly, some receptors within the VE that have views of the Proposed Development may experience different degrees of visibility such that views may be partial and glimpsed as they move through the landscape. Additionally, the amount of time over which the Proposed Development will be seen may also vary on account of intervening elements and the type of receptor. Highway users, for example, are moving through the landscape and typically experience fleeting views.

7.32 Through an examination of the landscape it is concluded that VE is comparatively limited in its overall extent as a result of the existing screening effects of landform to the south of the A50 and the to the west of Findern, the built up area of Derby (Sinfin and Stenson Fields) to the north, and by a line of tall poplar trees to the east. As a result, it is concluded that the VE is more or less limited to the landscape between the A50 and the edge of Sinfin and Stenson Fields. Opportunities in which to view the Proposed Development would be limited to those receptors within a localised area of the landscape.

Visual Receptors

7.33 The most sensitive receptors that would have a degree of change and effect would be residents and users of public rights of way/recreational routes. These are of high susceptibility to change and sensitivity.

7.34 The Visual Appraisal Plan (Figure 7) identifies the visual receptors that have been assessed, whilst the photographs (Figures 9-17) assist in the judgments on the level of change and effects. Impacts on landscape character and landscape features have been factored into the overall evaluation, alongside the proposed mitigation measures.

Visual Effects: Construction

7.35 Those visual receptors that are close to the site, such as residents on the edges of Sinfin and Stenson Fields, will experience close range views of construction activity. This would include views of construction vehicles and associated machinery, site compounds, earthworks and ground modelling etc. The provision of a CEMP will ensure that construction works are carried out in accordance with best practice procedures to protect and to minimise, as far as practicable, adverse impacts on visual amenity during the construction phases.

7.36 Effects on the various receptors during the demolition construction phase are contained within the Visual Effects Tables (Appendix 6.2). On account of the relatively restricted visual envelope, effects on visual amenity would be limited to a localised area of the landscape within the general confines of the A50 and the built edge of Derby at Stenson Fields. In summary, the most marked level of effect would be for those residents that lie opposite the site of the edges of Stenson Fields (to include those in the new development of Mulberry Place) that have close range views looking across the site. These effects are judged to be Substantial-Moderate Adverse, which are considered to be significant. None of the construction effects would, however, be permanent in nature.

Visual Effects: Operation

Residential Receptors and Settlements

7.37 The green infrastructure proposals includes the planting of new woodland, hedgerows and trees. Once established and mature these would combine with other features in the landscape to restrict, obscure and 'soften' views of the Proposed Development.

7.38 For residents on the southern edge of Sinfin and Stenson Fields the proposed green infrastructure of retained hedges that reinforced with new woodland planting would filter and 'soften' views, although new vegetation would take time to establish. Close range views would be afforded of the new development, albeit the extent of visibility for these receptors is dependant on building orientation, window positions and the degree of ground floor screening. It is considered that for operation (i.e. on completion) the level of effect and significance would be Substantial-Moderate Adverse, which is considered to be a significant effect by the assessor. In the longer term (i.e. the residual effects at 15 years after competition) it is considered that this will reduce to a Moderate Adverse effect/level of significance on account of the screening and filtering effects that would be achieved by the proposed

planting. These effects and level of significance would continue to lessen in the much longer term as the green infrastructure matures.

7.39 For the individual residential properties that lie in close proximity to the site at Arleston Farm, Ragley Boat Stop and Stenson Fields Farm there would be views of the development to varying degrees. Receptors within the Ragley Boat Stop would, for example, have views of the new A50 junction and the upper parts of the employment, whilst from Stenson Fields Farm views would be afforded of the residential development observed within the backdrop of the existing built up area.

7.40 It is considered that the operation effects and level of significance for these receptors would be Moderate Adverse, but would reduce in the longer term (i.e. the residual effects at 15 years after completion) to Moderate-Minor Adverse as visibility of the development would be filtered and softened by established and maturing green infrastructure

Public Rights of Way /Recreation Users

7.41 Users within the Sinfin Moor Park & Nature reserved would have no clear views of the Proposed Development on account of intervening vegetation within the Nature Reserve. Where Sinfin Moor Lane lies close to the edge of Sinfin there would be some glimpsed views of the Proposed Development, observed within the context of existing housing on the Sinfin that is already apparent. On certain parts of the lane there would also be some filtered views of the employment component. In conclusion, visibility of the development from Sinfin Moor Lane would be restricted to a few locations over comparatively short sections of the route. It is considered that the operation effects (i.e. on completion) and the residual effects for these for these receptors would be Moderate-Minor Adverse.

7.42 It is judged that there would be some glimpsed views of the Proposed Development from the Public Bridleway that lies to the east of the site. This would comprise views of the employment buildings. Intervening hedges and trees within the landscape would providing some filtering effects. It is considered that the operation effects (i.e. on completion) and the residual effects for these for these receptors would be Moderate-Minor Adverse.

Highway Users

7.43 These receptors are inherently of lower sensitivity as the moving through the landscape at comparative speed.

7.44 On Deep Dale Lane, Arleston Lane and Stenson Road, highway users would have clear and close-range views of the Proposed Development as they move through the site. They would experience changes in the character of the route between the A50 and the built-up edge of Derby, in that views of agricultural fields would be replaced by new development. These receptors are of lower sensitivity as they are moving through the landscape at speed. It is considered that the operation effects (i.e. on completion) for these receptors would be Moderate Adverse. In the longer term (i.e. the residual effects at 15 years after competition) it is considered that effects and level of significance would reduce to Moderate - Minor Adverse on account of the green infrastructure proposals that would be 'softening' and filtering views.

7.45 Along the A50 highway users are moving at speed and experience transient views of the landscape. With the Proposed Development in place there would be change in the view within this location as highway users would experience views of a new junction that includes new earthworks, slip roads, signage, and lighting etc. These views would be transient and fleeting for those that are passing the junction. For those leaving the A50 on the slip roads, receptors would have close range views of the proposed new roundabout as well as views of the Link Road residential and employment area. As these highway users experience junctions of this type along the route, such as at Junction 3 (Chellaston) and at Junction 4 (A38), it is concluded that views of the new junction would be not be an uncharacteristic element within the context of the highway corridor and within the overall experiences of these receptors. It is considered that the operation effects (i.e. on completion) for these receptors would be Moderate -Minor Adverse. In the longer term (i.e. the residual effects at 15 years after competition) it is considered that effects would reduce to Moderate -Minor Adverse

Visual Assessment – Night-Time

7.46 The site and the wider landscape is not subject to any 'dark sky' policies, as is the case with National Parks and AONBs. In terms of existing landscape character, the urban area of Derby imparts a level of sky glow on this landscape. The Proposed Development would embrace best practice guidance and standards on lighting installation to minimise sky glow. Whilst there would be levels of change, the lighting effects associated with the Proposed Development (light columns, vehicles lights etc.) would be localised in their extent and observed within the context of an urban edge landscape that includes a number of light sources. Best practice measures would be implemented in term of the design of lighting and columns to avoid unnecessary light spill and glare, whilst the green infrastructure framework of new trees and hedgerows planting will filter lighting.

Cumulative Effects

The Proposed Development & Infinity Garden Village

7.48 The Proposed Development forms part of the wider proposals of Infinity Garden Village which includes residential, employment, commercial, education and community facilities within the landscape to the east of the site, between Sinfin and Chellaston.

7.49 With the Proposed Development and the Infinity Garden Village project in place there would be an additional level of change and effect on landscape character and visual amenity through the construction and operational phase. This includes a high magnitude of change on the landscape of the site. Levels of adverse effects are expected to be limited to the urban edge landscape between the southern edge of Derby (Stenson Fields, Sinfin and Chellaston) and that of the A50, with effects on wider landscape and visual receptors being limited on account of the containment of the A50 corridor and the buitl up are of Derby.

7.50 It is expected that primary and secondary mitigation measures would be in place for the Infinity Garden Village. This is expected to include conservation of those landscape features of particular value, and compensatory and enhancement measures delivered by green infrastructure. It is expected that a CEMP would be in place to ensure good working practices for landscape character and visual amenity. It is anticipated that a Landscape & Ecological Management Plan (LEMP), or similar, would be produced to ensure that the green infrastructure is appropriately managed in the long term. This could form a planning condition or part of a S106.

7.51 Overall, it is judged that the cumulative effects of the Proposed Development coming forward in conjunction with the Infinity Garden Village project would result in varying degrees of change and effects on differing landscape and visual receptors. Given the capacity of this landscape to absorb change, and on the assumption that appropriate design and mitigation measures would be adopted to minimise effects, it is judged that the cumulative effects on landscape character and visual amenity are unlikely to result in any unacceptable long-term harm. Moreover, with development of this scale there are clear opportunities in which to deliver a comprehensive and significant amount of new green infrastructure that would provide biodiversity and recreational benefits.

H8.0 Summary & Conclusions

8.1 Impacts on landscape character and landscape features have been factored into the overall evaluation, alongside the proposed mitigation measures. It is assessed that effects on landscape character would be minimised by the design and mitigation responses adopted. It judged that on the completion of the Proposed Development the operation effects would result in a Substantial-Moderate Adverse level effect upon the site and immediate context. Over time, as the Green Infrastructure matures and establishes it is assessed that the level of effects and significance would diminish, such that the long-term residual effects (15 years after completion) would be Moderate Adverse.

8.2 On account of the relatively restricted visual envelope, impacts and subsequent effects on visual amenity would be limited to a comparatively localised area of the landscape between the A50 and the built edge of Derby at Stenson Fields and Sinfin. The most marked effects would be for residents of the edges of Sinfin and Stenson Fields that have close range views looking across the site. These effects are judged to be Substantial-Moderate Adverse, that would reduce in the longer term to Moderate Adverse on account of the screening and filtering effects that would be achieved by the proposed planting and green infrastructure.

8.3 The site and the immediate context site is judged to be of medium landscape value and of medium susceptibility to change. On the basis of a well-planned green infrastructure strategy that includes mitigation through new planting and the delivery of enhancement measures, it is assessed that impacts and adverse effects on landscape character and visual amenity would not result in any unacceptable long-term landscape and visual effects.

Table D0.1 Summary of most significant level of Landscape Effects

Receptor: **Application Site & Immediate Area**	Effects	Mitigation	Residual Effects
During Construction			
Application Site & Immediate Area	Substantial-Moderate Adverse (effects are Temporary)	CEMP & Primary Mitigation Measures. This includes appropriate protection of retained vegetation.	Substantial-Moderate Adverse level of effect/ significance (effects are Temporary)
During Operation			
Application Site & Immediate Area	Substantial-Moderate Adverse (year 1)	Primary mitigation measures are imbedded in the design and layout. This includes the retention of landscape features, compensatory planting, and new Green Infrastructure	Moderate Adverse level of effect/ significance (year 15)
During Decommissioning			
n/a	n/a	n/a	n/a

Table D0.2 Summary of most significant level of Visual Effects

[Please refer to Visual Effects table for full assessment of visual receptors]

Receptor	Effects	Mitigation	Residual Effects
During Construction			
Adjacent Residential Properties Stenson-Fields Sinfin	Substantial-Moderate Adverse level of effect/ significance	CEMP & Primary Mitigation Measures	Substantial-Moderate Adverse level of effect/ significance
During Operation			
Adjacent Residential Properties Stenson-Fields Sinfin	Substantial-Moderate Adverse level of effect/significance	Primary mitigation measures are imbedded in the design and layout. This includes the retention of landscape features and new Green Infrastructure that includes woodland planting and tree cover. Once established, these will 'soften' views of built development.	Moderate Adverse level of effect/ significance
During Decommissioning			
n/a	n/a	n/a	n/a

H9.0 Abbreviations & Definitions

CEMP	Construction & Environmental Management Plan ()
ES	Environmental Statement
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, third edition
IGV	Infinity Garden Village
LCA	Landscape Character Area
LCT	Landscape Character Type
LEMP	Landscape & Ecological Management Plan
LVIA	Landscape & Visual Impact Assessment
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
NCA	National Character
VE	Visual Envelope

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter I: Ecology

5th June 2019

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I1.0 Introduction

1.1 This Chapter of the Environmental Statement ("ES") has been prepared by FPCR on behalf of Hallam Land Management ("the Applicant"). This Chapter assesses the potential Ecology environmental impacts of the Proposed Development, and the likely significance of such impacts during its operational and construction phases.

About the Author

1.2 FPCR are a leading design and environmental company, with ecology being one of its core disciplines. The Ecology team comprises over 60 staff, many of whom are Full Members of the Chartered Institute of Environment and Ecology (CIEEM), encompassing expertise for a wide range of flora and fauna species and habitats, with many staff holding Natural England survey licences. Expertise includes assessing potential impacts on the significance of sensitive and complex ecological receptors including for EIA, Habitat Regulations Assessments (HRA), Management Plans, and Protected Species / European Protected Species licencing requirements. This experience is underpinned by sound understanding of current practice and the policy and legal context for biodiversity and nature conservation. Suitably qualified and experienced ecologists, including those who are members of CIEEM undertook all ecological survey work and technical report preparation associated with this chapter.

I2.0 Policy and Legislative Context

National

National Planning Policy Framework (NPPF)

2.1 Revised in February 2019, the NPPF sets out the Government's requirements for the planning system. Section 2 highlights the role that the planning system has in achieving sustainable development and states that at heart of planning there should be a 'presumption in favour of sustainable development'. It is however noted at paragraph 177, that this does not apply where there is likely to be a significant effect on a habitats site (including sites as described in paragraph 176), either alone or in combination, unless an Appropriate Assessment has concluded that there will be no adverse effect on the integrity of the site. Of specific relevance to this Chapter and assessment, Section 15 deals with Conserving and Enhancing the Natural Environment, providing guidance to the local planning authorities for both the development of their policies and their decision-making, including at paragraph 170:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

a) Protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
b) Recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland"; and;
d) Minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are resilient to current and future pressures."

2.2 Paragraph 175 highlights the principles which should be applied by local planning authorities in considering planning applications. In summary these are:

a) That permission should be refused if significant harm cannot be avoided, (through relocation to a less harmful location), adequately mitigated, or at the last resort, compensated.
b) Unless benefits clearly outweigh likely impacts both on a Site of Special Scientific Interest (SSSI) and the national SSSI network, development should not normally be permitted where it will have will have an adverse effect (individually or in combination with other developments) on a SSSI
c) Development should be refused where it results in the loss or deterioration of irreplaceable habitats (such as ancient woodland or

veteran trees, unless there are wholly exceptional reasons and a suitable compensation strategy

d) Development should be supported where its primary objective is to conserve or enhance biodiversity. Opportunity for biodiversity improvements within and around development should be encouraged, especially those which seek to secure measurable net gain.

Paragraph 180 also highlights the likely effects of pollution, including artificial light pollution which developments should seek to limit the impacts of on local amenity, intrinsically dark landscapes and nature conservation.

Local

2.3 The Site lies within the areas covered by both Derby City Council (DCC) and South Derbyshire District Council's (SDDC) local plans and policies. Also of relevance is the Lowland Derbyshire Biodiversity Action Plan (LDBAP), highlighting species and habitats of priority to the local area. Relevant extracts are provided below.

Derby City Local Plan - Part 1 Core Strategy

CP16 – Green Infrastructure

The Council will seek to maintain enhance and manage Derby's green infrastructure to ensure that everyone has access to high quality natural and semi-natural habitats, green space and sport and recreation facilities. The Council will ensure that land is available and managed to assist in adapting to and mitigating against climate change.

This includes: d) *identify Green Wedges as areas of land that define the City's neighbourhoods and seek improvements to enhance the wider green infrastructure network.*

CP17 – Public Green Space

The Council is committed to ensuring that everyone has access to a network of multi-functional public green spaces. It will seek to ensure that this network provides a diverse range of spaces to meet city-wide needs. Emphasis will be on reinforcing and improving this network to focus resources on improved quality and accessibility. This will be achieved by securing financial contributions from development to improve existing open spaces where these can meet the needs of that development or the provision of new public green spaces. Where new public green space is provided as part of the development, the Council will expect developers to provide for its ongoing, long term maintenance to an agreed standard.

CP18 – Green wedges

The council will continue to identify Green Wedges as areas of land that define and enhance the City's urban structure, maintain the identity of the different residential neighbourhoods, provide an uninterrupted link to the countryside, form part of the wider green infrastructure network and play an important role in climate change adaptation.
Where: j) ensure that development in or adjacent to a Green Wedge provides opportunities to improve the remaining green wedge.

CP19 – Biodiversity

Biodiversity and geodiversity assets across the City will be protected, enhanced, managed, restored, strengthened and created in a manner appropriate to their significance. The Council will:

a) Seek to avoid, minimise and mitigate the impacts on biodiversity and contribute to the City's ecological and geological resources resulting in a net gain in biodiversity over the plan period
b) Seek to reduce habitat and species fragmentation by developing a functional ecological network and maximising opportunities for restoration, enhancement, better management and connectivity of natural habitats, including links beyond the City
c) Ensure that development will protect, enhance and restore the biodiversity and geodiversity value of land and buildings
d) Support and contribute to the targets set out in the Lowland Derbyshire Biodiversity Action Plan for priority habitats and species
e) Work with partner organisations and neighbouring local authorities to ensure that Derby positively contributes to the wider, regional biodiversity networks
f) Work with relevant partner organisations to help meet the requirements of the Water Framework Directive to ensure that all surface and ground water bodies reach at least 'good' ecological status or 'good' ecological potential.

All development should ensure the protection, conservation, and where possible the enhancement of biodiversity. Designated international, national and local sites of biological or geological importance for nature conservation will be offered protection commensurate with their status within the established hierarchy.

Proposals for development in or likely to have an adverse effect (directly or indirectly) on a locally designated such as Local Nature Reserves, Local Wildlife Sites, local geological site, and/or ancient woodlands, veteran trees and hedgerows or wildlife corridors priority habitats or species will only be exceptionally permitted where:

1) *They cannot be located on alternative sites that would cause less or no harm*
2) *The benefits of the development clearly outweigh the impacts on the features of the site and the wider network of natural habitats, and*
3) *Adequate mitigation or as a last resort, compensation measures are provided.*

Where development proposals have the potential to impact a natural heritage asset including where sites are derelict, vacant or previously developed, the Council will require a supporting ecological site assessment to be submitted in conjunction with the planning application, the Assessment should identify the nature and extent of any impact and mitigation measures that need to be taken.

South Derbyshire District Local Plan, Parts 1 & 2

Policy BNE3 Biodiversity

The Local Planning Authority will support development which contributes to the protection, enhancement, management and restoration of biodiversity or geodiversity and delivers net gains in biodiversity wherever possible by:

i) Protecting sites of International, European, National and

County importance, together with local nature reserves, from inappropriate development within and adjacent to sites;

ii) Delivering long term plans to restore the River Mease Site of Special Scientific Interest (SSSI)/Special Area of Conservation (SAC) to a more natural condition and improve water quality within Mease and other catchments failing to meet Water Framework Directive objectives.

iii) Developing and maintaining a District-wide ecological network of SSSI's and local wildlife sites together with corridors and stepping stones sites to support the integrity of the biodiversity network, prevent fragmentation, deliver ecosystem services and enable biodiversity to respond and adapt to the impacts of climate change.

iv) Supporting and contributing to the targets set out in the Lowland Derbyshire and/or National Forest Biodiversity Action Plan (BAP) for priority habitats and species

v) Protecting ancient woodland and veteran trees from loss, unless the need for, and benefits of, the development in that location clearly outweigh the loss

Planning proposals that could have a direct or indirect effect on sites with potential or actual ecological or geological importance including:

- *Internationally important sites;*

- *Nationally important sites (such as SSSIs)*
- *Sites of County importance (such as Local Nature Reserves, Local Wildlife Sites and Local Geological Sites)*
- *Ancient woodlands, veteran trees and hedgerows*
- *Priority habitats and species*

will need to be supported by appropriate surveys or assessments sufficient to allow the Authority to fully understand the likely impacts of the scheme and the mitigation proposed. Where mitigation measures, or exceptionally, compensation cannot sufficiently offset the significant harm resulting from the development and/or where the development can potentially be located on an alternative site that would cause less or no harm, planning permission will be refused.

Lowland Derbyshire Biodiversity Action Plan 2011-2020 (LBAP)

2.4 The LBAP is divided into eight individual Area Action Plans (AAP). The Site falls largely within the Claylands AAP, the habitat objectives for which are as follows:

1. *The primary habitat objective within the Claylands area is the maintenance, restoration and expansion of wetlands, hedgerows, grassland and parkland habitats ….*
2. *The secondary objective is to increase connectivity of semi-natural habitats to create larger habitat complexes using priority habitats wherever possible. New habitats, linking and extending existing networks will be key to achieving this objective.*

2.5 The site also falls within/adjacent to the Derby City AAP, with the following habitat objectives:

1. *The primary habitat objective within the Derby action area is the maintenance, restoration and expansion of any semi-natural habitat to achieve targets*
2. *The secondary objective is to increase connectivity of semi-natural habitats to create larger habitat complexes using priority habitats wherever possible. Habitat creation, through development, will be key to achieving this objective.*

2.6 Priority habitats and species (classified as primary, secondary or localised features) are then listed for each area, together with targets for maintenance, management, restoration or expansion. Table I1 indicates those of particular relevance (either known to be present or with the potential to be present now or following development) to the Site are highlighted in *italics*.

Table I1: Relevant local Priority Habitats and Species

Habitat / Species	Area	Classification
Lowland Meadows	Claylands Derby	Primary Secondary
Wood pasture and parkland	Claylands Derby	Primary Primary
Hedgerows	Claylands Derby	Primary Secondary
Ponds	Claylands Derby	Primary Primary
Floodplain grazing marsh	Derby	Primary
Lowland mixed deciduous woodland	Claylands Derby	Secondary Primary
Rivers and streams	Derby	Primary
Field margins	Claylands	Secondary
Wet woodland	Claylands Derby	Secondary Secondary
Lowland dry acid grassland	Claylands Derby	Secondary Localised
Lakes and canals	Claylands	Secondary Localised
Rush pasture	Claylands	Secondary
Traditional orchards	Claylands Derby	Localised Localised
Lowland swamp	Claylands Derby	Localised Secondary
Lowland fen	Claylands	Localised
Lowland mire	Claylands	Localised
Lowland heathland	Claylands	Localised
Lowland calcareous grassland	Derby	Localised
Green roofs	Derby	Localised
Dingy Skipper	Claylands	-
Great crested newt	Claylands Derby	-
Oak polypore	Claylands	-
Otter	Claylands Derby	-
Water vole	Claylands Derby	-
White clawed crayfish	Claylands Derby	-
White Letter Hairstreak	Derby	-

Legislative Context

2.7 The following UK legislation and European Directives afford protection to wildlife and, where appropriate, enable the provision of licences to allow derogation from the law including for development purposes in order to undertake otherwise lawful actions, have been used to inform this assessment:

- Natural Environment and Communities (NERC) Act 2006
- Wildlife and Countryside Act 1981 (as amended)
- The EC Birds Directive (Directive 79/409/EEC) as transposed into UK law by the Habitat and Species Regulations 2010 (as amended)
- The EC Habitats Directive (Directive 92/43/EEC) as transposed into UK law by the Habitat and Species Regulations 2010 (as amended)
- The Protection of Badgers Act 1992
- The Hedgerow Regulations 1997

I3.0 Assessment Methodology & Significance Criteria

Assessment Methodology

3.1 For the purposes of this chapter, the term 'Site' refers to all land within the red line boundary as shown in Figure I1. The term 'study area' relates to the areas covered by the ecological survey and desk-based study which varies as appropriate for the ecological feature being considered due to its sensitivity, size of home-range etc., as well as the nature of the predicted impacts. The study areas used for the desk study are defined below.

3.2 This Ecological Impact Assessment (EcIA) follows the standard current guidance in place at the time of writing in 2019, as set out by the CIEEM[i] and as recommended by NE.

3.3 The assessment involves the following key stages:

- identifying the zone of influence (study area) arising from the whole lifespan of the project;
- a background data search to obtain archival records of sites and species, and to gain information to focus the field surveys;
- identifying ecological features through field surveys;
- determination of the ecological value of ecological features;
- identification of the potential impacts and assessment of impacts on the integrity or conservation status of the ecological features;
- incorporation of ecological enhancement and mitigation measures to avoid or reduce impacts, and compensation measures to balance any unavoidable significant impacts; and
- assessment of the significance of any residual ecological impacts remaining after the implementation of mitigation and compensation measures.

Identification of the Study Area

3.4 In determining a study area, the CIEEM guidelines first consider 'important ecological features' (IEF), defined as those warranting detailed assessment (thus excluding any that are 'widespread, unthreatened and resilient to project impacts and will remain viable and sustainable'). They are expressed geographically (international, national, regional, county, local) and identified on the basis of expert judgement, including published information (for example designations, guidelines and scientific literature) and also – especially at the local level - that of experienced professionals (ecological facilitators and specialist consultees).

3.5 The zone of influence (also referred to as the study area) for the assessment (the area within which ecological features may be affected) was determined with reference to IEF on or around the site (including designated sites), the extent and nature of project activities liable to give rise to potentially significant impacts, any incidence of mobile or migratory species, seasonality of ecological features, and ecosystem functioning including interdependencies between ecological features.

3.6 On this basis the study area includes:

- the land within the boundary of the Proposed Development,
- ecological features adjacent to the Proposed Development (e.g. adjacent features or designated nature conservation sites) or close by (at distances increasing with their likely sensitivity to likely impacts),
- ecological features at moderate distances from the site but within normal ranging distances for certain animal species (e.g. ponds suitable for great crested newts *Triturus cristatus* within 500m); and
- sites at greater distances if they are important for species that might also depend on the site.
- In particular, scoping of the study area relied on consultation responses from consultees during the scoping exercise and on information gathered in the background data search, especially in respect of designated sites that may be remote from the site. Many of these were scoped out from the study area at an early stage, owing to the implausibility of effects on the ecological features for which they are designated (which ruled them out as important ecological features requiring detailed consideration, e.g. geological SSSIs). The study area can therefore be inferred from the site mapping in Figure I1.

Methodology for Baseline

Desk Study

3.7 The Site was originally surveyed in 2014 by a third party and whilst this has been superseded by more recent surveys by FPCR, the information nevertheless provides contextual background data and has been drawn on where relevant.

3.8 An ecological desk study was completed to collate current baseline data from statutory and non-statutory sources. The following data were gathered:

- Records of statutorily designated sites of international (Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites), national/regional (Sites of Special Scientific Interest (SSSI)), or local

importance (Local Nature Reserves (LNR)) within 10km, 2km and 1km respectively;
- Records of non-statutorily designated sites for nature conservation (Local Wildlife Sites (LWS)) within 1km of the Site;
- Habitats of importance for nature conservation including ancient woodland and Habitats of Principal Importance (HPI) under the NERC Act within or adjacent to the Site;
- Records of legally protected and notable species (including Species of Principal Importance (SPI)) under the NERC Act within 1km of the Site.

3.9 Further inspection, using colour 1:25,000 OS base maps and aerial photographs from Bing and Google were also undertaken in order to provide additional context and identify any features of potential importance for nature conservation in the wider countryside. Online resources, including data available through the Multi-Agency Geographic Information for the Countryside website (www.magic.gov.uk), were used to supplement baseline data and reviewed in order to gain an overview and identify features of interest in the wider landscape. The following groups were contacted:

- Derbyshire Wildlife Trust
- South Derbyshire Badger Group
- Derbyshire Amphibian and Reptile Group
- Derbyshire Bat Group
- The Derbyshire Ornithological Society

Field Survey

3.10 This section considers the field survey methods relevant to collection of baseline data. Field surveys were undertaken at the site. Aerial mapping was used to assist with habitat descriptions.

3.11 All FPCR survey methodologies used within this assessment followed published guidelines as accepted by statutory and non-statutory agencies, including Natural England (NE) and CIEEM. All surveys were undertaken by appropriately experienced and licensed surveyors and were undertaken at the appropriate time of year and weather conditions. Any constraints or limitations are identified further below.

3.12 Full methods for all of the survey types are provided in the technical appendices (Appendices I.1 – I.7). A summary of all surveys undertaken to inform this assessment is provided in Table I2.

Table I2: Survey methods and Timings

Survey Type	Summary of Survey	Date	Appendix
Desk study	Data search of records from the local record centre, and freely available data.	2016	I.1
Extended Phase 1 Habitat Survey and preliminary protected species	Identification of broad habitat types, features of interest and habitat suitability for protected or notable species. Survey of hedgerows.	March 2018 & April 2019	I.1
Bat Activity Surveys	Seasonal transects to assess the level of activity of commuting and foraging bats. Two transect routes were used on each occasion. Static bat detectors were also deployed, with two per transect route.	Sept; Oct 2016 & June/July; Sept 2017 & April; July; Sept 2018	I.2
Bat Roost Survey - Structures	The buildings within the redline (Ashlea Farm) were surveyed for evidence roosting bats internally and externally. Following this any buildings identified as Low, Moderate or High potential for roosting bats were subject to emergence and dawn re-entry surveys. Surveyors were positioned at pre-selected survey points so that potential bat roosting features were visible. Surveyors used bat detectors and MP3 recorders to record bat calls to allow analysis at a later date.	Aug & Sept 2018	I.2
Bat Roost Survey - Trees	All trees were assessed from ground level with the aid of binoculars for their potential (negligible, low, moderate, high) to support roosting bats. All trees of moderate or above potential which are subject to removal were aerially assessed for the presence of bats.	March 2018 & April 2019	I.1
Breeding Bird Survey	Three walked transects to assess breeding assemblage at the Site, including any notable species	June 2016; April; May; June 2018	I.3
Badger survey	Habitat assessment of the study area for its suitability for badgers, with locations and status of any setts and foraging activity identified.	March 2018 and April 2019	I.4
Water vole and Otter Survey	Surveys of suitable water courses, recording signs indicating a presence of these species were recorded. Habitat was classified as suitable, suitable (sub-optimal), or unsuitable.	Sept 2018	I.5
Reptile Survey	Strategic presence/absence survey of suitable habitat areas to establish use of site and assess any population size	May – June 2018	I.6
Amphibian Surveys	Ponds within 500m (where access granted) assessed for their suitability for great crested newts using a Habitat	2016; March – May 2017;	I.7

Survey Type	Summary of Survey	Date	Appendix
	Suitability Index (HSI). Presence/absence surveys (Aquatic and/or eDNA) of suitable ponds and ditches on site and connected to it. followed by presence / likely absence surveys.	April – May 2018	
Arboricultural Assessment	Assessment in accordance with British Standard 5837:2012 'Trees in Relation to Design, Demolition and Construction - Recommendations'	2019	I.8

Ecological Evaluation and Assessment of Significance

3.13 Evaluation has been made in accordance with the CIEEM guidance for EcIA, which recognises that evaluation is a complex process and that a range of factors need to be considered in attributing value to ecological features. 'Important Ecological Features' (IEF) are identified, which are both potentially to be affected and considered important. If features are not to be affected, detailed assessment is not necessary because they are widespread, unthreatened and resilient to impacts, and will remain viable and sustainable.

3.14 The importance of any existing designations (e.g. SSSI, LWS, Red Data species etc) provides the starting point for identifying IEFs since such designations embody a wide range of established knowledge and reflect consensus views about what is important.

3.15 CIEEM guidance states that "*Ecologists may identify features that are not included in lists of important sites or features, but considered important on the basis if expert judgement, eg, because of their local rarity or because they enable effective conservation or other important features".* Such judgements will include consideration of characteristics such as:

- Naturalness;
- Species that are rare or uncommon, either internationally, nationally or more locally;
- Ecosystems and their component parts, which provide the habitats required by the above species, populations and/or assemblages;
- Endemic species or locally distinct sub-populations of a species;
- Habitat diversity, connectivity and/or synergistic associations (e.g. networks of hedgerows and areas of species-rich pasture that provide important feeding habitat for a rare species such as greater horseshoe bat);
- Notably large populations of animals or concentrations of animals considered uncommon or threatened in a wider context;

- Plant communities (and their associated animals) that are considered to be typical valued natural/semi-natural vegetation types – these will include examples of natural species-poor communities;
- Species on the edge of their range, particularly where their distribution is changing as a result of global trends and climate change;
- Species-rich assemblages of plants and animals;
- Ancient features that cannot easily be re-created; and
- Typical faunal assemblages that are characteristic of homogenous habitats.

3.16 The ecological features that may be affected by the Development 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. An assessment of the nature conservation importance of features (sensitivity) has been made following the criteria suggested by CIEEM as follows: International, National, Regional, County and Local as described at Table I3. Features with a value of Local (Low) or above were considered to represent IEFs. Features not meeting the criteria for IEFs are those that have been classified as having either less than Local or Negligible ecological importance. These features are excluded from further assessment given that impacts on such features are considered insignificant regardless of nature or magnitude of the potential impact.

Table I3: Geographic Frame of Reference and Definition of Sensitivity

Sensitivity	Typical descriptor
International / National (High)	High importance and rarity, international/national scale; limited potential for substitution
Regional / County (Medium)	High to medium importance and rarity, regional or county scale, limited potential for substitution
Local (Low)	Low importance and rarity district local scale
Negligible	Very low importance and rarity, below local scale

3.17 Describing and taking into account the embedded mitigation, the potential effects arising from the construction and operation of the Proposed Development are identified.

3.18 The likelihood that a change / activity will occur as predicted has a degree of confidence assigned (i.e. certain, near certain, probable, unlikely, extremely unlikely). Where there is an impact on an important ecological feature, the change / activity can result in a positive or negative impact. Other parameters used to describe an impact upon an ecological structure or function are the extent, size, duration, reversibility and frequency of the affect. The CIEEM

Guideline state in broad terms, significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution). The magnitude of the effect prior to and post mitigation is addressed as set out in Table I4.

Table I4: Definition of Magnitude of Impact

Magnitude	Typical criteria descriptors
High	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements such that post development character/composition/attributes will be fundamentally changed (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Medium	Loss or alteration of resource to one or more key elements of the baseline conditions such that post Development are materially changed, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Low	Some measurable change in attributes, quality or vulnerability and shift form base line, but not material; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. Underlying character/composition/attributes of baseline will be similar to pre-development circumstances (Adverse).
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	Very little change from baseline conditions, barely distinguishable minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).

3.19 The ecological significance of the impacts has been assessed, based upon the likely effect on the structure, function or conservation status of each feature. The assessment of impact significance has identified the need for mitigation and residual impacts have been assessed.

3.20 The significance of likely effects is determined by identifying those ecological features likely to be affected. The features have been evaluated to identify the important ones, i.e. those which, if their level of importance reduced, national or local policies (or in some cases legislation) would be triggered. The nature

of the individual and combined impacts have been characterised on each important feature, to determine the longevity, reversibility and consequences for the feature in terms of ecological structure and function. Where it is concluded that an effect would be likely to undermine the conservation objectives of an IEF, it will be described as significant. In accordance with CIEEM guidelines, an effect may be significant at any geographical scale, i.e. from local to international.

3.21 The overall level of effect of each effect is determined qualitatively by comparing its magnitude against the value (sensitivity) of the IEF. For this purpose, magnitude of effect is expressed synoptically on a scale of high, medium, and low (or negligible, if the magnitude of effect would have no perceptible effect on the integrity of the IEF). The value (sensitivity) of the affected IEF (already assessed on a geographical scale) can similarly be expressed as negligible, low, medium, high (or combined classifications, such as low/medium) as shown in Table I5 below. The level of the effect is identified on a scale of negligible, minor, moderate and major. Where the matrix below identifies a combined classification, professional judgement is used to choose one classification or the other, or a "mid" level between the two significance levels is assumed.

Table I5: Significance Matrix

Magnitude of Change	**Sensitivity of Receptor**				
		High	**Medium**	**Low**	**Negligible**
	High	*Major*	*Major*	*Moderate*	Negligible
	Medium	*Major*	*Moderate*	Minor to Moderate	Negligible
	Low	*Moderate*	Minor to Moderate	Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

3.22 Whether an effect is direct or indirect is considered. Residual and cumulative impacts are also considered:

- Direct impacts are changes directly attributable to a defined action of the Proposed Development such as the physical loss of a habitat or the immediate mortality of an individual of a particular species
- Indirect impacts are attributable to an action which affects ecological resources through effects on an intermediary ecosystem, process or receptor, e.g. a loss of food resources for a species downstream of a site due to fish-kill by polluted runoff entering a river.

- After assessing the impacts of the proposal all attempts should be made to avoid and mitigate ecological impacts. Once measures to avoid and mitigate ecological impacts have been finalised, assessment of the residual impacts should be undertaken to determine the significance of their effects on ecological features.
- Cumulative impacts are the collective effects of changes that may be insignificant individually but in combination, often over time, have the potential to be significant. Intra project ("in combination") cumulative effects (i.e. cumulative effects on the same receptor from different aspects of the Proposed Development are assessed for example bats could be affected by noise, and lighting; and so are intra-project effects – i.e. minor effects on a receptor from several projects.

Significance Criteria

3.23 Describing and taking into account the embedded mitigation, the potential effects arising from the construction and operation of the Development are identified. The likelihood that a change will occur as predicted has a degree of confidence assigned indicated at Table I6.

Table I6: Levels of confidence

Level of Confidence	Estimated Probability
Certain / Near-Certain	Probability estimated at 95% chance or higher
Probable	Probability estimated below 95% but above 50%
Unlikely	Probability estimated below 50% but above 5%
Extremely Unlikely	Probability estimated at less than 5%

3.24 The impacts of the Development have been predicted taking into the account the different stages and activities within the development process. Impacts have bene considered both individually and cumulatively. When describing impacts, the following parameters and terms in Table I7 below are used.

Table I7: Characteristics and parameters of effects

Characteristic / parameter	Definition
Positive or Negative	Whether the impact has a positive or negative effect
Extent	The area of which the impact occurs
Magnitude	The size or amount of an impact
Duration	The time for which the impact is predicted to last prior

Characteristic / parameter	Definition
	to recovery or replacement of the resource or feature
Reversibility	Whether the impact is permanent (i.e. irreversible) or temporary (i.e. reversible)
Timing and Frequency	How often the impact occurs (e.g. repeated noise from piling work) and when it occurs (e.g. vegetation clearance undertaken outside of the bird breeding season.

Consultation

3.25 A comprehensive suite of surveys appropriate to the habitats recorded was undertaken and no detailed scoping undertaken.

Assumptions and Limitations

3.26 No particular constraints or limitations to the surveys were identified that would significantly affect results. Technical appendices highlight any small scale limitations at the time of survey.

3.27 A change to the final red line in April 2019 to increase the site area, necessitated additional surveying at this time and the new areas were subject to an Extended Phase 1 and preliminary protected species surveys, badger survey and ground level assessment of trees. Where detailed surveys in this area could not be undertaken due to seasonal constraints, other existing survey data for the wider area available to the Applicant was used to supplement the existing data. Whilst this may mean that small areas fall outside both data sets, given the similarity of habitats recorded in the revised area to previously surveyed areas, this is not considered a constraint.

I4.0 Baseline Conditions

Designated Sites

4.1 No statutory sites of international conservation importance are located within 5km of the Site boundary.

4.2 Boulton Moor Site of Special Scientific Interest (SSSI) lies within 2km of the Applications. This SSSI is designated at a **national** level for its geological interest, rather than biodiversity interest. Sinfin Moor Local Nature Reserve (LNR) lies within 500m of the red line at its north western extent and supports broadleaved woodland, scrub, grassland (semi-natural and re-seeded meadow) and ponds, with an extensive hedgerow network. A range of notable invertebrates, bird species and amphibians occur. Further to the north, Sunnydale Park LNR comprises broadleaved and wet woodland, semi-natural grassland and ponds. The sites are publically accessible, with Sinfin Moor having an active Friends group. Both LNR are of **county** level value.

4.3 Six Local Wildlife Sites (LWS), six potential LWS (pLWS) of **county** value and two sites of interest (SoI) of **local** value are located on or within 1km. Table I8 indicates the sites and their proximity to all designated sites.

Table I8: Designated Sites within Zone of Influence

Site Name	Designation	Relative Location	Size (ha)	Reasons for Designation
Sinfin Moor Lane Stream	LWS	300m north-east	1.6147	Water vole
Sinfin Moor Park	LWS	300m north-east	7.3227	Habitat mosaic
Sinfin Moor Lane Meadows	LWS	565m north-east	9.1232	Habitat mosaic
Hell Meadow Wood	LWS	230m north-west	10.1227	Secondary broadleaved woodland
Arleston Canal & Pond	LWS	400m south	3.8173	Habitat mosaic
Barrow Bridge Wet Woodland	pLWS	510m south-east	4.2277	Wet woodland
Trent and Mersey Canal	pLWS	435m south	19.3104	Standing open water
Stenson Junction	pLWS	435m south-west	1.3544	Semi-improved grassland
Kirby's Triangle	LWS	445m south-west	0.5118	Lowland swamp
Cardales Wildflower Meadow	pLWS	490m south-west	1.2357	None provided
Possible Extension to Kirby's Triangle	pLWS	550m south-west	1.0542	None provided
Possible Extension to Kirby's Triangle	pLWS	800m south-west	0.7643	None provided
Willow Wood and Drains	Site of Interest	On-site	0.71	None provided
Ash plantation	Site of Interest	320m west	1.83	None provided

Protected and Notable Species

4.4 Table I9 indicates the protected and notable species located within 1km of the Site.

Table I9: Notable and Protected Species Recorded within 1km of the Site Boundary

Name	Designation	Location
Common pipistrelle *Pipistrellus pipistrellus*	W&CA, NERC	Numerous records of foraging and commuting common pipistrelles were returned within 1km of the site boundary, the nearest of which is approximately 340m south of the site boundary (2011). No records of roosts were returned.
Soprano Pipistrelle *Pipistrellus pygmaeus*	W&CA, NERC, LBAP	Numerous records of foraging and commuting common pipistrelles were returned within 1km of the site boundary, the nearest of which is approximately 550m south-west of the site boundary (2012). One record of a small roost was returned approximately 475m north-east of the site boundary (2013).
Unidentified Pipistrelle Bat *Pipistrellus sp*	W&CA, NERC	Two records were returned within 1km of the site, the nearest of which was approximately 980m south-west of the site boundary.
Brown Long-eared Bat *Plecotus auritus*	NERC, W&CA, LBAP	Several records of brown long-eared droppings were returned within 1km of the site boundary, the nearest of which was approximately 475m south-west of the site boundary (2012).
Unidentified *Myotis* sp.	NERC, W&CA, LBAP	Two records were returned located approximately 420m and 750m south-west of the site boundary (2015). No details about these records were provided.
Whiskered Bat *Myotis mystacinus*	W&CA, NERC	A single record was returned approximately 1km north of the site boundary (2010).
Whiskered Bat *Myotis mystacinus* / Brandt's Bat *Myotis brandti*	W&CA, NERC	A record of a roost was returned from the main farmhouse of Ashlea Farm within site boundary (2005).
Water Vole *Arvicola amphibius*	W&CA, NERC, LBAP	Several records returned within Sinfin Moor Lane Stream LWS the nearest of which is approximately 100m east of the site boundary (2000) and a record returned within Stenson Bubble Marina approximately 280m south (2007).
Brown Hare *Lepus europaeus*	NERC, LBAP	One record returned approximately 950m south-west of the site boundary (2016).
Yellowhammer *Emberiza citrinella*	NERC, LBAP	Two records returned, one of which was located approximately 40m north of the site boundary (unknown date) and the other record was located approximately 1km north-east of the site boundary (2000).
Song Thrush *Turdus philomelos*	NERC, LBAP	Several records returned within 1km of the site boundary, the closest of which was located approximately 335m north of the site boundary (2002).
Reed Bunting *Emberiza schoeniclus*	NERC, LBAP	One record returned approximately 445m north-east of the site boundary (2010).

Key LBAP – Local Biodiversity Action Plan. NERC – Natural Environment and Rural Communities Act 2006, W&CA – Wildlife and Countryside Act 1981.

Field Surveys

4.5 The Site is dominated by intensively managed habitats associated with farming, with smaller areas of more semi-natural habitats, scattered trees and linear features.

Trees

4.6 Individual trees occur largely as standards within hedgerows, although a small number are scattered within fields in the south west of the site and north of Ashlea Farm. Trees include a mix of species including mature oak, ash and crack willow. A number of mature crack willow exhibit features which are typical of veteran trees. The mature tree resource on site is assessed as being of **local** nature conservation value and sensitivity. The Arboricultural Assessment at Appendix I8 provides a detailed assessment of trees, tree groups and condition.

Semi-natural broadleaved woodland

4.7 This comprises a small area of woodland forming part of the Willow Wood and Drains SoI with a canopy dominated by crack willow above a fairly dense understorey of scrub with occasional regenerating oak and the ground flora is consequently limited in both extent and diversity. Dead occurs as an integral part of the woodland as recumbent trees, dead branches and deadwood piles. Given its designation, the woodland is accorded **local** nature conservation interest and sensitivity, although it is small in extent and not particularly diverse or representative of good quality broadleaved woodland.

Plantation broadleaved woodland

4.8 Located in the south east of the site along the A50, this linear habitat is small and immature, although supported a fairly diverse range of native species in its canopy. Both understorey and ground flora were of limited diversity. This woodland is of **negligible** value and sensitivity, as immature created habitat.

4.9 The eastern boundary comprised a belt of plantation woodland mainly comprising mature hybrid black poplars, continuing beyond the site and linking with the habitats to the north at Sinfin Moor LWS, this is likely to function as a habitat corridor for a range of fauna and is assessed as being of **local** value and sensitivity.

Scrub

4.10 Localised occurrences of scrub were scattered throughout, with an area of dense bramble scrub in the south. Scrub is of **negligible** value and sensitivity as a result.

Improved grassland

4.11 Heavily grazed improved grassland was extant in the south east. Dominated by a few coarse grasses, with limited herb interest and typical of nutrient input it is of **negligible** value and sensitivity.

Species-poor semi-improved grassland

4.12 Located in the east of the site and adjacent to Deepdale Lane and west of the broadleaved woodland, compartments were dominated by coarse grasses, with low numbers of common herbs and scattered stands of tall ruderal species This habitat is of **negligible** value and sensitivity due to lack of botanical diversity and management.

Marshy grassland

4.13 This habitat was recorded within a species poor grassland compartment, dominated by soft rush *Juncus effusus* and with coarse grasses and limited herbs associated. Occasional pooling ephemeral water was considered likely (see below) within it. Again given its small size and limited diversity it is of **negligible** value and sensitivity.

Standing water

4.14 Four small ponds and five ditches (largely associated with hedgerows) were extant within the Site as described in Table I10.

Table I10: Pond and Ditch descriptions

Pond / Ditch	Description
P1	Small ephemeral pools within marshy grassland, devoid of vegetation within them
P2	Duckweed covered feature adjacent to hedgerow
P3	Within broadleaved woodland, with duckweed and floating sweet grass and surrounded by bramble scrub
P4	Devoid of vegetation other than common duckweed
D3	Water to c10cm deep. No marginal/aquatic vegetation. Himalayan balsam present.
D5, D8, D12, D29	Water <5cm deep. No marginal/aquatic vegetation.

4.15 All were considered to be of **negligible** value and sensitivity as a result of their poor quality and lack of aquatic flora.

Running water

4.16 Seven ditches and drains supported running water at field boundaries, sometimes associated with hedgerows.

Table I11: Ditches and Drains with running water

Ditch	Description
D1-D3	The continuation of a single ditch, D1 supported shallow water with no aquatic or marginal vegetation. D2 was up to 10cm deep and supported common reed *Phragmites australis*. D3 was wider, being c2m wide and up to 50cm deep, supporting bulrush and links with Sinfin Moor Lane Stream LWS.
D6	Flowed east. No vegetation. <5cm water.
D7, D9-D11	Part of the Barrow Drain. Flowing east with c5m. D7 had dense common reed. Otherwise all devoid of vegetation.
D27	Part of the Willow Wood and Drains SoI. Up to 50cm water at western end, c5cm at east. Flowed east. Limited vegetation.
D28	C50cm in depth, largely absent of vegetation. Flowed east, where water depth decreased. Forms part of Willow Wood and Drain SoI.

4.17 As a smaller ditch D6 is considered to be of **negligible** value and sensitivity. D3, D7, D9, D10, D11, D27 and D28 are all larger drains, forming part of a drain network which flows through the site and beyond connecting with the LWS sites to the north and east, providing a movement corridor for fauna through the site, although none are of inherent botanical value in themselves. As such these are considered to be of **local** value and low sensitivity.

Arable

4.18 This habitat dominated the Site. Fields had limited margins, typically no more than 1-2m wide, supporting species poor grassland and ruderal species, typically associated to nearby agricultural management practices and disturbance. Fields and margins are of **negligible** value and sensitivity.

Hedgerows

4.19 A total of 60 hedgerows form the majority of field boundaries. Predominantly comprising native species they are classified as HPI under the NERC Act. None however are species rich, with most being species poor, dominated by one or two species only, and none are assessed as being Important under the Hedgerow Regulations 1997. Twenty-five are considered to be of non-statutory nature conservation priority under the Hedgerow Evaluation and Grading System (HEGS)[ii], scoring grade 2 or above. As a whole the hedgerows

provide a good network across the more intensively managed farmland for movement and dispersal of fauna and is of **local** nature conservation and low sensitivity.

Dry ditches

4.20 Dry ditches were largely associated with hedgerows and field boundaries, vegetated by coarse grasses, ruderal herbs and scattered bramble scrub and are of **negligible** value and sensitivity.

4.21 Ditches D24 and D25 fall within the Willow Wood and Drain SoI, although of limited value themselves are assessed as having **local** value within the context of this designation.

Other habitats

4.22 Buildings and associated hardstanding occur at Ashlea Farm. These have **negligible** botanical value and sensitivity.

Invasive Species

4.23 Himalayan balsam, listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), was recorded in ditches D6 and has **negligible** value and sensitivity.

Bats

4.24 The woodland, ponds, ditches, scrub and hedgerows provide scattered and linear features of interest to foraging and commuting bats species across intensively managed farmland of lesser value for bats. The site has a degree of isolation from more suitable habitats, with road infrastructure and existing built development limiting movement beyond the site particularly to the north west, west and south.

4.25 Transect and static detector activity surveys indicate relatively low levels of activity across the site, with mainly common and widespread bat species recorded, predominantly common pipistrelles, soprano pipistrelles, with noctules, unidentified *Myotis sp* bats and unidentified *Nyctalus sp* bats. Levels of activity recorded along hedgerow corridors in the central section of the site, which connect to the small area of semi-natural broadleaved woodland suggest this area provides greater importance in the context of the site as a commuting and foraging resource for the local bat population.

4.26 Thirty-five trees were considered to offer bat roosting potential, the majority of which were assessed in accordance with current guidance as having moderate suitability for roosting bats.

4.27 The only notable bat species recorded during the surveys was a single registration recorded of a single Nathusius' pipistrelle during September. This species is widespread but rare across the UK, most commonly encountered on migration in late summer/autumn although some do remain all year and breed in the UK. The September timing of this record combined with only a single recorded registration recorded suggests it is very likely that this was a commuting individual which had remained resident in the UK. The level of activity associated with this species is consistent with its known abundance at a regional and national scale and is not considered to be significant.

4.28 Overall based on the abundance, species and activity recorded at the site, it is assessed as being of no more than **local** value to bats.

4.29 Buildings at Ashlea Farm provided some potential for roosting bats within the main farm brick built house. Other outbuildings and barns of varying construction and style provided no suitability for roosting bats. Desk study records indicate the previous presence of a Brandt's/Whiskered bat roost at the Farm in 2010. Emergence surveys at the farmhouse recorded no bats emerging from or entering the building and no roost is considered to be present. All buildings at Ashlea Farm are assessed as having **negligible** value to this group.

Breeding birds

4.30 Habitats within the site provide potential habitat for a range of urban edge, farmland and woodland birds, with shelter, foraging and nesting opportunities within the woodland and hedgerows. Dependent on cropping type, arable land provides potential habitat for ground nesting birds. A total of 47 bird species were recorded within the survey area during the 2018 breeding bird survey, 18 of which were considered notable. Seven species were confirmed as breeding within the survey area including the notable mistle thrush *Turdus viscivorus* and dunnock *Prunella modularis.* Sixteen species were considered probable breeders, including the notable skylark *Alauda arvensis,* willow warbler *Phylloscopus trochilus,* song thrush, yellowhammer and bullfinch *Pyrrhula pyrrhula.* The remaining 24 species recorded were considered possible breeders (11) or non-breeders (13). Bull finch was additionally recorded within the employment application area in 2016.

Table I13: Protected or Notable bird species recorded in 2018

Species	Legal/ Conservation Status[iii]	Peak Count / No. of Survey Visits Recorded	Breeding status	Recent Status in Derbyshire[iv]
Mallard *Anas platyrhynchos*	Amber list	2/2	Non breeder	A common or abundant resident and winter visitor
Black-headed gull *Chroicocephalus ridibundus*	Amber list	5/1	Non breeder	An abundant winter visitor and passage migrant. A fairly common breeder in S and NW
Lesser black-backed gull *Larus fuscus*	Amber list	1 flyover / 1	Non breeder	A common summer visitor, passage migrant and winter visitor
Stock dove *Columba oenas*	Amber list	6 flyovers / 1	Non breeder	A fairly common resident
Kestrel *Falco tinnunculus*	Amber list	2 / 2	Possible	A fairly common resident and partial migrant
Skylark *Alauda arvensis*	Red list NERC SPI	8 + 4 flyovers / 3	Probable	A common resident and passage migrant
Willow warbler *Phylloscopus trochilus*	Amber list	2 / 2	Probable	A common summer visitor
Starling *Sturnus vulgaris*	Red list NERC SPI	2 + 2 flyovers / 2	Possible	An abundant resident, passage migrant and winter visitor
Fieldfare *Turdus pilaris*	Red list WCA Sch.1	37 flyovers / 1	Non breeder	A common winter visitor and passage migrant.
Song thrush *Turdus philomelos*	Red list NERC SPI	5 / 3	Probable	A common resident and partial migrant
Mistle thrush *Turdus viscivorus*	Red list	3 / 2	Confirmed	A fairly common or common resident
Dunnock *Prunella modularis*	Amber list NERC SPI	24 / 3	Confirmed	An abundant resident
House sparrow *Passer domesticus*	Red list NERC SPI	1 colony / 3	Non breeder	A common but decreasing resident

Species	Legal/ Conservation Status[iii]	Peak Count / No. of Survey Visits Recorded	Breeding status	Recent Status in Derbyshire[iv]
Meadow pipit *Anthus pratensis*	Amber list	3 + 1 flyover / 1	Non breeder	In lowlands an uncommon breeder but a common winter visitor passage migrant
Bullfinch *Pyrrhula pyrrhula*	Amber list NERC SPI	4 + 1 flyover / 2	Probable	A fairly common resident
Linnet *Carduelis cannabina*	Red list NERC SPI	28 + 28 flyovers / 3	Possible	A common resident and partial migrant
Yellowhammer *Emberiza citronella*	Red list NERC SPI	15 + 5 flyovers / 3	Probable	A common resident
Reed bunting *Emberiza schoeniclus*	Amber list NERC SPI	3 + 2 flyovers / 1	Non breeder	A fairly common resident and passage migrant

4.31 Assessment of the assemblage recorded against the published criteria for LWS selection in the Derbyshire Local Wildlife Site Selection Guidelines[v] indicates that the site does not meet the Threshold value for any criterion.

4.32 Farmland birds including skylark, yellowhammer and linnet and provided foraging for kestrel, reed bunting and meadow pipit were recorded using fields and their boundary habitats and the survey area is considered to be of **Local** level importance for its farmland bird assemblage.

4.33 The hedgerows, woodland, scrub and scattered trees on site supported a large range of widespread species typical of this habitat, with breeding and foraging opportunities for mistle thrush, dunnock, song thrush, bullfinch, willow warbler, starling and house sparrow. The survey area was considered to be of **Local** level importance for its hedgerow/woodland bird assemblage.

4.34 Seven species recorded were considered to be of at lefegast **Local** level nature conservation importance at the site.

Table I14: Nature Conservation Importance of Birds Recorded

Name		Status		Importance
		SPI	WCA Sch.1	
Red List				
Skylark	*Alauda arvensis*	+		Local
Mistle thrush	*Turdus viscivorus*			Local
Song thrush	*Turdus philomelos*	+		Local
Linnet	*Linaria cannabina*	+		Local

Yellowhammer	*Emberiza citrinella*	+		Local
Amber List				
Bullfinch	*Pyrrhula pyrrhula*	+		Local
Dunnock	*Prunella modularis*	+		Local

Badger

4.35 Potential habitat for badgers is widely present across the site, although much of this is of seasonal nature being arable, with more scattered permanent foraging areas within woodland and grassland habitats, connected via the hedgerow network. Locally, off-site habitats are likely to be of higher value, particularly to the north around the LNR. Several low status setts were recorded, largely in the east of the site, but also more centrally. Overall given the size of the site, activity suggests that the Site does not provide a significant or important resource for the local population and it is considered to be of **below local** value for this group.

Riparian Species

4.36 Drains and ditches within the Site have connections with the wider area, where water vole and otter have been recorded previously, water vole have additionally been recorded in the past within Main Drain in the east of the site. Despite the suitability, although not optimal, of a number of ditches and drains, no evidence of either species was recorded on site. The site is considered to be of **negligible** value to these species currently.

4.37 The ditches and drains provide no suitability for white clawed crayfish.

Great Crested Newts

4.38 Suitable terrestrial habitat was present on-site in the form of woodland, hedgerows, scrub and field margins which offer commuting, foraging and refuge/hibernation habitat. The majority of the site comprised arable land with improved grassland and semi-improved grassland also present which are of limited/negligible value to this species due to their poor structure and homogenous nature at this site. Aquatic survey of all on site ponds and ditches supporting standing water found GCN to be absent. Smooth newt and toad have been recorded. The site is considered to be of **negligible** suitability for GCN.

Reptiles

4.39 Habitats provide overall low suitability for reptile species, dominated by intensively managed compartments of limited suitability although the woodland, field margins, scrub, hedgerows and ditches, and marshy

grassland areas offered some suitable hibernation, commuting, foraging and refuge habitat for reptiles, particularly grass snake. No reptiles were recorded during surveys for these species and the site is considered to be **negligible** value to them.

Summary

4.40 Table I15 provides a summary of those features identified as being important within the zone of influence of the site.

Table I15: Summary of IEF

IEF	Context	Value	Application	
			Resi	Empl
Sinfin Moor Park LNR and LWS	Habitat mosaic with woodland, scrub, grassland and wetland.	County	X	X
Sinfin Moor Lane Meadow LWS	Habitat mosaic	County	X	X
Sinfin Moor Lane Stream LWS	Flowing water; water vole	County	X	X
Cuttle Brook LWS	Flowing water	County	X	X
Arlestone Canal and Pond LWS	Habitat mosaic	County	X	X
Barrow Bridge Wet Woodland pLWS	Wet woodland	County	X	X
Trent & Mersey Canal pLWS	Standing open water	County	X	X
Stenson Junction pLWS	Semi-improved grassland	County	X	-
Kirby's Triangle LWS and possible extension pLWS	-	County	X	-
Willow Wood and Drains SoI	Broadleaved woodland and flowing water (D28) onsite	Local	X	-
Ash Plantation SoI	-	Local	X	-
Semi-natural broadleaved woodland (Willow Wood)	Small extent of woodland, with connectivity in the form of hedgerows and ditches, although limited other semi-natural habitats in immediate area.	Local	X	-

Broadleaved plantation woodland	Linear planting belt dominated by hybrid black poplar, forming habitat corridor along eastern boundary	Local	X	X
Mature tree resource	Scattered throughout largely along hedgerows but also as individual standards. Provide habitat continuity over time and structural diversity.	Local	X	X
Running Water – D1, D2, D3, D7, D9, D10, D11, D27, D28	Larger drains and ditches on site and with some off-site connections of limited botanical interest, but provide wildlife corridors with links to LWS and other semi-natural habitats	Local	X	-
Hedgerow network	Species-poor native hedgerows but provide wildlife corridor network through site; S41 HPI; LBAP. Twenty-five of non-statutory conservation priority.	Local	X	X
Bats	Small numbers of six generally common and widespread species, of which 3 are S41 species. Site supports mainly linear and edge habitat, with western end partially isolated by surrounding road and built environment. Many trees provide potential roosting habitat. Better quality bat habitat to north.	Local	X	X
Breeding birds – general assemblages	Moderate diversity of farmland species in generally low numbers. Moderate diversity of hedgerow and woodland species. Includes notable breeders and probable breeders.	Local	X	-
Breeding bird - individual species	Seven species of individual note: skylark; Mistle thrush; song thrush; linnet; yellowhammer; bullfinch; Dunnock. Includes breeders and probable breeders.	Local	X	-

Future conditions

4.41 In the absence of the Development, it could be assumed that the site will continue to be managed as agricultural land and much of it would therefore experience limited change, continuing to support an overall low biodiversity value for wildlife across the managed habitats. Depending on management practices, ditches could become more overgrown initially with ruderal and coarse grasses and then with scrub, further decreasing the extent of flowing water and suitability for riparian species. Continued lack of management of ponds is also likely to lead to ongoing enrichment through agricultural practices, increased scrub development around margins leading to over-shading and a consequent long term decrease in quality. Unless managed as part of the farm practices, hedgerows would be expected to become increasingly outgrown with a consequent decrease in form and structure over time although would be likely to continue to have some value as habitat corridors at least in the short-medium term, until gaps start to lead to a discontinuous and fragmented line. Trees, in the continued absence of

management, would deteriorate in health and quality would be expected to decrease value over time, although in the short-medium term this might provide some increased potential bat roosting habitat. Woodland structure would be expected to deteriorate further as the scrub layer increases, reducing the ability for regeneration of standards and ground flora layer development. Grassland could become further dominated by ruderal and coarse grasses, further reducing quality.

I5.0 Potential Effects

5.1 The potential effects arising as a result of the development have been assessed with regards to the parameters plan and description of the development. The potential effects are based on the Development taking place with no mitigation other than the avoidance measures which have been integrated into the landscaping proposals described below. Residual effects, following the implementation of proposed mitigation are then assessed.

5.2 Effects associated with the construction of the new A50 Link Road are not addressed within the chapter, other than as a cumulative impact, and have been dealt with under a separate application and assessment.

Avoidance measures

5.3 From the outset, and following review of the ecological baseline type potential effects arising as a result of the design of the development have been reviewed in order that, where possible, potential effects can be avoided through the design process or through alteration to future on site working methods.

5.4 Design includes significant green infrastructure (GI) for which the Site's existing semi-natural habitats, including woodland, hedgerows and mature trees provide the framework, with the vast majority of these habitats to be retained as integral components within it. The GI provides the scope for the mitigation of any necessary losses, with new planting and habitats alongside the retained habitats, and will be as indicated by the Parameters Plan.

During Construction

Designated Sites

5.5 The following designated sites are within the zone of influence of Development and have the potential to be affected by works. All other sites are considered to be at sufficient distance that they would not be adversely affected by construction works.

Table I16: Effects on designated sites

Site	Potential Effect	Application	
		Residential	Employment
Sinfin Moor Lane Stream LWS	Habitat degradation and disturbance	X	X
Sinfin Moor Park LWS	Habitat degradation and disturbance	X	-
Sinfin Moor LNR	Habitat degradation and disturbance		-
Willow Wood and Drain SoI	Habitat loss; Habitat degradation and disturbance	X	-

5.6 Sections of Willow Wood and Drain SoI will be affected by new infrastructure associated with the residential application. The northern periphery of Willow Wood will be lost to accommodate a new road link between Wragley Way and Arleston Lane. Loss is certain, will be a low magnitude of change, permanent, occurring once during construction and is of **minor adverse** effect. The majority of the wood and SoI remaining intact and its overall value is unlikely to be adversely affected as result of the removal. The western and eastern extents of the drain (D28) are expected to be culverted below new roads. The drain supports limited aquatic vegetation, but may act as a wildlife corridor. Loss of these habitats for culverting is as above and is of **minor adverse** effect.

5.7 Construction works have the potential to adversely impact on the designated sites where these abut or are within the red line. Disturbance effects have the potential to adversely affect the site's habitats as follows through:

- Habitat degradation arising from dust and particulate deposition
- Habitat degradation arising from accidental ingress leading to physical damage
- Accidental pollution, including through sediment loading of water bodies

5.8 Ground clearance, including soil stripping and earth movements have the potential to lead to increase in airborne dust, particularly during dry weather periods, damaging vegetation and dependent fauna. The Institute of Air Quality Management have produced guidance on the assessment of dust deposition[vi]. This notes that sites such as LWS and LNR are classified as being low sensitivity to effects of dust deposition and states a maximum distance of risk at <50m and at a low level. Effects would occur upon only a small proportion of the designated sites and their associated habitats, with much of them remaining unaffected and are a low magnitude of change. Effects are likely to be temporary and periodic throughout the course of construction, only while works are within 50m of the designated sites. As such effects are considered to be **minor adverse** at a local level.

5.9 Without mitigation, retained vegetation could suffer from damage, including soil compaction and physical damage to vegetation along the edges of the designated sites arising from ingress of machinery and works into habitats, whilst construction works are in the vicinity of these sites and as such effects would be periodic. Physical damage can lead to the irreversible and long term deterioration of habitats. Not all the habitats within the designations would be affected and this would be a low magnitude of change for the designated site; these potential effects are assessed as being of **minor adverse** effect as a result.

5.10 Accidental pollution arising from site works in proximity to the identified designated sites has the potential to lead to effects on flora and fauna both within the immediate locality, but also downstream where a water course is affected, although effects would lessen with distance as pollutants became diluted. Effects would not be expected to adversely affect the whole designation and low magnitude of change and would be expected to be short term in nature, sporadic over the course of works and potentially reversible over time but are of **minor adverse effect.**

Habitat loss

5.11 Land take will inevitably lead to the permanent total or partial of loss of a number of habitats. For habitats which have not been identified as being IEF, effects are not considered significant and are not discussed further. The following IEF habitat loss, outside of the designated sites, is expected as a result of the proposals

Table I17: Effects on IEF habitats

IEF		Potential effect	Application	
			Residential	Employment
Mature Trees	8 trees and trees within 11 tree groups	Loss due to A50 and internal road construction;	x	-
		Loss due to A50 road construction	-	X
Hedgerows	H39; H37; H36; H40; H43; H35; H26; H25; H29; H22; H13; H14; H7; H16;	Partial loss/ breaching for internal road and footpath construction	X	-
	H53; H54	Potential for total or partial loss within development footprint	-	X
Ditches	D9;	Loss for internal road construction	X	-

5.12 Several trees are highlighted as being unsuitable for retention within the Arboricultural Assessment due to condition, although all could otherwise be feasibly retained within the design, including with appropriate management and any removal is not required for development purposes. The effect of any loss of these trees has therefore not been assessed.

Eight trees are to be lost, together with sections of tree groups with all other trees to be retained and incorporated. Full details of tree retention and loss are provided within Appendix I8.

Given the overall tree resource which will be retained within each application, loss of trees to development is **minor**.

5.13 No hedgerows will be totally removed as part of the residential application. Fourteen hedgerows will be breached or partially removed to accommodate internal roads or development plots within the residential area. Of these, eight are classified as having nature conservation priority under HEGS and all are S41 HPI. Loss of these sections is considered to be a low magnitude of change with much of the network unaffected. Loss is near certain and would be permanent, phased throughout the course of development and of **minor adverse** significance.

5.14 Design of the employment area has the potential to lead to the loss of two hedgerows, this would be medium-high magnitude of change, given only 3 hedgerows lie within this area, loss would likely be in a single event and would be permanent leading to **minor-moderate adverse** effect. This effect is not certain.

5.15 The construction of new roads for the residential application is likely to require the culverting of two sections of one ditch, D9, which supported no aquatic vegetation and the permanent loss of these habitats is a negligible magnitude of change and unlikely to affect the overall ditch quality. Effects of this would be **negligible.**

Habitat disturbance

5.16 All retained IEF within both application areas have the potential to be affected by construction works as described above for designated sites. Effects of dust deposition are considered to be **negligible;** effects of accidental pollution and physical damage are considered to be of **minor significance at a local level.**

Fauna

5.17 Table I18 describes the effects of habitat loss and disturbance on IEF fauna during construction.

Table I18: Effects on IEF fauna

IEF	Potential effect	Application	
		Residential	Employment
Bats	Severance of flight lines for works accesses	x	X
	Disturbance to foraging and commuting habitats from altered lighting	X	X
	Loss of potential roosts (7)	X	-
Birds	Loss of potential nesting habitat	X	X

Bats

5.18 For both applications, the creation of access routes through linear features will lead to the interruption of such features used for movement. Losses

associated with construction access are anticipated as being sufficiently small that most common bat species recoded at the site would cross these gaps to move around and through site to foraging and roosting habitats in the local and wider area. The retention of other linear and boundary features providing alternative flight lines in similar orientations further reduces these effects and loss at both the residential and employment areas is a low magnitude of change. Where construction occurs outside of daylight hours, the use of high intensity lighting has the potential to adversely affect the ability of bats to forage and move around the site. These effects would be periodic, short term and likely to be restricted to only part of the site at any one time.

5.19 Common and soprano pipistrelle comprise the majority of bats using the site. These are species which are typically more adaptable and are generally widespread species. Therefore it would be anticipated that these bats would be likely to adapt to changes in foraging and commuting habitats and effects would be unlikely to affect the Favourable Conservation Status (FCS) of the local bat population. Construction effects on foraging and commuting bats are considered to be short term and temporary and of **minor adverse** effect.

Seven trees with roosting potential are to be removed as result of development.

Eco Reference	Species	Roosting feature	Category
T2	Crack Willow *Salix fragilis*	1 x west facing vertical split approx. 2m high	Moderate
T5	Crack Willow *Salix fragilis*	1 x west-facing rot hole approx. 3m high	Moderate
T6	Crack Willow *Salix fragilis*	Vertical split in stem approx. 2-3m high	Moderate
T7	Crack Willow *Salix fragilis*	1 x south-facing vertical split approx. 1m high	Low
T8	Crack Willow *Salix fragilis*	1 x south-facing knot hole approx. 1.5m high	Low
T14	Crack Willow *Salix fragilis*	1 x west-facing knot hole approx. 5m high 1 x west facing horizontal split approx. 5m high 1 x branch split approx. 6m high 3 x broken branches approx. 5-6m high	Moderate
T16	Crack Willow *Salix fragilis*	1 x north-east facing branch split approx. 5m high Multiple patches of loose bark	Moderate

5.20 Loss of these potential roosts is considered **negligible** given the availability of other potential roosts which will not be affected. Further survey is scheduled to be undertaken during the summer 2019 to ascertain whether an actual roost will be affected by loss. Unless roosts are assessed at a local or above

level, loss of any roost would be unlikely to affect the FCS of the local bat population.

5.21 None of the buildings within the red line of this application provided potential for roosting bats and there will be no loss of potential roosting habitat at these buildings as a result of these proposals.

Breeding birds

5.22 Much of the woodland hedgerow habitat providing foraging and nesting habitat will be retained, with only a relatively small proportion lost, and a resultant low magnitude of change. This is expected to be in a phased nature, and not all potential habitats would be lost at the same time. Effects of this habitat loss on the woodland/hedgerow bird assemblage and individual woodland/hedgerow species and farmland species using these habitats is therefore considered to be **negligible.**

5.23 Potential breeding habitat for ground nesting species, such as skylark and loss of some ground foraging habitat for farmland species will be lost and is a high magnitude of change in the long term, although loss would be phased in nature and would not occur as single event. The site is located in similarly farmed landscape in the local and wider area. Boundary hedgerows and margins would be retained, retaining habitat for farmland species such as linnet and yellowhammer. Value of the site to farmland birds is variable and dependent on the current cropping regime. Effects on the notable breeding farmland assemblage and particularly skylark are anticipated as being of **minor adverse effect** as given the numbers recorded at the site (8 pairs), the overall conservation status of the wider population would be unlikely to be significantly affected by this loss.

5.24 Construction works in the vicinity of nesting birds can lead to desertion and abandonment of nests and dependent young, leading to reduced breeding success. The phased nature of the development, the availability of other suitable habitat both on and off site as well as the short term temporary nature of effects mean that it is unlikely that the status of any other local species using the site would be adversely affected as a result of disturbance effects and are considered **negligible.**

Operational effects

Designated Sites

5.25 Impacts on designated sites could arise from:

- Increased disturbance to a species as a result for residential development and recreational activity

- Damage to sensitive habitats as a result of increased recreational disturbance through fragmentation, disturbance, trampling, arson and eutrophication and;
- Airborne emissions from increased traffic associated with the development.
- Damage to habitats and species as a result of changed hydrological regimes

5.26 All designated sites within the area which have public access have the potential to be affected by effects relating to increased recreational disturbance as a result of the residential application.

5.27 The design includes significant areas of GI, easily accessible to the new community within the development, which will provide a variety of recreational opportunities and biodiverse habitats in closer proximity to the housing, to meet the majority of every day recreational needs. Willow Wood and Drains SoI will be incorporated into the GI, and an increase in use would be expected as it is currently not accessible. Effects are likely to be permanent, and regularly occurring across all accessible parts of the SoI. The habitats themselves are not particularly sensitive or diverse, and disturbance effects to habitats and species at the site are considered to be of **minor adverse significance.**

5.28 Habitats and species recorded at the closest sites at Sinfin Moor are also not of a highly sensitive nature. The LNR is already a well-publicised and publically accessible resource, managed by an active Friends group and subject to a management plan, including for access. It includes both maintained and less formal providing walking routes and it would be expected that this site would experience an increase in recreational access due to the organised facilities and activities available here. Given the extent of GI within the development area itself however, it is considered that this will reduce access every day pressures at the LNR/LWS and it is therefore considered that increases in recreational pressure at the Sinfin Moor designated sites will lead to **minor adverse** effects on these sites.

5.29 Sinfin Moor Lane Stream LWS adjoins the site to the north and is designated for supporting water vole. It has hydrological links to the site via the local ditch system and therefore could potentially be adversely affected by the proposed development, particularly if outfalls are proposed into it, affecting both habitat and water quality. Any effects arising from changes in water quality or flows could therefore affect the value of the stream to water vole lead could be a **moderate adverse effect** on the local water vole population.

Habitats

5.30 Once operational all new and retained habitats will be subject to long term increases in use by both the new community and the existing local community, with open access leading to habitat degradation, including the creation of desire line. In addition it can lead to the poor establishment of newly created habitats. This could lead to permanent **minor adverse effects,** across all retained and new habitats.

Fauna

Bats

5.31 Once operational there is the potential for indirect disturbance to bats through altered lighting regimes, increasing light pollution on new and retained foraging commuting and roosting habitat This has the potential to lead to changes in emergence and roosting behaviour and the ability for bats to move around the site to use suitable foraging habitat on and off site. Increased lighting could therefore lead to adverse effects on bats using habitats adjacent to the built development and access roads and lit pathways through the GI for both the residential and employment applications, although overall this would be a low magnitude for change with many areas unaffected. Effects would be of **minor adverse significance**.

5.32 New roads and junctions may lead to an increase in harm or mortality of bats where these breach new or retained foraging and commuting routes. Bat activity at the site was relatively low, and although the hedgerows where higher levels of use by bats was recorded will be breached, given the nature of the residential application, nocturnal use of roads is likely to be relatively limited and there will be a low magnitude of change, with alternative flight lines available. Effects of mortality are therefore considered to be **negligible** to maintaining the FCS of the local bat population. Whilst nocturnal activity may be higher dependent on the final nature of the employment application, existing linear habitats in the area are of lower suitability for commuting bats, and effects are also considered **negligible** to maintaining the FCS of the local bat population.

Birds

5.33 Once operational there is also the potential for disturbance to bird species using the Site's habitats as a result of increased disturbance and predation from domestic pets and corvids. Effects are considered to be **minor adverse significance.**

Cumulative Impacts

5.34 The Proposed Development forms part of the wider proposals of Infinity Garden Village (IGV) which includes residential, employment, commercial, education and community facilities between Sinfin and Chellaston, some of which has been partially built out. In addition a new link road to the A50 is proposed, extending north of the Proposed Development, the line of which is partially indicated on the Parameters Plan for this Application, where it bisects the Site between the residential and employment areas to join the A50.

5.35 Cumulative effects might therefore be reasonably expected as a result. Cumulative effects of the Proposed Development coming forward in conjunction with the IGV would result in varying degrees of change and effects on the identified ecological receptors.

5.36 Features of greater interest at the Proposed Development are to be retained and enhanced through both the design and mitigation measures as described.

5.37 Within the red line of the residential application, the A50 link road proposals will lead to the additional loss of a number of hedgerow sections, mature trees and ditches to be culverted which would otherwise be retained with the residential application to which this assessment relates.

5.38 It is anticipated that primary and secondary mitigation measures would be in place for the IGV and A50 link road to reduce any adverse effects on nature conservation and biodiversity arising from these developments to acceptable levels, including through appropriate design, with mitigation and compensatory measures where necessary leading to biodiversity enhancements. It is expected that a CEMP, or similar would also be in place to ensure good working practices for habitats and fauna and that a Green Infrastructure and Biodiversity Management Strategy or Plan, (or similar) would ensure that the green infrastructure is appropriately managed in the long term, delivered via a planning condition or as part of a S106.

5.39 The Site and surrounding areas to be developed are largely intensively managed farmland of limited ecological value. On the assumption that each proposed or anticipated forthcoming development incorporates appropriate mitigation to reduce effects, overall effects will be no greater than any individual effect identified for this Proposed Development and would be unlikely to result in any long-term significant harm for the vast majority of receptors.

5.40 However, loss of farmland at the Proposed Development would lead to minor impacts on breeding skylark at a local level which cannot be mitigated within the Scheme. The cumulative loss of the wider farmland habitats to the A50 and IGV, has the potential to result in a permanent, up to **moderate adverse effect** on breeding skylark.

5.41 Cumulatively, the ability to deliver a significant extent of new green infrastructure as a result of development at this scale, provides opportunity for integrated and diverse habitat creation and enhancement across the whole of the IGV, bringing biodiversity benefits to the local area. Up to **moderate positive effects** could be expected once the whole GI has successfully established and matured.

I6.0 Mitigation and Monitoring

6.1 The following covers specific mitigation measures aimed at reducing the level of any adverse effects which have been identified as potentially significant in the previous section. In addition, detailed measures are set out to ensure legal compliance, including for those species which have not been identified as IEF at the Site, but which nonetheless have legal protection to be considered. It is anticipated that final details of mitigation and enhancement would be agreed with the local planning authority and be delivered through appropriately worded planning condition and/or S106 legal agreement or similar.

During Construction

6.2 A Construction Environmental Management Plan (CEMP) or similar will be put in place to ensure best working practices are adopted during construction to ensure that impacts are reduced to an acceptable level. The contents of this will adhere to, and where necessary, provide further detail on any specific recommendations that are outlined for ecology and nature conservation below. In brief, it will identify any specific locations for the protection of ecological details and provide details of any avoidance or mitigation measures, including timings, working practices and barriers and signage. Roles and responsibilities with respect to nature conservation will be outlined, including for an Ecological Clerk of Works. It is anticipated that the need and content for a CEMP would be secured by condition. Given the time required to deliver the individual phases of the Development from the current supporting surveys, where necessary the CEMP will be informed by updated ecological surveys relevant to each phase of Development or species, applying the most recent ecological baseline to inform any changes to mitigation required at that time.

6.3 All construction works will adhere to the most current best practice recommendations and guidance in respect of all working practices, in relation to airborne particulates, accidental pollution and contamination, including erosion and sediment control which may arise as a result of works and materials storage. A remediation strategy to deal with pollution incidents will be provided where necessary. These measures will avoid, and where necessary reduce and mitigate, all pollution and contamination effects.

6.4 Suitable fencing and buffers, including as set out within an approved Tree Protection Plan or similar, CEMP and in accordance with current guidance such as BS 5837 Guide to Trees and Hedgerows in Relation to Construction 2014 will avoid the potential for accidental ingress, physical damage and pollution.

6.5 In addition to the above the following provides additional specific mitigation measures to be applied.

Designated Sites

6.6 No works will be undertaken within 5m of the Sinfin Moor Lane Stream LWS and Willow Wood and Drain SoI without a pre-commencement survey for the presence of water vole, which may be affected by works in order to avoid impacts or identify suitable mitigation necessary prior to commencement.

Habitats

6.7 The majority of habitats to be lost are not IEF and do not require direct mitigation. Design has avoided as much habitat loss of IEF as possible within the proposed GI. Overall the design of the GI will mitigate the small scale losses of IEF habitats identified through the provision of new native species hedgerows and broadleaved woodland, delivering significant biodiversity benefits as a whole above this.

6.8 Overall GI proposals will include a mix of public open space sports/play areas, allotments, flood attenuation and semi-natural habitats, integrated with and linked to the existing retained habitats at the Site, which will be restored and enhanced as part of the GI. GI will provide a habitat mosaic with enhanced habitat connections around the site. The main green space will lie along the southern boundary with smaller green ways east-west through the site, including along the line of the Barrow Drain and Willow Wood and Drain SoI. Green corridors will also provide habitat linkages north-south to link these areas. Flood attenuation habitats in the north of the site, adjacent to Sinfin Moor LNR, will create another area of semi-natural space, linked to the off-site habitats, with habitat links to the southern GI areas along the new A50 link road. Biodiverse habitats to be created will include new native broadleaved woodland and woodland edge habitats; scattered and dense scrub and individual trees, with species-rich native hedgerows. Grassland will include species-rich neutral meadow grassland (such as of a MG5 Cynosurus cristatus-Sanguisorba officinalis type), tussock and wet grassland (MG4 Alopecurus pratensis- Sanguisorba officinalis type mixes.

6.9 The GI will be publically accessible, with clear paths providing walking and cycling routes to minimise the potential for the creation of desire lines and avoid more sensitive habitats. The use of denser planting and natural obstacles will further naturally limit access into selected habitats to promote their biodiversity and prevent disturbance and degradation. Interpretation boards would highlight the habitats and wildlife that may be seen and encourage a sense of community ownership.

6.10 Habitat creation will be undertaken in accordance with any landscape specifications and habitat creation prescriptions at the appropriate time of year and following recommended guidance to ensure its effective creation and initial establishment. Willow Wood and Drain SoI will benefit from initial restoration works to enhance its value.

Fauna

Bats

6.11 All potential bats roosts which will be directly affected by the development will be assessed to determine the presence of any actual bat roosts through aerial assessment where Health and Safety allows, or nocturnal assessment. In order to ensure legal compliance and ensure removal works are undertaken in an appropriate manner to compensate and mitigate loss, a European Protected Species derogation licence will be required form Natural England for any confirmed roost. Mitigation required in this instance would be likely to include the erection of replacement roost habitat commensurate with the status of the identified roost loss, in the form of three bat boxes per roost lost, precautionary working methods for the removal of the trees and timing of works. Where no roosts are confirmed but potential roosting habitat is to be lost, mitigation will include the provision of bat boxes on nearby retained trees as replacement potential habitat. Implementation of the above will ensure that the FCS is maintained for the local population during construction.

6.12 Bats make transitory use of suitable tree roost sites and as such there is a risk that other trees supporting suitable features may become occupied, in the interim between this assessment and works occurring. Therefore in order ensure legal compliance further survey should be carried prior to works that will directly affect any tree with potential to support roosting bats to ascertain roosting potential/evidence at the time, including through aerial assessment where health and safety allows. Providing that trees have low roosting potential or further survey indicates no bats are present the tree/s will be sectionally felled by experienced arborists. In the event bats are confirmed

then the works will be halted until an appropriate derogation licence is put in place as described for above for known roosts. Although not currently anticipated, any other mature tree subsequently to be removed should be checked from ground level, to ascertain any potential for roosting bats at that time and appropriate actions put in place as above as condition may change over time.

6.13 Where construction works will occur adjacent to new or retained foraging and commuting habitat , night working will not be undertaken to avoid the potential for disturbance when bats are active (April – mid-October).

Birds

6.14 As all birds, their nests, eggs and fledgling young are protected whilst nesting, mitigation will be implemented to ensure legal compliance and that no breeding birds are harmed during construction. Therefore to avoid disturbance to nesting birds, site clearance works including the removal of woody vegetation/trees and ground flora will be conducted where possible outside the bird breeding season, which runs March – August (inclusive).

6.15 If clearance is planned for the bird breeding season, it will be preceded by a nesting bird survey conducted by an experienced ecologist. This will involve observing any vegetation to identify birds exhibiting nesting behaviour and / or searching for active nests. Should any active bird nests be identified then an exclusion zone would need to be retained until the chicks had fledged as determined by the supervising ecologist.

Badger

6.16 Although not an IEF, badger are known to use the site with four small low status setts and limited activity recorded for both the residential and employment applications. Full details are provided in Appendix I.4; this appendix includes sensitive information and is not to be placed within the public domain. Badgers are afforded legal protection at the UK level, which protects the individual animals and their setts and appropriate mitigation is required to ensure legal compliance. Badger setts at the Site all occur along linear features to be retained. Two setts lie within the GI for the residential application and will be retained and buffered. Two setts, a well-used two hole subsidiary and a partially used single hole outlier, lie within the Employment application red line. Whilst the setts themselves could be retained, the potential proximity of works within 30m means that they may require closure.

Where future detailed design indicates this to be the case, permanent or temporary closure under an appropriate Natural England derogation licence between July and November, inclusive will be required. Given the status of two setts in this area no replacement setts will be required and the GI proposals in the area will provide sufficient new habitat to allow for the natural re-creation of setts by badgers and maintain their movement corridors around and out of the site.

6.17 Overall the GI proposals will create large areas of new habitat opportunities for foraging and sett creation, linked with other suitable habitats off-site and will provide positive benefits for this species.

6.18 Prior to any works on site a pre-commencement survey will be undertaken to ascertain the current status of badger activity and identify any changes to mitigation required.

6.19 All retained setts not subject to a temporary closure licence will be protected by a fenced stand-off (appropriate to the size of the sett) to ensure that the sett is protected for the duration of the construction phase and subject to a watching brief by an ecologist to ensure the setts remain undisturbed.

6.20 Best practice measures will be also adopted to avoid the risk of harm to badgers which may be using the Site's habitats. During construction, this will include precautionary surveys in advance of site clearance and covering any large pipes, pits or trenches that are left open overnight, or where appropriate providing an adequate means of escape, such as sloping profile or plank. Badger fencing may also be used where necessary to avoid the risk of badgers entering the construction area and to guide individuals towards foraging habitat and commuting routes.

6.21 Construction operations should be restricted to daylight hours where they are in proximity to semi-natural habitats in order to reduce the potential for adverse effects through disturbance to badger.

Water vole and otter

6.22 All watercourses with the potential to support water vole and otter will be subject to a pre-commencement survey prior to works, where these are anticipated to be within 5m of the water-course, and appropriate mitigation put in place should water vole have subsequently colonised these areas or otter evidence recorded.

During Operation

Habitats

6.23 The Development provides the opportunity to enhance the overall biodiversity of the Site, with the creation of the new semi-natural areas extending the existing retained habitats, creating a larger more ecologically viable habitat complex of greater species richness and diversity for flora and fauna. Together with landscaped buffers and attenuation facilities this will improve ecological connections at the Development, positively contributing to the effectiveness and functionality of wider ecological networks beyond the Site's boundaries as far is possible given its location surrounded by roads to the west in particular.

6.24 A conservation-led Green Infrastructure and Biodiversity Strategy or similar will be provided for the Development. This will provide the over-arching aims and objectives for on Site habitat creation and management aimed at benefiting biodiversity over the long-term, including details of management responsibilities and mechanisms to secure the long term management and setting out the framework for ongoing management and monitoring.

6.25 Phased detailed Biodiversity Creation and Management Plans (BMP) or similar, will be produced as necessary covering all habitats to be created and managed at the Site as each phase which includes part of the GI develops, coherent with the overall strategy for the wider GI. These will set out the targeted objectives and detailed management prescriptions for each habitat type or feature, the monitoring requirements and a five year work programme. The requirement for these will be delivered through a suitably worded condition or other appropriate planning mechanism. These measures will seek to benefit local fauna which use or could use the Site. The plan would be a 'living document', with a programme of monitoring and feedback, to ensure that the on-going management is flexible and responds to change. Annual reviews and updates will be submitted and agreed by LPA, the Applicant, and any other parties, as agreed and will be as set out within the approved Management Plan.

6.26 The Applicant will retain the responsibility for the on Site habitats, ensuring they are created and managed by an experienced landscape contractor or management for the life of the Development, or until such a time as the open space is passed via legal mechanism into the

control of a third party, as agreed by the LPA and/or any other relevant party.

6.27 A full consideration of the potential for hydrological impacts post-development is considered in detail within Chapter E Water Environment. Implementation of the proposed sustainable drainage system would ensure that the rate and amount of water run-off are unaltered, i.e. not significantly altered above existing greenfield rates. A reduction in water quality of surface run-off is also unlikely due to the implementation of appropriate measures within the SUDS proposals.

6.28 Delivery of the extensive GI will largely mitigate effects of recreational pressure on nearby designated sites. Willow Wood and Drain SoI on site will form an integral part this and adverse effects avoided, through habitat restoration, sensitive management and access control along designated footpaths.

Fauna

Bats

6.29 The design of lighting will minimise light-spill onto adjacent habitats, including potential roosts and potential foraging or commuting habitat that is regularly used by the local bat population. Implementation of a sensitive lighting regime, which follows industry best practice guidance and recommendations with regard to bats, will be achieved through a combination of the following summarised measures and as detailed within Appendix I.2:

- Avoiding unnecessary lighting;
- Timed lighting to light areas only when necessary
- Low-level and / or hooded lamps to minimise light-spill, where possible;
- Low-intensity (sodium lamps or similar) lighting, where possible; and
- Strategic planting or landscaping to shield sensitive areas.

6.30 Mitigation for the breaching of hedgerows will be implemented through the establishment of bat 'hop-overs' to maintain this foraging and movement corridor. These will comprise heavy standard trees located either on each side of the hedgerow gaps and between the two spines of the new roundabout for the larger breaches associated with this. The hop-overs will be sensitively lit within any health and safety parameters for vehicular traffic at junctions, and managed to raise bat flight lines above the height of traffic as detailed above and in Appendix I.2.

6.31 The design provides mitigation for the small scale loss of the foraging and commuting habitat with a significant increase in linear wood-edge habitat created around the site, which will also provide both foraging and commuting habitat, linked to other habitats in the local area. GI will provide a valuable foraging resource for bats overall, with the associated complex of woodland, edge features, open water and grassland, In addition new attenuation facilities will provide potential new foraging habitat closely associated to movement corridors. A range of bat boxes will be provided for bats across the site to increase potential roosting habitat as the scheme matures.

Birds

6.32 The retention and appropriate management of 2m wide grassy margins adjacent to hedgerows will ensure suitable habitat is retained for the farmland species such as linnet and yellowhammer.

6.33 A range of bird boxes aimed at providing enhancements for notable species that occur locally will provide additional nesting habitat whilst the scheme matures. A range of hole-nesting bird boxes will be erected across the site on suitable retained trees and hedgerows, with 32mm and 28mm hole sized boxes used. A kestrel box will provide additional nesting habitat for this species.

Badger

6.34 Design will ensure that all retained badger setts are buffered and protected from potential disturbance with an increase in dense scrub planting around them to limit disturbance including from dogs. New habitats will significantly improve opportunities for foraging and sett creation.

I7.0 Residual Effects

7.1 Residual effects for IEF are identified and described below.

During Construction

7.2 There will be residual effects from the loss of mature trees until such a time as other mature trees reach similar maturity in the medium – long term. This is considered to be **negligible** given the extent of retained trees.

7.3 Residual impacts will arise from the loss of the woodland habitat at Willow Wood until such a time as other new woodland reaches similar maturity in the medium – long term. This is a **minor adverse effect** in the short term only.

7.4 The establishment of bat 'hop-overs' to maintain connectivity along breached foraging and commuting routes will reduce the impact of any habitat fragmentation although there will be a short term **minor adverse** impact at a site level only, until hop-overs mature and re-establish connectivity along retained routes and whilst bats habituate to new routes. This will be minimised by the early creation of hop-overs in the scheme. In the medium-long term, residual impacts will be **negligible.**

7.5 Loss of potential ground nesting vegetation which cannot be replaced within the Scheme will lead to residual impacts for skylark of **minor significance** at a local level at the Proposed Development.

7.6 Residual impacts may be expected in the short term for other breeding birds through loss of nesting and foraging habitat in the form of woody habitats. Other similar habitat will be retained and residual impacts are **negligible.** Upon maturation significant new habitat will be available to these species and **positive minor effects,** may be expected.

During Operation

7.7 The nature of the habitats and facilities at Sinfin Moor LNR and LWS, mean that it is likely that the new community will use these sites for some recreational activities. Given the extent of on site provision likely to meet everyday needs, residual effects on the nearby sites are considered to be **negligible**.

7.8 Once new habitats have matured it is anticipated that there will be an overall

increase in biodiversity at the site, of value to a range of local species, either using the site already, or with the potential to use the site. In the medium to long term as habitats and mature **minor-moderate positive residual effects** would be expected for biodiversity.

I8.0 Summary & Conclusions

8.1 This chapter has assessed the likely significant effects of the Proposed Development on the ecology and nature conservation at the Site, based on an assessment of desk study and field data against the parameters of the Proposals. The methodology and approach to assessment have been described; baseline conditions for the site and surrounding area set out; avoidance and design measures undertaken at the outset highlighted with subsequent effects characterised and assessed for both the site and in combination with other projects in the local area. Mitigation required to reduce or off-set identified effects has been described and any residual effects following this, noted. Measures required to ensure legal compliance for any protected species have also been presented.

8.2 The Site supports one non-statutory designation for nature conservation, Willow Wood and Drain Site of Interest, of local value, but limited inherent botanical interest. This will largely be incorporated into the new green infrastructure, although the drain will be culverted in two places and the northern edge of the woodland likely to be lost. Effects are not significant.

8.3 Several non-statutory and statutory designated sites for nature conservation interest lie in close proximity to the development and have the potential to be indirectly affected by construction works and by increased recreational pressure. Mitigation will be put in place to reduce all effects, including through the implementation of appropriate protective and precautionary measures and working practices as described within a supporting CEMP and through the provision of the Site's GI, such that none are considered significant.

8.4 The site is dominated by intensively managed farmland, and of consequent limited ecological value. Linear features provide habitat corridors through this and into the wider area, including hedgerows, tree lines and a mix of dry and wet ditches, and whilst not of particular botanical interest, provide a foraging and commuting network for local fauna. Small areas of broadleaved semi-natural and plantation woodland and scrub occur, linked to the hedgerow network. The vast majority of these habitats are to be retained and incorporated into the GI, with small scale losses to accommodate access infrastructure mitigated by the GI and not significant.

8.5 The Site offers suitability for a number of protected species, including bats, water vole, otter, reptiles, great crested newts and badger as well as a range of notable bird species. Despite this, survey indicates a relatively low diversity and extent of species using it as follows:

- A small range of largely common and widespread bat species, dominated by common and soprano pipistrelle, typical of the habitats present. Activity levels were generally low. No roosts were recorded, although many trees provide suitable roosting features. Commuting features will largely be retained and mitigation put in place to enable continued movement along breached features. New habitats will be created to enhance foraging and movement opportunities throughout the GI and a sensitive lighting regime put in place. Adverse effects on bats are not significant and positive effects expected once GI establishes.
- Four low-status badger setts occur, with a low level of activity recorded at the site and the Site is considered to be of particular importance to the local badger clan. Setts are anticipated as being retained within the GI, although this may not be possible within the employment area and sett closure under licence may be required. The creation of additional further habitats suitable for badgers will allow natural re-creation of setts and no significant adverse effects expected. The GI will provide increase opportunities for foraging and habitation, bring positive effects for the local clan.
- Positive effects on woodland and urban edge bird species are anticipated as result of the retention of the majority of foraging and breeding habitat and the creation of the GI. For the majority of farmland species recorded effects of habitat loss are not considered significant. Residual effects are expected for skylark as the loss of the arable ground nesting habitat cannot be mitigated within the Scheme, these effects ae unlikely to have a significant adverse effect on the breeding status of the local population. Adverse effects on breeding skylark are more significant when considered in combination with farmland habitat losses associated with the wider IGV and could be of a minor-moderate scale for the local population.

8.6 Overall, the scheme brings the opportunity for significant biodiversity benefits in the local area, particularly when considered in the context of the wider IGV proposals, enabling a sensitively managed coherent habitat mosaic to be created, linked to off-site semi-natural habitats and contributing to biodiversity targets for a range of locally important habitats and species.

Table I19: Summary of Effects

Receptor	Effects	Mitigation	Residual Effects
During Construction			
Sinfin Moor LWS / LNR /	Habitat degradation and disturbance, including dust deposition, physical damage and accidental pollution	Implementation of CEMP; best practice working methods; protective buffers; pre-	Negligible

Receptor	Effects	Mitigation	Residual Effects
Sinfin Moor Lane Stream LWS		commencement surveys for water vole and otter	
Willow Wood & Drain SoI	Habitat loss of northern edge and culverting of ditch in two locations. Habitat degradation and disturbance, including dust deposition, physical damage and accidental pollution	Implementation of CEMP; best practice working methods; protective buffers; pre-commencement surveys for water vole and otter; Incorporation of retained areas into GI and creation of new more diverse woodland and swale habitat	Minor Positive
Mature trees	Habitat loss	Incorporation of majority of trees. Replacement with more diverse native tree planting	Minor positive
Hedgerows	Habitat loss – partial breaching of 14 hedgerows, possible total loss of two	Incorporation of majority of hedgerows. Replacement planting of species rich hedgerows within GI; enhancement of retained hedgerows	Minor positive
Ditches	Culverting of Ditch D9 in two locations	Incorporation of majority of ditches. Creation of new more diverse swale habitat	Minor positive
All retained habitats	Habitat degradation and disturbance, including dust deposition, physical damage and accidental pollution	Implementation of CEMP; best practice working methods; protective buffers	Negligible
Habitats - general	Overall land take	Creation of significant areas of GI, with diverse range of habitats using native species including meadow, marshy and tussock grassland, wetland habitats; broadleaved woodland and scrub planting; trees and hedgerows	Minor-moderate positive
Foraging and commuting bats	Interruption of linear features Disruption of foraging habits due to nocturnal lighting	Retention of alternative flight corridors; phased operations; limits to nocturnal working near suitable habitats	Minor adverse
Roosting bats	Loss of potential tree roosts	Avoidance of tree removal; pre-commencement surveys as necessary; creation of new habitat in GI	Negligible
Birds – woodland and urban edge	Disturbance of breeding birds; Loss of foraging and breeding habitat	Retention and incorporation of habitats into GI; phased operations; timing of removal to avoid nesting; creation of new habitats in GI	Minor positive
Birds – skylark	Disturbance of breeding birds; Loss of breeding habitat and	Phased operations; timing of removal to avoid nesting;	Minor adverse

Receptor	Effects	Mitigation	Residual Effects
During Operation			
Designated Sites	Disturbance and damage arising from increased recreation	Creation of on site GI; implementation of management plan	Negligible
Designated Sites	Changes to local hydrological regime	Implementation of SUDS	Negligible
All new and retained habitats	Disturbance and damage to retained and establishing habitats arising from increased recreation;	Implementation of management plan	Negligible
Bats	Disruption of foraging habits due to new lighting regime; harm or mortality across breached movement lines	Implementation of best practice sensitive lighting; dark corridors; creation of "hop-overs"	Negligible
Birds	Disturbance and predation from domestic pets and corvids	Areas of GI provide sheltered habitats	Negligible

I9.0 Abbreviations & Definitions

1 Assemblage: group of species found in the same location

2 Baseline conditions: the conditions that would pertain in the absence of the Development at the time of its construction

3 Biodiversity: the biological diversity of the earth's living resources

4 Compensation: measures to make up for the loss of, or permanent damage to ecological features, despite mitigation

5 Connectivity/connections: the functional availability of the habitats needed for a species to move through an area

6 Conservation status: the state of a species or habitat, including for example, extent, abundance, distribution and their trends

7 Distribution: the geographical; presence of a feature

8 Ecological feature: habitats, species or eco-systems

9 Effect: outcome to an ecological feature from an impact

10 Enhancement/enhanced: improved management of ecological features or provision of new feature/s resulting in a net increase in biodiversity, over and above that required to mitigate to compensate

11 Favourable/condition/status: satisfactory condition/status of an ecological feature

12 Fragmentation: the breaking up of habitat, eco-system or land-use type into smaller parcels with consequent impairment of ecological function

13 Habitat: the place or type of site where an organism or population naturally occurs

14 Impact: actions resulting in a change to an ecological feature

15 Important ecological feature (IEF): ecological feature/s requiring specific assessment, can be important for variety of reasons (quality, extent, rarity)

16 Mitigation: measures taken to avoid or reduce negative effects

17 Population: collection of individuals (plants or animals) of the same species in a defined geographical area

18 Replacement: creation of habitat that is an acceptable substitute for the habitat which has been lost

19 Significant effect: an effect that either supports or undermines biodiversity conservation objectives for important ecological features

20 Zone of influence: area over which ecological features may be affected by the biophysical changes caused by the Development and its associated activities

I10.0 References

[i] Guidelines for Ecological Impact Assessment in the UK and Ireland (Terrestrial, Freshwater and Coastal); Chartered Institute of Ecology and Environmental Management; September 2018
[ii] Hedgerow Evaluation and Grading System (HEGS); Clemet and Tofts; 1991
[iii] Birds of Conservation Concern 4 – the Red List of Species; RSPB; 2015
[iv] Derbyshire Bird Report 2017; Derbyshire Ornithological Society; 2018
[v] Derbyshire Local Wildlife Sites Handbook Volume 2; Guidelines for the Selection of Local Wildlife Sites; Derbyshire Wildlife Trust; 2003 (amended 2011)

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter J: Arboriculture

June 2019

Aboricultural effects are considered within Chapter I Ecology

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter K: Air Quality

June 2019

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K1.0 Introduction

1.1 This Chapter of the Environmental Statement ("ES") has been prepared by Air Quality Consultants on behalf of Hallam Land Management ("the Applicant"). This Chapter assesses the potential local air quality impacts of the Proposed Development, and the likely significance of such impacts during its operational and construction phases.

1.2 The Proposed Development will consist of up to 1,850 homes, a primary school and a local centre including retail units, other local services and facilities. The development will lead to changes in vehicle flows on local roads, which may impact on air quality at existing residential properties. The new residential properties will also be subject to the impacts of road traffic emissions from the adjacent network. The main air pollutants of concern related to road traffic emissions are nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$).

1.3 The new homes will be provided with heat and hot water by individual boilers within each unit; there will be no centralised energy plant and thus no significant point sources of emissions within the Proposed Development.

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

1.5 This chapter describes existing local air quality conditions (base year 2018), 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 2025, which is the anticipated year of opening. The assessment of construction dust impacts focuses on the anticipated duration of the works.

1.6 This chapter has been prepared taking into account all relevant local and national guidance and regulations, and follows a methodology agreed with South Derbyshire District Council (the Council) and Derbyshire County Council (the County Council).

About the Authors

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1.7 Dr Evans is an Associate Director with AQC, with more than 19 years' relevant experience. She has prepared air quality review and assessment reports for local authorities and has appraised local authority air quality assessments on

behalf of the UK governments, and provided support to the Review and Assessment helpdesk. She has carried out numerous assessments for new residential and commercial developments, including the identification of mitigation measures where relevant. She is a Member of the Institute of Air Quality Management.

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1.8 Mr Caird is an Associate Director with AQC, with 13 years' experience in the field of air quality including the detailed assessment of emissions from road traffic, airports, heating and energy plant, and a wide range of industrial sources including the thermal treatment of waste. He has experience in ambient air quality monitoring for numerous pollutants using a wide range of techniques and is also competent in the monitoring and assessment of nuisance odours and dust. Mr Caird has worked with a variety of clients to provide expert air quality services and advice, including local authorities, planners, developers and process operators. He is a Member of the Institute of Air Quality Management and is a Chartered Scientist.

Yasmin Wright BSc (Hons) MSc AMIEnvSc AMIAQM

1.9 Miss Wright is a Consultant with AQC, with two years' experience in the field of air quality. She has undertaken air quality impact assessments for a wide range of development projects in the UK, including road traffic assessments for residential and mixed-use developments and transport schemes. Miss Wright also has extensive experience in ambient air quality and nuisance dust monitoring. She is an Associate Member of the Institute of Air Quality Management and of the Institute of Environmental Sciences.

K2.0 Policy Context

Air Quality Strategy

2.1 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, 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. 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.

Clean Air Strategy 2019

2.2 The Clean Air Strategy (Defra, 2019a) sets out a wide range of actions by which the UK Government, will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

Reducing Emissions from Road Transport: Road to Zero Strategy

2.3 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

2.4 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades, likely beyond the scale of reductions forecast in the tools utilised in carrying out this air quality assessment.

National

National Planning Policy Framework

2.5 The National Planning Policy Framework (NPPF) (2019) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which is an environmental objective:

"to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy".

2.6 To prevent unacceptable risks from air pollution, the NPPF states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by…preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air quality".

and

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development".

2.7 More specifically on air quality, the NPPF makes clear that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified,

such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan".

2.8 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that *"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values"* and *"It is important that the potential impact of new development on air quality is taken into account … where the national assessment indicates that relevant limits have been exceeded or are near the limit"*. The role of the local authorities is covered by the LAQM regime, with the PPG stating that local authority Air Quality Action Plans *"identify measures that will be introduced in pursuit of the objectives".*

2.9 The PPG states that:

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

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

Local Transport Plan

2.11 Derby City Council's Third Local Transport Plan (LTP) (Derby City Council, 2011a) details a long-term strategy for transport for the years 2011 to 2026.

2.12 The LTP outlines two goals which relate to air quality.

"Goal 3 - To contribute to better safety, security and health for all people in Derby by improving road safety, improving security on transport networks and promoting active travel …
Goal 5 - To improve the quality of life for all people living, working in or visiting Derby by promoting investment in transport that enhances the urban and natural environment and sense of place"

Local

2.13 The South Derbyshire Local Plan (South Derbyshire District Council, 2016) was adopted in June 2016. Within this there is one policy that refers to air quality. Local Plan Strategic Objective 1 states that South Derbyshire District Council will:

"… ensure future development is locally distinctive and environmentally, socially and economically sustainable through the achievement of the design excellence, addressing the causes and effects of climate change and reducing waste and pollution."

2.14 The Council also has a Supplementary Planning Document (SPD) on sustainable design and construction (South Derbyshire District Council, 2017). This sets out the existing waste and pollution status in South Derbyshire and outlines measures that can be employed by new developments to reduce waste production and pollutant emissions during both the construction and operational phases.

2.15 Derby City Local Plan Core Strategy (Derby City Council, 2017) was adopted in January 2017 and forms the statutory development plan for the city alongside the remaining "saved" policies from the City of Derby Local Plan published in 2006 (City of Derby, 2006).

2.16 Policy E12 – Pollution states that:

"Planning permission will not be granted for development which would generate pollutants that would be unacceptably detrimental to the health and amenity of users of the development, users of adjoining land or the environment; or where the level of existing pollutants would be unacceptably detrimental to the health and amenity of users of the proposed development."

2.17 Policy CP23 – Delivering a Sustainable Transport Network states that:

"Actively manage the pattern of development to ensure that new development:

- *is not permitted where it would cause, or exacerbate, severe transport problems, including unacceptable impacts on congestion, road or rail*

safety, the rail network, access and air quality – including any cumulative impacts on Air Quality Management Areas (AQMA)"

Air Quality Action Plans

National Air Quality Plan

2.18 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017a). Alongside a package of national measures, the Plan requires those English Local Authorities (or the GLA in the case of London Authorities) that are predicted to have exceedances of the limit values beyond 2020 to have produced local action plans by December 2018. These plans must have measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a Clean Air Zone (CAZ). There is currently no practical way to take account of the effects of the national Plan in the modelling undertaken for this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the Proposed Development. This assessment has principally been carried out in relation to the air quality objectives, rather than the EU limit values that are the focus of the Air Quality Plan.

Local Air Quality Action Plan

2.19 The Council has not declared any AQMAs and thus has not prepared an air quality action plan.

2.20 Derby City Council (the City Council) has declared two AQMAs for exceedances of annual mean nitrogen dioxide concentrations. The City Council developed an Air Quality Action Plan (Derby City Council, 2011b) which focussed on reducing vehicle and building emissions, congestion and the impact of new developments whilst promoting cleaner vehicle technologies and encouraging a model shift away from the private car.

2.21 The City Council was identified in the 2015 National Air Quality Plan (Defra, 2017a) as one of the councils required to introduce urgent air quality improvement measures. It is currently in the process of implementing a CAZ.

Assessment Criteria

2.22 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 (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

2.23 The objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The $PM_{2.5}$ objective is to be achieved by 2020. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 $\mu g/m^3$ (Defra, 2018). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level. Measurements have also shown that the 24-hour PM_{10} objective could be exceeded at roadside locations where the annual mean concentration is above 32 $\mu g/m^3$ (Defra, 2018). The predicted annual mean PM_{10} concentrations are thus used as a proxy to determine the likelihood of an exceedance of the 24-hour mean PM_{10} objective. Where predicted annual mean concentrations are below 32 $\mu g/m^3$ it is unlikely that the 24-hour mean objective will be exceeded.

2.24 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 (Defra, 2018). The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. 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.

2.25 The European Union has also set limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$ (The European Parliament and the Council of the European Union, 2008). The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded.

2.26 The relevant air quality criteria for this assessment are provided in Table K1.

Table K1: Air Quality Criteria for Nitrogen Dioxide, PM_{10} and $PM_{2.5}$

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

[a] A proxy value of 32 $\mu g/m^3$ as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM_{10} objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM_{10} objective are possible (Defra, 2018).

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

Construction Dust Criteria

2.27 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the Institute of Air Quality Management (IAQM)[1] (2016) has been used. Full details of this approach are provided in Appendix KA1.

Screening Criteria for Road Traffic Assessments

2.28 Environmental Protection UK (EPUK) and the IAQM recommend a two-stage screening approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in Appendix KA2, first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1,000 m^2 of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment. The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. Where these criteria are exceeded, a detailed assessment is required, although the guidance advises that *"the criteria provided are precautionary and should be treated as indicative"*, and *"it may be appropriate to amend them on the basis of professional judgement"*.

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

K3.0 Assessment Methodology & Significance Criteria

Assessment Methodology

Existing Conditions

3.1 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 (Defra, 2019b).

3.2 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. Background concentrations have been defined using the national pollution maps published by Defra (2019c). These cover the whole of the UK on a 1x1 km grid.

3.3 Exceedances of the annual mean EU limit value for nitrogen dioxide in the study area have been identified using the maps of roadside concentrations published by Defra (2017b) as part of its 2017 Air Quality Plan for the baseline year 2015 and for the future years 2017 to 2030, as well as from any nearby Automatic Urban and Rural Network (AURN) monitoring sites (which operate to EU data quality standards). These maps are used by the UK Government, together with the AURN results, to report exceedances of the limit value to the EU. The national maps of roadside PM_{10} and $PM_{2.5}$ concentrations (Defra, 2019d), which are available for the years 2009 to 2015, show no exceedances of the limit values anywhere in the UK in 2015.

Construction Impacts

3.4 The construction dust assessment considers the potential for impacts within 350 m of the site boundary; or within 50 m of roads used by construction vehicles. The assessment methodology is that provided by IAQM (2016). This follows a sequence of steps. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the site. Step 2b defines the sensitivity of the area to any dust that may be raised. Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation. Step 3 uses this information to determine the appropriate level of mitigation required to ensure that there should be no significant impacts. Appendix KA1 explains the approach in more detail.

Road Traffic Impacts

Sensitive Locations

3.5 Concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ have been predicted at a number of locations both within, and close to, the Proposed Development. Receptors have been identified to represent a range of exposure within the development, including the worst-case locations (these being at the façades of the residential properties closest to the sources). When selecting receptors, particular attention has been paid to assessing impacts close to junctions, where traffic may become congested and where there is a combined effect of several road links, and close to those roads where the traffic increases as a result of the Proposed Development will be greatest.

3.6 Thirty existing residential properties have been identified as receptors for the assessment. Twelve additional receptor locations have been identified within the new development, which represent exposure to existing sources. These locations are described in Table K2 and shown in Figure K1. In addition, concentrations have been modelled at diffusion tube monitoring sites located adjacent to the modelled road network, in order to verify the model outputs (see Appendix KA3 for verification method).

Table K2: Description of Receptor Locations

Receptor	Description
Existing properties [a]	
R01	Residential property at Warwick Avenue
R02	Residential property at Stenson Road
R03	Residential property at Kenilworth Avenue
R04	Residential property at Newdigate Street
R05	Residential property at Newdigate Street
R06	Residential property at Osmaston Park Road
R07	Residential property at Sinfin Lane
R08	Residential property at Stenson Road
R09	Residential property at Sinfin Lane
R10	Residential property at Stenson Road
R11	Residential property at Sinfin Lane
R12	Residential property at Stenson Road
R13	Residential property at Sinfin Lane
R14	Residential property at Briar Lea Close
R15	Residential property at Grampian Way
R16	Residential property at Stenson Road
R17	Residential property at Inveraray Close
R18	Residential property at Stenson Road

Receptor	Description
R19	Residential property at Lupin Close
R21	Residential property at Arleston Lane
R22	Residential property at Arleston Lane
R23	Residential property at Deep Dale Lane
R24	Residential property at Wragley Way
R25	Residential property at Wragley Way
R26	Residential property at Wragley Way
R27	Residential property at Wragley Way
R28	Residential property at Wragley Way
R29	Residential property at Deep Dale Lane
R30	Residential property at Stenson Road
New properties [a]	
N01	Property within the Proposed Development
N02	Property within the Proposed Development
N03	Property within the Proposed Development
N04	Property within the Proposed Development
N05	Property within the Proposed Development
N06	Property within the Proposed Development
N07	Property within the Proposed Development
N08	Property within the Proposed Development
N09	Property within the Proposed Development
N10	Property within the Proposed Development
N11	Property within the Proposed Development
N12	Property within the Proposed Development

[a] Receptors modelled at a height of 1.5 m.

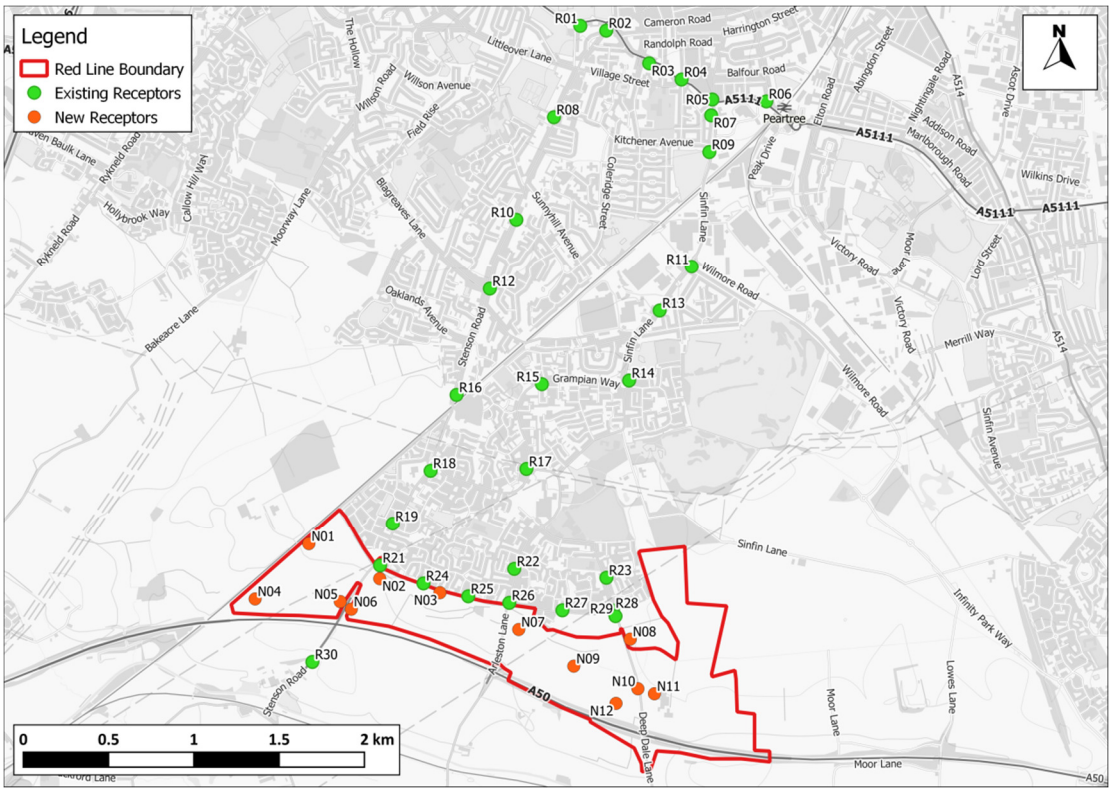


Figure K1: Receptor Locations

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Modelling Methodology

3.7 Concentrations have been predicted using the ADMS-Roads dispersion model, with vehicle emissions derived using Defra's Emission Factor Toolkit (EFT) (v8.0.1) (Defra, 2019c). Details of the model inputs, assumptions and the verification are provided in Appendix KA3, together with the method used to derive base and future year background concentrations. Where assumptions have been made, a realistic worst-case approach has been adopted.

Assessment Scenarios

3.8 Nitrogen dioxide, PM_{10} and $PM_{2.5}$ concentrations have been predicted for a base year (2018) and a future year of development (2025). The assessment in 2025, which represents a year in which early phases of the Proposed Development will be delivered, is based on traffic data for the fully completed and occupied development (expected to be 2030). This provides a reasonable worst-case assessment. For 2025, predictions have been made assuming both that the development does proceed (With Scheme), and does not proceed (Without Scheme).

3.9 In addition to the set of 'official' predictions (those from Defra's EFT), a sensitivity test has been carried out for nitrogen dioxide that involves assuming higher nitrogen oxides emissions from some diesel vehicles than have been predicted by Defra, using AQC's Calculator Using Realistic Emissions for Diesels (CURED v3A) tool (AQC, 2017).

Traffic Data

3.10 Traffic data for the assessment have been provided by RPS Group, who have undertaken the Transport Assessment for the Proposed Development. Further details of the traffic data used in this assessment are provided in Appendix KA3.

Significance Criteria

Construction Dust Significance

3.11 Guidance from IAQM (2016) is that, with appropriate mitigation in place, the effects of construction dust will be 'not significant'. The assessment thus focuses on determining the appropriate level of mitigation so as to ensure that effects will normally be 'not significant'.

Operational Significance

3.12 There is no official guidance in the UK in relation to development control on how to describe air quality impacts, nor how to assess their significance. The approach developed jointly by EPUK and the IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement, taking account of the impact descriptors. Full details of the EPUK/IAQM approach are provided in Appendix KA2.

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

Assumptions and Limitations

Uncertainty

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

3.15 An important stage in the process is model verification, which involves comparing the model output with measured concentrations (see Appendix KA3). Because the model has been verified and adjusted, there can be reasonable confidence in the prediction of base year (2018) concentrations.

3.16 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.

3.17 European type approval ('Euro') standards for vehicle emissions apply to all new vehicles manufactured for sale in Europe. These standards have, over many years, become progressively more stringent and this is one of the factors that has driven reductions in both predicted and measured pollutant concentrations over time.

3.18 Historically, the emissions tests used for type approval were carried out within laboratories and were quite simplistic. They were thus insufficiently representative of emissions when driving in the real world. For a time, this resulted in a discrepancy, whereby nitrogen oxides emissions from new diesel vehicles reduced over time when measured within the laboratory, but did not fall in the real world. This, in turn, led to a discrepancy between models (which predicted improvements in nitrogen dioxide concentrations over time) and measurements (which very often showed no improvements year-on-year).

3.19 Recognition of these discrepancies has led to changes to the type approval process. Vehicles are now tested using a more complex laboratory drive cycle and also through 'Real Driving Emissions' (RDE) testing, which involves driving on real roads while measuring exhaust emissions. For Heavy Duty Vehicles (HDVs), the new testing regime has worked very well and NOx emissions from

the latest vehicles (Euro VI[2]) are now very low when compared with those from older models (ICCT, 2017).

3.20 For Light Duty Vehicles (LDVs), while the latest (Euro 6) emission standard has been in place since 2015, the new type-approval testing regime only came into force in 2017. Despite this delay, earlier work by AQC (2016) showed that Euro 6 diesel cars manufactured prior to 2017 tend to emit significantly less NOx than previous (Euro 5 and earlier) models. Given the changes to the testing regime, it is reasonable to expect that diesel cars and vans registered for type approval since 2017 will, on average, generate even lower NOx emissions.

3.21 As well as reviewing information on the emissions from modern diesel vehicles in the real world (AQC, 2016), AQC has also reviewed the assumptions contained within Defra's latest EFT (v8.0.1) (AQC, 2018). One point of note is that the EFT makes a range of assumptions, which appear to be very conservative, regarding the continued use of diesel cars into the future and the relatively slow uptake of non-conventional (e.g. electric) vehicles (AQC, 2018). Thus, despite previous versions of Defra's EFT being over-optimistic regarding future-year predictions, it is not unreasonable to consider that EFT v8.0.1 might under-state the scale of reductions over coming years (i.e. over-predict future-year traffic emissions).

3.22 Overall, it is considered that, for assessment years prior to 2020, the EFT provides a robust method of calculating emissions. While there is still some uncertainty regarding any predictions of what will occur in the future, there are no obvious reasons to expect predictions made using the EFT to under-predict concentrations in the future up to and including 2019.

3.23 For assessment years beyond 2020, EFT v8.0.1 makes additional assumptions regarding the expected performance of diesel cars and vans registered for type approval beyond this date, reflecting further planned changes to the type approval testing. While there is currently no reason to disbelieve these assumptions, it is sensible to consider the possibility that this future-year technology might be less effective than has been assumed. A sensitivity test has thus been carried out using AQC's CURED v3A model (AQC, 2017), which assumes that this, post-2020, technology does not deliver any benefits. Further details of CURED v3A are provided in a supporting report prepared by AQC (2018). CURED v3A is considered to provide a worst-case assessment.

3.24 It is also worth noting that the fleet projections incorporated within the EFT do not appear to reflect the Government's ambitions as set out in the Road

[2] Euro VI refers to HDVs while Euro 6 refers to LDVs.

to Zero Strategy (see Paragraphs 2.3 and 2.4), predicting a relatively low proportion of zero tailpipe emission vehicles in years up to and including 2030. If the Government's ambitions relating to the uptake of zero tailpipe emission vehicles are realised then the EFT's emissions projections for NOx are likely to be overly-conservative for the latter part of the 2020s, if not the entire decade. As a result, there is the potential for the nitrogen dioxide concentrations presented in this report for the year 2025, and the resultant impacts, to have been over-predicted.

3.25 It must also be borne in mind that the predictions in 2025 are based on worst-case assumptions regarding the increase in traffic flows, utilising 2030 flows, such that all committed developments and the Proposed Development, are assumed to be fully operational. This will have overestimated the traffic emissions and hence the concentrations and impacts in 2025.

K4.0 Baseline Conditions

Existing Conditions

4.1 The Proposed Development is located approximately 6 km to the south west of Derby city centre. There is an existing residential estate to the north of the Site.

4.2 Further details of the site location can be found in Chapter C.

Air Quality Management Areas

4.3 The Council has investigated air quality within its area as part of its responsibilities under the LAQM regime and has not declared any AQMAs as a result.

4.4 The City Council has also investigated air quality under the LAQM regime and has declared two AQMAs for exceedances of annual mean nitrogen dioxide concentrations, both of which were declared in 2001 (Derby City Council, 2018). 'Derby NO_2 AQMA No.1 Ring Roads' encompasses the inner and outer ring roads in the city, as well as some sections of radial roads and the entire length of Osmaston Park Road. This AQMA is located 3 km to the north east of the Proposed Development and is shown in Figure K2.

4.5 'Derby NO_2 AQMA No.2 A52' encompasses sections of the A52, Derby Road and Nottingham Road in Spondon and lies well outside the geographic scope of this assessment.

4.6 In terms of PM_{10}, both the Council and City Council concluded that there are no exceedances of the objectives. It is, therefore, reasonable to assume that existing PM_{10} levels will not exceed the objectives within the study area (South Derbyshire District Council, 2018; Derby City Council, 2018).

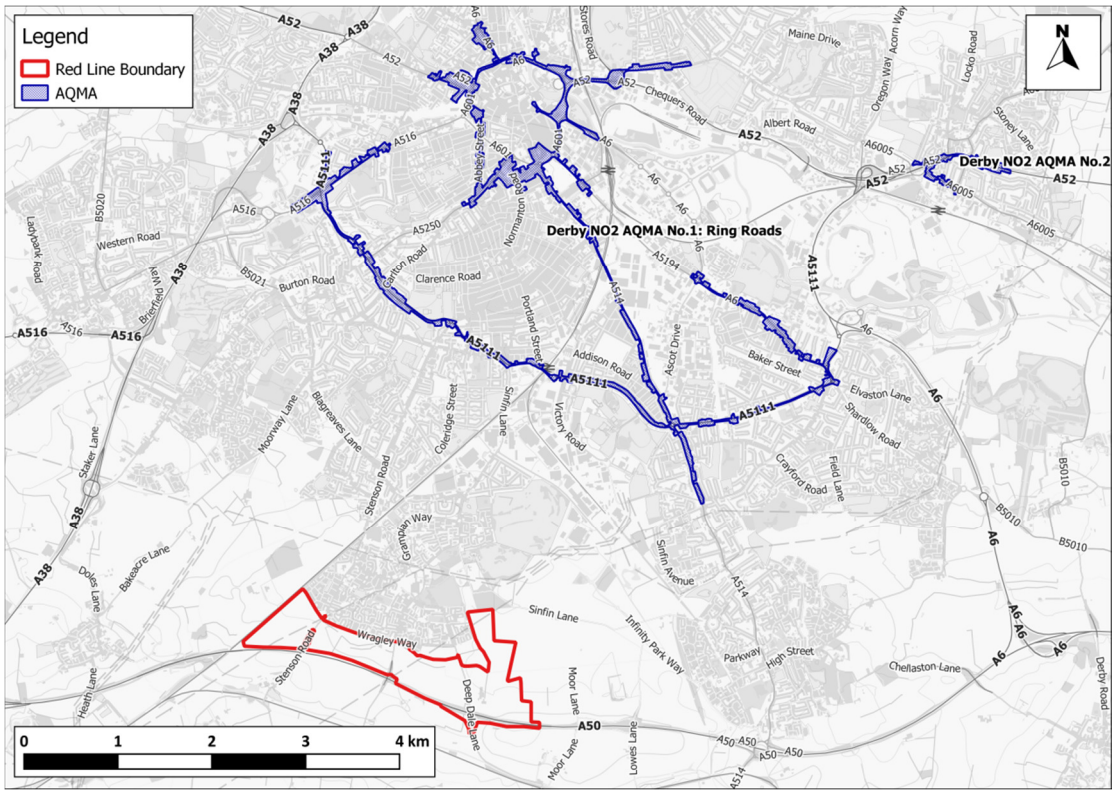


Figure K2: Derby City Declared AQMAs

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Local Air Quality Monitoring

4.7 The Council does not operate any automatic monitoring stations within its area. The Council does, however, operate several nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by ESG Didcot (using the 50% TEA in acetone method). These include one deployed at Findern Lane, Burnaston, which is in the vicinity of the Proposed Development. Nitrogen dioxide monitoring is also undertaken by neighbouring Derby City Council at a number of locations throughout the city. The nearest monitoring sites to the Proposed Development include four locations within the Derby NO_2 AQMA No.1 Ring Roads. Results for relevant sites for the years 2013 to 2018 are summarised in Table K3 and the monitoring locations are shown in Figure K3.

Table K3: Summary of Nitrogen Dioxide (NO_2) Monitoring (2013-2018) [a b]

Site No.	Site Type	Location	2013	2014	2015	2016	2017	2018
Diffusion Tubes – Annual Mean ($\mu g/m^3$)								
SDDC1	Roadside	Findern Lane, Burnaston	31	26	25	25	23	22
DT24	Roadside	32 Newdigate Street	39	37	34	**41**	38	35
DT25	Roadside	80 Newdigate Street	-	-	-	**41**	36	39
DT26	Kerbside	Warwick Ave Monitoring Station [c]	**49**	**48**	**47**	**47**	32	-
DT27	Kerbside	Warwick Ave Monitoring Station [c]	**49**	**46**	**44**	**46**	33	-
DT28	Kerbside	Warwick Ave Monitoring Station [c]	**47**	**46**	**43**	**48**	30	-
DT29	Roadside	2a Lime Walk	-	-	-	27	25	25
Objective			**40**					

a. The data for 2013 – 2017 period has been taken from the South Derbyshire District Council Annual Status Report (2018) and Derby City Council Annual Status report (2018). 2018 monitoring data has been provided by the Environmental Health Officers at South Derbyshire Council and Derby City Council.

b Exceedances of the NO_2 annual mean of 40 $\mu g/m^3$ are shown in **bold**.

c Warwick Avenue Monitoring Station is currently not in operation, no monitoring data is available.

4.8 Measured concentrations were all below the annual mean NO_2 objective in 2017 and 2018. Measured concentrations between 2013 and 2018 show a generally decreasing trend, with concentrations at SDDC1 and DT26 showing the clearest reductions over the past six years.

4.9 The Proposed Development is located alongside the A50, a heavily trafficked road which has a similar number of vehicles to the A38. Therefore, it is likely that concentrations at the Proposed Development will be similar to those measured at SDDC1, and well below the annual mean NO_2 objective.

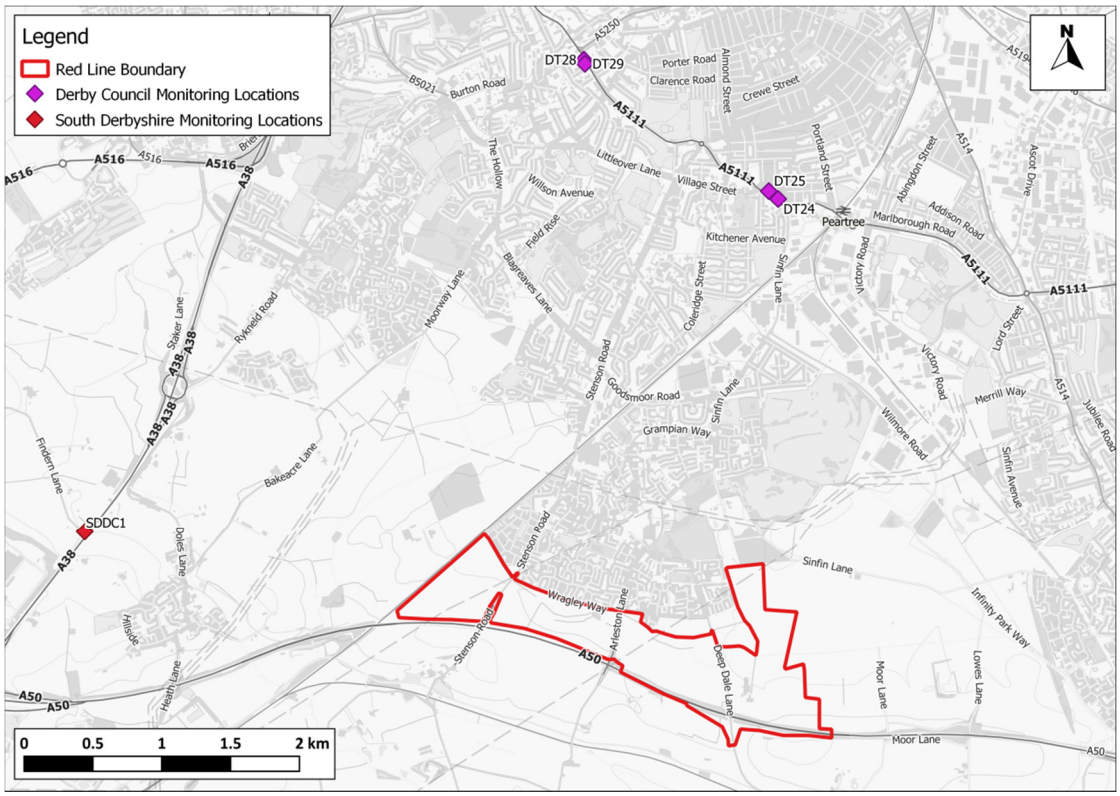


Figure K3: Monitoring Locations

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4.10 Neither the Council or the City Council currently undertake PM_{10} or $PM_{2.5}$.

Background Concentrations

4.11 Estimated background concentrations in the study area have been determined for 2018 and the opening year 2025 using Defra's background maps (Defra, 2019c). The background concentrations are set out in Table K4 and have been derived as described in Appendix KA3. The background concentrations are all well below the objectives.

Table K4: Estimated Annual Mean Background Pollutant Concentrations in 2018 and 2025 ($\mu g/m^3$)

Year	NO2	PM10	PM2.5
2018	13.3 – 18.2	14.9 – 16.7	9.9 – 11.0
2025 [a]	10.4 – 14.4	14.5 – 16.2	9.4 – 10.4
2025 Worst-case Sensitivity Test [b]	11.0 – 15.2	N/A	N/A
Objectives	40	40	25[c]

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

a In line with Defra's forecasts.

b Assuming higher emissions from future diesel cars and vans as described in Paragraph A4.5 in Appendix KA3.

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

Baseline Model Results

4.12 Baseline concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ have been modelled at each of the existing receptor locations (see Figure K1 and Table K2 for receptor locations). The results, which cover the existing (2018) baseline, are set out in Table K5. The modelled road components of nitrogen oxides, PM_{10} and $PM_{2.5}$ have been increased from those predicted by the model based on a comparison with local measurements (see Appendix KA3 for the verification methodology).

Table K5: Modelled Annual Mean Baseline Concentrations of Nitrogen Dioxide, PM_{10} and $PM_{2.5}$ ($\mu g/m^3$) at Existing Receptors in 2018 [a]

Receptor	Nitrogen Dioxide	PM_{10}	$PM_{2.5}$
R01	27.5	15.9	10.5
R02	**40.6**	17.5	11.5
R03	24.4	15.2	10.2
R04	32.3	16.9	11.1
R05	**42.4**	18.7	12.1
R06	30.0	17.3	11.2
R07	31.0	17.0	11.1
R08	28.0	15.9	10.5
R09	30.2	17.2	11.2
R10	25.1	15.3	10.2
R11	25.7	15.0	10.1
R12	25.2	15.3	10.3
R13	24.6	14.8	10.1
R14	23.9	14.8	10.0
R15	21.8	14.8	9.9
R16	22.6	15.9	10.7
R17	22.6	14.6	9.8
R18	25.2	16.0	10.8
R19	19.6	15.3	10.3
R20	16.8	15.5	10.2
R21	21.3	17.4	11.3
R22	19.3	17.1	11.1
R23	16.1	15.4	10.2
R24	19.8	17.2	11.2

Receptor	Nitrogen Dioxide	PM_{10}	$PM_{2.5}$
R25	19.5	17.2	11.1
R26	21.7	17.5	11.3
R27	16.9	15.6	10.2
R28	17.7	15.6	10.3
R29	16.4	15.5	10.2
R30	23.6	17.7	11.5
Objective	**40.0**	**32** [b]	**25** [c]

a Exceedances of the objective are shown in bold.

b While the annual mean PM_{10} objective is 40 $\mu g/m^3$, 32 $\mu g/m^3$ is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} objective is possible, as outlined in LAQM.TG16 (Defra, 2018). A value of 32 $\mu g/m^3$ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Moorcroft and Barrowcliffe et al, 2017).

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

4.13 The predicted annual mean concentrations of PM_{10} and $PM_{2.5}$ are well below the objective in 2018 at all receptors. Predicted annual mean NO_2 concentrations are also below the objective in 2018, except at receptors R02 and R05. The annual mean PM_{10} concentrations are well below 32 $\mu g/m^3$ and it is, therefore, unlikely that the 24-hour mean PM_{10} objective will be exceeded.

4.14 The annual mean nitrogen dioxide concentrations are below 60 $\mu g/m^3$ at every receptor; it is, therefore, unlikely that the 1-hour mean nitrogen dioxide objective will be exceeded (see Paragraph 2.24).

4.15 These results are generally consistent with the conclusions of Derby City Council in the outcome of its air quality review and assessment work. Predicted annual mean nitrogen dioxide concentrations at R02 and R05 are higher than the monitored concentrations at DT24 and DT25, due to their closer proximity to junctions where emissions are expected to be higher due to queuing and congested traffic.

Future Baseline

4.16 Predicted concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ for the future (2025) baseline (Without Scheme), are set out in Table K6. The modelled road components of nitrogen oxides, PM_{10} and $PM_{2.5}$ have been increased from those predicted by the model based on a comparison with local measurements (see Appendix KA3 for the verification methodology).

Table K6: Modelled Annual Mean Baseline Concentrations of Nitrogen Dioxide, PM_{10} and $PM_{2.5}$ ($\mu g/m^3$) at Existing Receptors in 2025

Receptor	Nitrogen Dioxide		PM_{10}	$PM_{2.5}$
	'Official Predictions'	Worst-Case Sensitivity Test		
R01	19.9	22.6	15.6	10.0
R02	27.9	32.3	17.2	11.0
R03	17.8	20.0	14.9	9.7
R04	22.9	26.3	16.7	10.7
R05	30.0	34.0	18.3	11.5
R06	22.5	24.9	16.9	10.7
R07	22.9	25.3	16.5	10.5
R08	20.1	22.8	15.5	10.0
R09	22.5	24.9	16.8	10.6
R10	18.0	20.3	14.9	9.7
R11	18.9	21.3	14.6	9.6
R12	18.1	20.6	15.0	9.8
R13	18.6	20.6	14.4	9.6
R14	17.4	19.7	14.4	9.5
R15	16.0	17.9	14.4	9.4
R16	17.2	19.0	15.5	10.2
R17	16.5	18.6	14.2	9.4
R18	18.7	20.9	15.6	10.2
R19	15.2	16.3	14.8	9.8
R20	12.5	13.7	15.0	9.7
R21	15.6	17.3	17.0	10.8
R22	14.3	15.7	16.6	10.6
R23	12.2	13.3	15.0	9.7
R24	14.6	16.1	16.8	10.7
R25	14.4	15.8	16.7	10.6
R26	15.8	17.6	17.0	10.8
R27	12.6	13.9	15.2	9.8
R28	13.2	14.5	15.2	9.8
R29	12.3	13.5	15.0	9.7
R30	17.7	19.4	17.3	11.0
Objective	**40**		**32** [a]	**25** [b]

a While the annual mean PM_{10} objective is 40 $\mu g/m^3$, 32 $\mu g/m^3$ is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} objective is possible, as outlined in LAQM.TG16 (Defra, 2018). A value of 32 $\mu g/m^3$ is thus used as a proxy to determine the likelihood

of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Moorcroft and Barrowcliffe et al, 2017).

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

4.17 The predicted annual mean concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ are well below the objectives at all receptor locations, including in the worst-case sensitivity test for nitrogen dioxide. The annual mean PM_{10} concentrations are below 32 $\mu g/m^3$ and it is, therefore, unlikely that the 24-hour mean PM_{10} objective will be exceeded.

4.18 The annual mean nitrogen dioxide concentrations are below 60 $\mu g/m^3$ at every receptor; it is, therefore, unlikely that the 1-hour mean nitrogen dioxide objective will be exceeded (see Paragraph 2.24).

K5.0 Potential Effects

During Construction

5.1 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 the vehicles onto the public highway. Step 1 of the assessment process is to screen the need for a detailed assessment. There are receptors within the distances set out in the guidance (see Appendix KA1), thus a detailed assessment is required. The following section sets out Step 2 of the assessment procedure.

Potential Dust Emission Magnitude

Demolition

5.2 There is no requirement for demolition on site.

Earthworks

5.3 The characteristics of the soil at the development site have been defined using the British Geological Survey's UK Soil Observatory website (British Geological Survey, 2019), as set out in Table K7. Overall; it is considered that, when dry, this soil has the potential to be moderately dusty.

Table K7. Summary of Soil Characteristics

Category	Record
Soil Layer Depth	Deep
Subsoil Grain size	Argillaceous [a] with areas of Argillic – Arenaceous [b]
Subsoil Description	Predominantly Claystone / Mudstone with areas of Lake Deposits
Soil Texture	Clayey loam [c] to silty loam

[a] grain size < 0.06 mm.

[b] grain size 0.06 – 2.0 mm.

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

5.4 The site covers 146 ha and most of this will be subject to earthworks, involving excavation, haulage, tipping, stockpiling and landscaping. The earthworks will be phased throughout the works and dust will arise mainly from vehicles travelling over unpaved ground and from the handling of dusty materials (such as dry soil).

5.5 Based on the example definitions set out in Table A1.1 in Appendix KA1, the dust emission class for earthworks is considered to be *large*.

Construction

5.6 The proposals involve the construction of approximately 1,850 brick built residential properties, a primary school, a district centre and employment space. Dust will arise from vehicles travelling over unpaved ground, the handling and storage of dusty materials. The construction is projected to continue up until 2030. Based on the example definitions set out in Table A1.1 in Appendix KA1, the dust emission class for construction is considered to be *large*.

Trackout

5.7 The number of heavy vehicles (>3.5 tonnes) accessing the site, which may track out dust and dirt is not known, but based on the scale of the site is estimated to be in the order of 100 vehicles per day or more during peak construction. Based on the example definitions set out in Table A1.1 in Appendix KA1, the dust emission magnitude for trackout is considered to be *large*.

5.8 Table K8 summarises the dust emission magnitude for the Proposed Development.

Table K8. Summary of Dust Emission Magnitude

Source	Dust Emission Magnitude
Earthworks	Large
Construction	Large
Trackout	Large

Sensitivity of the Area

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

Sensitivity of the Area to Effects from Dust Soiling

5.10 The IAQM guidance explains that residential properties are 'high' sensitivity receptors to dust soiling (Table A1.2 in Appendix KA1). There are approximately 75 residential properties within 20 m of the site boundary (see Figure K4). Using the matrix set out in Table A1.3 in Appendix KA1, the area surrounding the onsite works is of 'high' sensitivity to dust soiling.

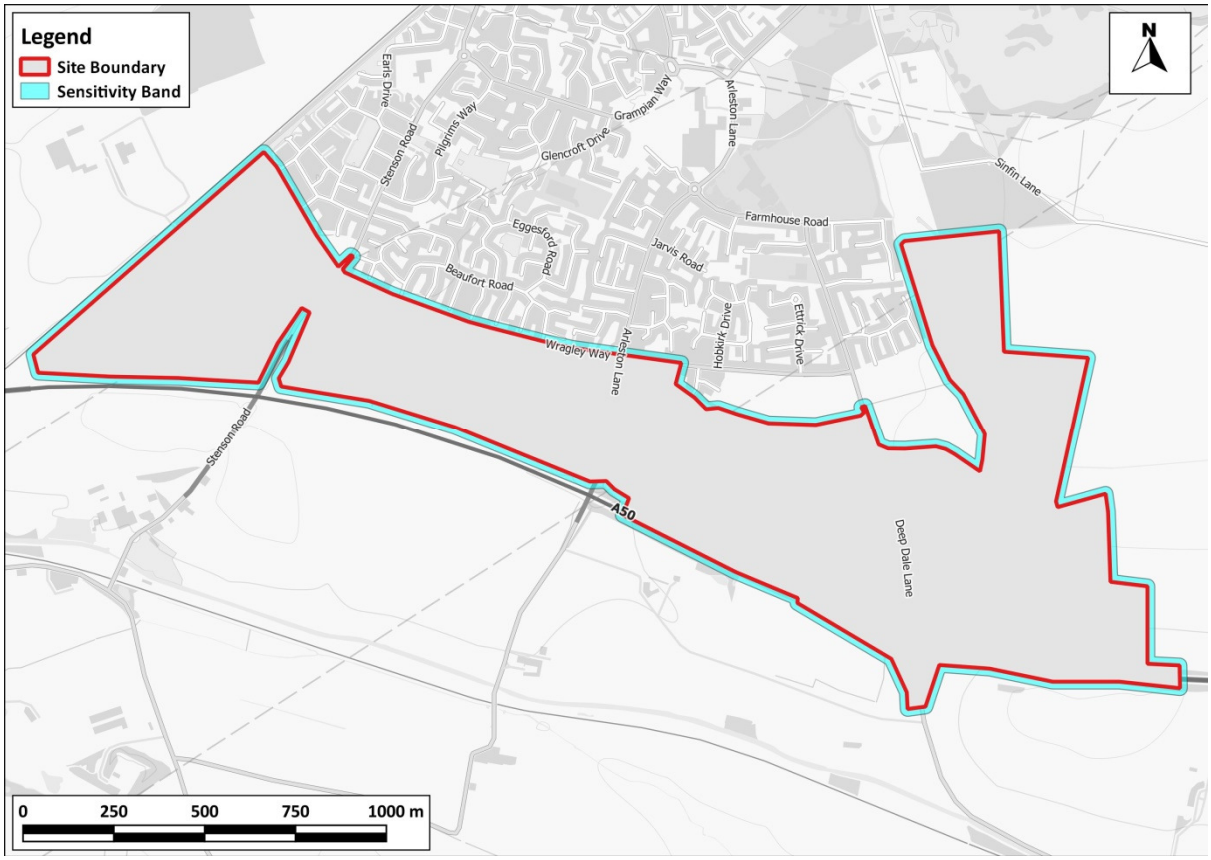


Figure K4: 20 m Distance Band around Site Boundary

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5.11 Table K8 shows that the dust emission magnitude for trackout is *large* and Table A1.3 in Appendix KA1 thus explains that there is a risk of material being tracked 500 m from the site exit. Since it is not known which roads construction vehicles will use, it has been assumed that the construction vehicles will utilise Stenson Road, Arleston Lane, as well as Deep Dale Lane for the duration of the construction of the development. There are approximately 240 residential properties within 50 m of the roads along which material could be tracked (see Figure K5), and Table A1.4 in Appendix KA1 thus indicates that the area is of 'high' sensitivity to dust soiling due to trackout.

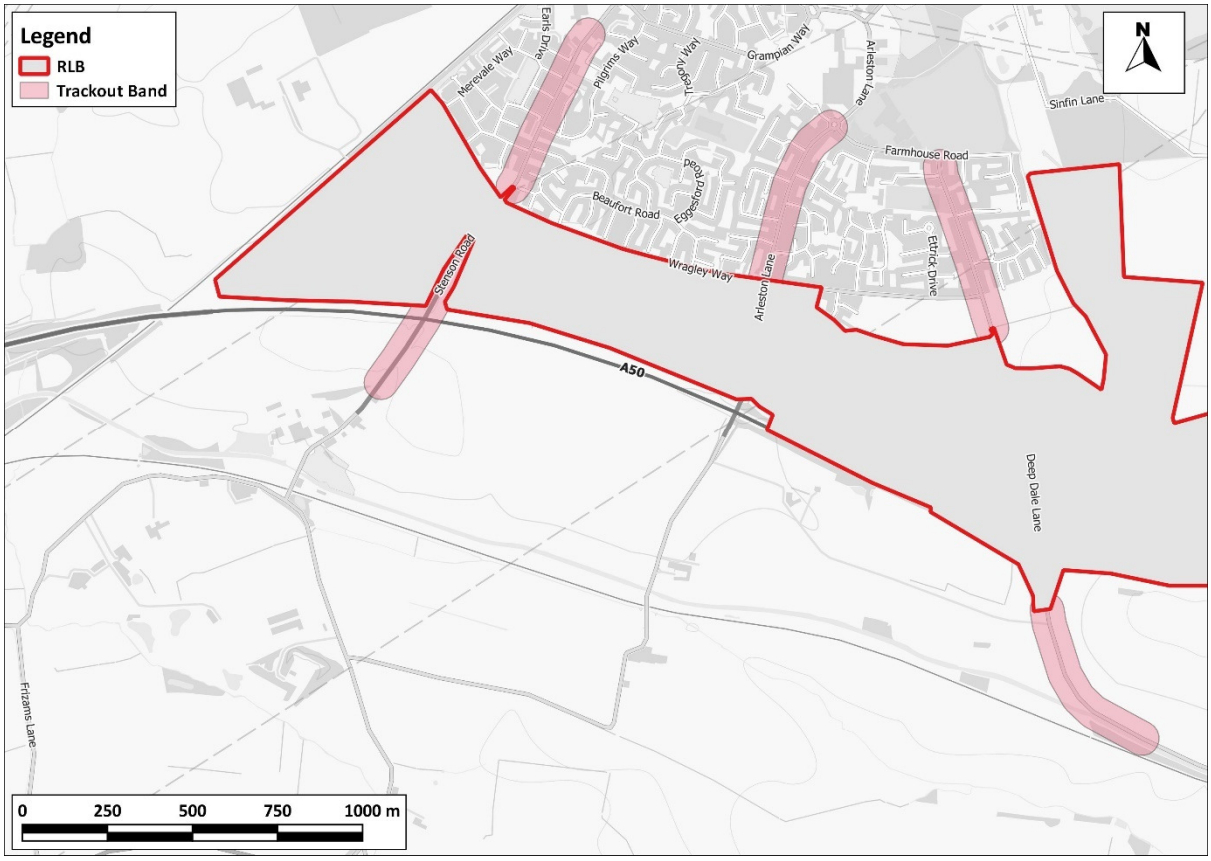


Figure K5: 50 m Distance Band around Roads Used by Construction Traffic Within 500 m of the Site Exits

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Sensitivity of the Area to any Human Health Effects

5.12 Residential properties are also classified as being of 'high' sensitivity to human health effects. The matrix in Table A1.4 in Appendix KA1 requires information on the baseline annual mean PM_{10} concentration in the area. Receptors R21, R24, R25, R26 in Figure K1 are all within 20 m of the site. The maximum predicted baseline PM_{10} concentration at these receptors is less than 24 $\mu g/m^3$ (Table K4).

5.13 Using the matrix in Table A1.4 in Appendix KA1, the area surrounding the onsite works is of 'low' sensitivity to human health effects, while the area surrounding roads along which material may be tracked from the site is also of 'low' sensitivity.

Summary of the Area Sensitivity

5.14 Table K9 summarises the sensitivity of the area around the proposed construction works.

Table K9: Summary of the Area Sensitivity

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

Risk and Significance

5.15 The dust emission magnitudes in Table K8 have been combined with the sensitivities of the area in Table K9 using the matrix in Table A1.6 in Appendix KA1, in order to assign a risk category to each activity. The resulting risk categories for the three construction activities, without mitigation, are set out in Table K10. These risk categories have been used to determine the appropriate level of mitigation as set out in Section 6.0 (step 3 of the assessment procedure).

Table K10: Summary of Risk Impacts Without Mitigation

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

5.16 The IAQM guidance 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 be 'not significant' (IAQM, 2016).

During Operation

Impacts at Existing Receptors

Initial Screening Assessment of Development – Generated Road – Traffic Emissions

5.17 The trip generation of the Proposed Development on local roads (as provided by RPS Group) has initially been compared to the screening criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) (see Paragraphs A2.7 to A2.14 in Appendix KA2).

5.18 The roads on which the Proposed Development is predicted to change Annual Average Daily Traffic (AADT) flows by more than 500 vehicles (outside of an

AQMA) or 100 vehicles (within an AQMA) have been included in the detailed assessment, using dispersion modelling.

Detailed Assessment of Development – Generated Road Traffic Emissions

5.19 Predicted annual mean concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ in 2025 for existing receptors are set out in Table K11 and Table K12 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 KA2. For nitrogen dioxide, results are presented for two scenarios so as to include a worst–case sensitivity test.

Table K11: Predicted Impacts on Annual Mean Nitrogen Dioxide Concentrations in 2025 ($\mu g/m^3$)[a]

Receptor	Without Scheme [b]	With Scheme [b]	% Change [b,c]	Impact Descriptor [b]	Worst-case Sensitivity Test [d]			
					Without Scheme	With Scheme	% Change [c]	Impact Descriptor
R01	19.9	20.7	2	Negligible	22.6	23.6	3	Negligible
R02	27.9	31.1	8	Moderate Adverse	32.3	36.3	10	Moderate Adverse
R03	17.8	18.2	1	Negligible	20.0	20.5	1	Negligible
R04	22.9	23.6	2	Negligible	26.3	27.2	2	Negligible
R05	30.0	30.4	1	Negligible	34.0	34.6	1	Negligible
R06	22.5	22.9	1	Negligible	24.9	25.4	1	Negligible
R07	22.9	22.3	-1	Negligible	25.3	24.6	-2	Negligible
R08	20.1	21.9	5	Negligible	22.8	25.1	6	Slight Adverse
R09	22.5	21.7	-2	Negligible	24.9	23.9	-2	Negligible
R10	18.0	19.8	5	Negligible	20.3	22.6	6	Slight Adverse
R11	18.9	20.5	4	Negligible	21.3	23.3	5	Negligible
R12	18.1	20.3	5	Negligible	20.6	23.4	7	Slight Adverse
R13	18.6	20.1	4	Negligible	20.6	22.5	5	Negligible
R14	17.4	19.6	5	Negligible	19.7	22.5	7	Slight Adverse
R15	16.0	18.0	5	Negligible	17.9	20.4	6	Slight Adverse
R16	17.2	19.4	6	Slight Adverse	19.0	21.8	7	Slight Adverse
R17	16.5	18.0	4	Negligible	18.6	20.5	5	Negligible
R18	18.7	26.2	19	Moderate Adverse	20.9	30.3	24	Moderate Adverse
R19	15.2	17.9	7	Slight Adverse	16.3	19.8	9	Slight Adverse
R20	12.5	13.7	3	Negligible	13.7	15.2	4	Negligible
R21	15.6	18.5	7	Slight Adverse	17.3	21.1	9	Slight Adverse
R22	14.3	15.3	2	Negligible	15.7	17.0	3	Negligible
R23	12.2	12.3	0	Negligible	13.3	13.5	1	Negligible
R24	14.6	17.7	8	Slight Adverse	16.1	20.1	10	Slight Adverse
R25	14.4	16.9	6	Slight Adverse	15.8	19.1	8	Slight Adverse
R26	15.8	17.2	4	Negligible	17.6	19.4	5	Negligible
R27	12.6	12.3	-1	Negligible	13.9	13.4	-1	Negligible
R28	13.2	12.8	-1	Negligible	14.5	14.0	-1	Negligible
R29	12.3	12.5	0	Negligible	13.5	13.7	0	Negligible
R30	17.7	17.9	1	Negligible	19.4	19.8	1	Negligible
Objective	**40**		-	-	**40**		-	-

a Exceedances of the objective are shown in bold.

b In line with Defra's forecasts.

c % changes are relative to the objective and have been rounded to the nearest whole number.

d Assuming higher emissions from future diesel cars and vans as described in Paragraph A3.5 in Appendix KA3.

Table K12: Predicted Impacts on Annual Mean PM_{10} and $PM_{2.5}$ Concentrations in 2025 ($\mu g/m^3$)

Receptor	Annual Mean PM_{10} ($\mu g/m^3$)				Annual Mean $PM_{2.5}$ ($\mu g/m^3$)			
	Without Scheme	With Scheme	% Change [a]	Impact Descriptor	Without Scheme	With Scheme	% Change [a]	Impact Descriptor
R01	15.6	15.8	1	Negligible	10.0	10.2	1	Negligible
R02	17.2	18.1	3	Negligible	11.0	11.5	2	Negligible
R03	14.9	15.0	0	Negligible	9.7	9.7	0	Negligible
R04	16.7	16.9	1	Negligible	10.7	10.8	1	Negligible
R05	18.3	18.4	0	Negligible	11.5	11.6	0	Negligible
R06	16.9	17.0	0	Negligible	10.7	10.8	0	Negligible
R07	16.5	16.4	0	Negligible	10.5	10.4	0	Negligible
R08	15.5	16.1	2	Negligible	10.0	10.4	1	Negligible
R09	16.8	16.5	-1	Negligible	10.6	10.5	-1	Negligible
R10	14.9	15.5	2	Negligible	9.7	10.1	1	Negligible
R11	14.6	15.0	1	Negligible	9.6	9.8	1	Negligible
R12	15.0	15.7	2	Negligible	9.8	10.2	2	Negligible
R13	14.4	14.9	1	Negligible	9.6	9.8	1	Negligible
R14	14.4	14.9	2	Negligible	9.5	9.8	1	Negligible
R15	14.4	15.0	2	Negligible	9.4	9.8	1	Negligible
R16	15.5	16.2	2	Negligible	10.2	10.6	2	Negligible
R17	14.2	14.6	1	Negligible	9.4	9.6	1	Negligible
R18	15.6	17.5	6	Slight Adverse	10.2	11.3	4	Negligible
R19	14.8	15.7	3	Negligible	9.8	10.3	2	Negligible
R20	15.0	15.3	1	Negligible	9.7	9.9	1	Negligible
R21	17.0	17.9	3	Negligible	10.8	11.3	2	Negligible
R22	16.6	16.9	1	Negligible	10.6	10.8	1	Negligible
R23	15.0	15.0	0	Negligible	9.7	9.7	0	Negligible
R24	16.8	17.8	3	Negligible	10.7	11.2	2	Negligible
R25	16.7	17.5	3	Negligible	10.6	11.1	2	Negligible
R26	17.0	17.4	1	Negligible	10.8	11.0	1	Negligible
R27	15.2	15.1	0	Negligible	9.8	9.7	0	Negligible
R28	15.2	15.1	0	Negligible	9.8	9.8	0	Negligible
R29	15.0	15.1	0	Negligible	9.7	9.7	0	Negligible
R30	17.3	17.3	0	Negligible	11.0	11.1	0	Negligible
Criterion	**32** [b]		-	-	**25** [c]		-	-

a % changes are relative to the criterion and have been rounded to the nearest whole number.

b While the annual mean PM_{10} objective is 40 $\mu g/m^3$, 32 $\mu g/m^3$ is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} objective is possible, as outlined in LAQM.TG16 (Defra, 2018). A value of 32 $\mu g/m^3$ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Moorcroft and Barrowcliffe et al, 2017).

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

Nitrogen Dioxide

5.20 The annual mean nitrogen dioxide concentrations are below the objective at all receptors.

5.21 The percentage changes in concentrations, relative to the air quality objective (when rounded), are predicted to be less than 5% at 23 of the receptors, between 6% and 8% at six of the receptors and 19% at one receptor (R18). Using the matrix in Table A3.1 (Appendix KA3), these impacts are described as *negligible* to *moderate adverse*.

5.22 The annual mean nitrogen dioxide concentrations are below 60 $\mu g/m^3$ at every receptor; it is, therefore, unlikely that the 1–hour mean nitrogen dioxide objective will be exceeded (see Paragraph 2.24).

5.23 The results from the worst-case sensitivity scenario show no exceedance of the annual mean or hourly mean nitrogen dioxide objective. The percentage changes in concentrations, relative to the air quality objective (when rounded), are higher with changes predicted to be less than 5% at 18 receptors, changes between 6 and 10% predicted at 11 receptors with, and an increase of 24% predicted at one receptor (R18). These impacts are described as *negligible* to *moderate adverse*.

5.24 The majority of the receptors where adverse impacts are predicted are located along Stenson Road, which is predicted to experience large increases in traffic as a result of the Proposed Development linking south Derby to the new A50 junction. Importantly, the moderate adverse impacts at receptors R02 and R18 are isolated to dwellings which are close to the carriageway of Stenson Road, but also in close proximity to junctions where traffic emissions will be elevated due to queuing and congestion. The moderate adverse impacts will therefore be limited to these two locations and are not judged to extend to a greater number of properties along Stenson Road.

PM_{10} and $PM_{2.5}$

5.25 The annual mean PM_{10} and $PM_{2.5}$ concentrations are well below the relevant criteria at all receptors, with or without the Proposed Development. Furthermore, as the annual mean PM_{10} concentrations are below 32 $\mu g/m^3$, it is unlikely that the 24–hour mean PM_{10} objective will be exceeded at any of the receptors.

5.26 The percentage change in PM_{10} concentrations, relative to the applied annual mean criteria (when rounded), are predicted to be less than 3% at all receptors except R18. Using the matrix in Table A2.1 (Appendix KA2), these impacts are described as *negligible*. Receptor R18 is predicted to experience a 6% change and a *slight adverse* impact according to Table A2.1 in Appendix KA2.

5.27 The percentage changes in $PM_{2.5}$ concentrations, relative to the applied annual mean criteria (when rounded), are predicted to be 4% at R18 and less than 2% at all remaining receptors. Using the matrix in Table A2.1 in Appendix KA2, these impacts are described as *negligible*.

Impacts of Existing Sources on Future Residents/Occupants of the Development

5.28 Predicted air quality conditions for future residents of the Proposed Development, taking account of emissions from the adjacent road network including the proposed link road through the Site, are set out in Table K13 for Receptors N01 to N12 (see Table K2 and Figure K1 for receptor locations). All of the values are well below the objectives. Air quality for future residents within the development will thus be acceptable.

Table K13: Predicted Concentrations of Nitrogen Dioxide (NO_2), PM_{10} and $PM_{2.5}$ in 2025 for New Receptors in the Development Site

Receptor	Annual Mean NO_2 ($\mu g/m^3$)		Annual Mean PM_{10} ($\mu g/m^3$)	Annual Mean $PM_{2.5}$ ($\mu g/m^3$)
	'Official' Prediction [a]	Worst-case Sensitivity Test [b]		
N01	15.9	17.1	16.7	10.7
N02	18.4	21.0	17.7	11.2
N03	16.8	18.9	17.5	11.1
N04	16.8	18.3	17.0	10.9
N05	17.4	19.1	17.2	11.0
N06	16.6	18.6	17.4	11.0
N07	15.6	17.4	16.2	10.3
N08	13.9	15.4	15.6	10.0
N09	16.0	17.9	16.4	10.4
N10	19.1	21.7	17.4	11.0
N11	14.8	16.3	16.0	10.2
N12	14.8	16.4	17.0	10.9
Objective / Criterion	**40**		**32** [c]	**25** [d]

a In line with Defra's forecasts.

b Assuming higher emissions from future diesel cars and vans as described in Paragraph A3.5 in Appendix KA3.

c While the annual mean PM_{10} objective is 40 $\mu g/m^3$, 32 $\mu g/m^3$ is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} objective is possible, as outlined in LAQM.TG16 (Defra, 2018). A value of 32 $\mu g/m^3$ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Moorcroft and Barrowcliffe et al, 2017).

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

Significance of Operational Air Quality Effects

5.29 The operational air quality effects without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendix KA2, and also takes into account the results of the worst-case sensitivity test for nitrogen dioxide. Future year concentrations are expected to lie between the two sets of results, but in order to provide a reasonable worst-case assessment, the judgement of significance focuses primarily on the results from the sensitivity test.

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

- pollutant concentrations at worst-case locations within the Proposed Development will all be below the objectives, thus future residents will experience acceptable air quality;
- pollutant concentrations at all of the selected worst-case existing receptors along the local road network will be below the air quality objectives, with or without the Proposed Development in operation;
- the Proposed Development is predicted to lead to moderate adverse impacts only at two isolated locations close to junctions on Stenson Road. Model inputs are conservative and the concentrations and impacts are likely to be overestimated;
- the Proposed Development is predicted to lead to slight adverse impacts at a number of locations; however, concentrations remain well below the objective and the concentrations and impacts are likely to be overestimated; and
- the predicted PM_{10} and $PM_{2.5}$ impacts are all negligible with the exception of a single worst-case receptor location where slight adverse impacts are predicted.

Cumulative Impacts

5.31 The traffic data used in the assessment includes the contribution of cumulative developments to predicted traffic flows in the without development and with development future assessment scenarios. The air quality assessment is therefore intrinsically cumulative and the cumulative effects are the same as those described in paragraph 5.29.

K6.0 Mitigation and Monitoring

Mitigation Included by Design

6.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required. The Proposed Development incorporates the following good design and best practice measures:

- adoption of a Dust Management Plan (DMP) or Construction Environmental Management Plan (CEMP) to minimise the environmental impacts of the construction works;
- scheme design such that the sensitive uses (residential/school) are sufficiently set back from sources of pollution (roads);
- provision of pedestrian and cycle access to the new development; and
- provision of a new bus stop to encourage use of public transport.

Recommended Mitigation

Construction Impacts

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

6.3 The site has been identified as a *High* Risk site during earthworks construction and trackout, as set out in A1. Comprehensive guidance has been published by IAQM (2016) that describes measures that should be employed, as appropriate, to reduce the impacts, along with guidance on monitoring during demolition and construction (IAQM, 2012). This reflects best practice experience and has been used, together with the professional experience of the consultant who has undertaken the dust impact assessment and the findings of the assessment, to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in Appendix KA4.

6.4 The mitigation measures should be written into a dust management plan (DMP). The DMP may be integrated into a Code of Construction Practice or the Construction Environmental Management Plan, and may require monitoring.

6.5 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.

During Operation

6.6 The assessment has demonstrated that the Proposed Development will not cause any exceedances of the air quality objectives and that the overall effect of the Proposed Development will be 'not significant'. The Proposed Development is predicted to lead to adverse impacts at a small number of receptor locations and therefore it is appropriate to consider mitigation to ensure the predicted adverse impacts are minimised or prevented.

6.7 Mitigation measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law). The local air quality plan that the Council is required to produce in order to address limit value exceedances in its area will also help to improve air quality; the proposed implementation of a CAZ by Derby City Council can also reasonably be expected to lead to significant improvements, which are not directly accounted for in the assessment.

6.8 It is further recommended that measures to reduce private vehicle trips and encourage low-emission and sustainable transport will be delivered by the Proposed Development through the investment in infrastructure (e.g. pedestrian and cycle facilities and electric vehicle charging) and development of a Travel Plan. It is anticipated that measures can be identified during reserved matters applications.

K7.0 Residual Effects

During Construction

7.1 The IAQM guidance, is clear that, with appropriate mitigation in place, the residual effects will normally be 'not significant'. The mitigation measures set out in Section K6.0 Mitigation and Monitoring and Appendix KA4 are based on the IAQM guidance. With these measures in place and effectively implemented the residual effects are judged to be 'not significant'.

7.2 The IAQM guidance does, however, recognise 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. During these events, short-term dust annoyance may occur, however, the scale of this would not normally be considered sufficient to change the conclusion that overall the effects will be 'not significant'.

During Operation

7.3 The residual effects will be the same as those described in paragraph 5.29 and are therefore not significant.

K8.0 Summary & Conclusions

8.1 A summary of the air quality effects is provided in Table K14

Table K14: Summary of Effects

Receptor	Effects	Mitigation	Residual Effects
During Construction			
Existing properties	n/a	Good practice measures to minimise dust emissions during works.	Not Significant
During Operation			
Existing properties	Not Significant	Measures to reduce private vehicle trips and encourage sustainable travel.	Not Significant
Future residents of the development	Not Significant	None	Not Significant
During Decommissioning			
n/a	n/a	n/a	n/a

K9.0 Abbreviations & Definitions

1. AADT - Annual Average Daily Traffic
2. ADMS-Roads - Atmospheric Dispersion Modelling System model for Roads
3. AQC - Air Quality Consultants
4. AQAL - Air Quality Assessment Level
5. AQMA - Air Quality Management Area
6. AURN - Automatic Urban and Rural Network
7. CAZ - Clean Air Zone
8. CEMP - Construction Environmental Management Plan
9. CURED - Calculator Using Realistic Emissions for Diesels
10. Defra - Department for Environment, Food and Rural Affairs
11. DfT - Department for Transport
12. DMP - Dust Management Plan
13. EFT - Emission Factor Toolkit
14. EPUK - Environmental Protection UK
15. Exceedance - A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
16. EU - European Union
17. EV - Electric Vehicle
18. HDV - Heavy Duty Vehicles (> 3.5 tonnes)
19. HMSO - Her Majesty's Stationery Office
20. HGV - Heavy Goods Vehicle
21. IAQM - Institute of Air Quality Management
22. ICCT - International Council on Clean Transportation
23. Kph - Kilometres Per hour
24. LAQM - Local Air Quality Management
25. LDV - Light Duty Vehicles (<3.5 tonnes)
26. LGV - Light Goods Vehicle

27. $\mu g/m^3$ - Microgrammes per cubic metre
28. NO - Nitric oxide
29. NO_2 - Nitrogen dioxide
30. NOx - Nitrogen oxides (taken to be NO_2 + NO)
31. NPPF - National Planning Policy Framework
32. Objectives - A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
33. OLEV - Office for Low Emission Vehicles
34. PM_{10} - Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
35. $PM_{2.5}$ - Small airborne particles less than 2.5 micrometres in aerodynamic diameter
36. PPG - Planning Practice Guidance
37. RDE - Real Driving Emissions
38. SPG - Supplementary Planning Guidance
39. Standards - A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
40. TEA **-** Triethanolamine – used to absorb nitrogen dioxide

K10.0 References

1.AQC (2016) *Emissions of Nitrogen Oxides from Modern Diesel Vehicles*, Available: http://www.aqconsultants.co.uk/getattachment/Resources/Download-Reports/Emissions-of-Nitrogen-Oxides-from-Modern-Diesel-Vehicles-210116.pdf.aspx.

2.AQC (2017) *CURED v3A*, Available: http://www.aqconsultants.co.uk/Resources/Download-Reports.aspx.

3. AQC (2018) *Development of the CURED v3A Emissions Model*, http://www.aqconsultants.co.uk/Resources/Download-Reports.aspx, Available: http://www.aqconsultants.co.uk/Resources/Download-Reports.aspx.

4. British Geological Survey (2019) *UK Soil Observatory Map Viewer*, Available: http://mapapps2.bgs.ac.uk/ukso/home.html.

5. City of Derby (2006) *Local Plan*.

6. Defra (2007) *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*, Defra.

7. Defra (2017a) *Air quality plan for nitrogen dioxide (NO2) in the UK*, Available: https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017.

8. Defra (2017b) *2017 NO2 projections data (2015 reference year)*, Available: https://uk-air.defra.gov.uk/library/no2ten/2017-no2-projections-from-2015-data.

9. Defra (2018) *Review & Assessment: Technical Guidance LAQM.TG16 February 2018 Version*, Defra, Available: https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf.

10. Defra (2019a) *Clean Air Strategy 2019*, Available: https://www.gov.uk/government/publications/clean-air-strategy-2019.

11. Defra (2019b) *UK Pollutant Release and Transfer Register*, Available: http://prtr.defra.gov.uk/map-search.

12. Defra (2019c) *Local Air Quality Management (LAQM) Support Website*, Available: http://laqm.defra.gov.uk/.

13. Defra (2019d) *UK Ambient Air Quality Interactive Map*, Available: https://uk-air.defra.gov.uk/data/gis-mapping.

14. Derby City Council (2011a) *Derby Local Transport Plan, LTP3 2011-2026*.

15. Derby City Council (2011b) *Air Quality Action Plan*.

16. Derby City Council (2017) *Derby City Local Plan - Part 1 Core Strategy*.

17. Derby City Council (2018) *2018 Air Quality Annual Status Report (ASR)*.

18. DfT (2018) *The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy*.

19. IAQM (2012) *Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites*, Available: www.iaqm.co.uk/guidance.html.

20. IAQM (2016) *Guidance on the Assessment of Dust from Demolition and Construction v1.1*, Available: http://iaqm.co.uk/guidance/.

21. ICCT (2017) *NOx emissions from heavy-duty and light-duty diesel vehicles in the EU: Comparison of real-world performance and current type-approval requirements*, Available: http://www.theicct.org/nox-europe-hdv-ldv-comparison-jan2017.

22. Moorcroft and Barrowcliffe et al (2017) *Land-Use Planning & Development Control: Planning For Air Quality v1.2*, IAQM, London, Available: http://iaqm.co.uk/guidance/.

23. South Derbyshire District Council (2016) *Local Plan Part 1*, [Online].

24. South Derbyshire District Council (2017) *Design Supplementary Planning Document*, [Online].

25. South Derbyshire District Council (2018) *2018 Annual Status Report (ASR)*.

26. *The Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043* (2002), HMSO, Available: https://www.legislation.gov.uk/uksi/2002/3043/contents/made.

27. *The Air Quality (England) Regulations 2000 Statutory Instrument 928* (2000), HMSO, Available: http://www.legislation.gov.uk/uksi/2000/928/contents/made.

28. The European Parliament and the Council of the European Union (2008) *Directive 2008/50/EC of the European Parliament and of the Council*, Available: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0050.

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter L: Noise

June 2019

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L1.0 Introduction

1.1 This Chapter of the Environmental Statement ("ES") has been prepared by Cole Jarman on behalf of Hallam Land Management ("the Applicant"). This Chapter assesses potential noise environmental impacts of the Proposed Development, and the likely significance of such impacts during its operational and construction phases.

1.2 The following elements have been assessed and are detailed within this chapter and its technical appendices:

- Construction Noise (to existing receptors) – Noise generated by temporary construction activities on the site.
- Road Network Traffic Noise (to existing receptors) – Noise effects linked to changes in traffic flow on local roads due to the introduction of the site.
- Fixed Plant Items (to existing receptors) – Noise generated by fixed plant items installed as part of the development.
- Noise from Existing Sources (to proposed receptors) – Noise generated by local road traffic.
- Employment Land Activity (to existing and proposed receptors) – Noise generated by the operation of the proposed employment land.

1.3 Full information regarding the proposed development and local area can be found in Chapter C of this ES. This chapter (L) considers two distinct developmental components of the scheme; the first being the proposed residential provision and second being an area allocated for employment use.

About the Author

1.4 This noise chapter has been prepared by Richard Masey and checked by Ian Yates, both of Cole Jarman Ltd. All consultants at Cole Jarman hold academic qualifications necessary to operate as professional acoustics consultants, holding technical qualifications in acoustics or a related field.

1.5 Richard Masey, who has completed the noise assessments and environmental statement for the proposed development, is a full Member of the Institute of Acoustics (IOA). He has over 6 years' experience working as an acoustic consultant since 2013, holds the IOA Diploma in Acoustics and Noise Control and a BA in Sound Design.

1.6 Ian Yates, who was the overseeing associate director for the project, is a full Member of the Institute of Acoustics. He has over 17 years' experience

working as an acoustic consultant and holds a BEng in Engineering Acoustics and Vibration.

1.7 Cole Jarman are sponsor members of the Institute of Acoustics, with all consultants being at individual membership grades ranging from Associate to Member. Cole Jarman is also a corporate member of the Institute of Environmental Management and Assessment.

L2.0 Policy Context

National Planning Policy Framework (NPPF)

2.1 The National Planning Policy Framework (NPPF), published in 2012 and updated in February 2019, is currently the relevant document for defining the national policy toward noise sensitive development. It refers to the Noise Policy Statement for England (NPSE), which is discussed in the subsequent section.

2.2 PPG24 permitted noise sensitive development in areas subject to low levels of environmental noise while discouraging noise sensitive development in areas subject to high levels of environmental noise. The current policy on sustainable development can be considered as subtly altering the emphasis. The development of a quiet, rural site is by most measures less sustainable than the development of a busy, urban site and the rating of development sites based on prevailing noise levels should now reflect this.

2.3 Specifically, on the subject of noise, paragraph 180 of NPPF states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;"

2.4 Paragraph 180 explicitly refers to the Noise Policy Statement for England, and no other particular standards.

2.5 On the general issue of amenity, paragraph 127 states that planning should

"create places that […] promote health and well-being, with a high standard of amenity for existing and future users…"

Noise Policy Statement for England (NPSE)

2.6 This document does not set quantitative guidelines for the suitability of noise sensitive development in an area depending on the prevailing levels of noise. Absent, therefore, is reference to specific noise thresholds (e.g. the Noise Exposure Categories as defined in PPG 24) which determined whether noise

sensitive development is suitable and, if so, whether particular mitigation factors need to be considered.

2.7 Instead, the NPSE sets out three aims:

- 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 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 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."

2.8 In essence, therefore, each development site must be judged on its ability to deliver on each of these aims, and while rating the prevailing noise against predefined thresholds is no longer necessary, defining the prevailing noise levels is a first step in assessing a given site under the current regime.

2.9 With respect to SOAEL's etc. (Significant Observed Adverse Effect Level - see further discussion below; in particular please refer to Table 7.4 below) the NPSE states:

"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times."

2.10 It is therefore necessary to assess each site and situation on its own merits and establish SOAEL's etc. which relate specifically to those circumstances.

National Planning Practice Guidance (NPPG)

2.11 The Department for Communities and Local Government 'National Planning Practice Guidance' (NPPG) was published in March 2014.

2.12 The NPPG on Noise expands upon the NPPF and NPSE and sets out more detailed guidance on noise assessment. Like the NPPF and NPSE, the guidance does not include any specific noise levels but sets out further principles that should underpin an assessment.

2.13 The NPPG includes a section on noise, which states:

"Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:
whether or not a significant adverse effect is occurring or likely to occur;
whether or not an adverse effect is occurring or likely to occur; and
whether or not a good standard of amenity can be achieved."

2.14 It then refers to the NPSE and states that the aim is to identify where the overall effect of the noise exposure falls in relation to Significant Observed Adverse Effect Level (SOAEL), the Lowest Observed Adverse Effect Level (LOAEL) and the No Observed Effect Level (NOEL).

2.15 The guidance then presents a table, which is reproduced as table 6.1 overleaf. The final line of the table makes clear that it is only the 'noticeable and very disruptive' outcomes that are unacceptable and should be prevented. All other outcomes (i.e. all other lines in the table) can be acceptable, depending upon the specific circumstances and factors such as the practicalities of mitigation.

2.16 Under the topic of further considerations relating to mitigating the impact of noise on residential developments, the NPPG states:

"The noise impact may be partially off-set if the residents of those dwellings have access to:

a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling, and/or;

a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur, and/or;

a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or;

a relatively quiet, protected, external publically accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance)."

2.17 This is not to say that access to the above items is mandatory, rather that it can help to offset any noise impacts.

Table L1: Summary of Noise Exposure Hierarchy (from NPPG)

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum

2.18 The aim shall be to ensure that the proposed development does not give rise to changes in noise levels above what may be considered the SOAEL. In addition, the noise climate provided to the proposed residences should also not exceed the SOAEL.

L3.0 Assessment Methodology & Significance Criteria

Assessment Methodology

Construction Noise (To Existing Receptors)

3.1 The noise effects from construction activities on site have been considered in general terms.

3.2 Construction noise is inherently temporary in nature and so any effect will be in the short term only. A pragmatic approach needs to be taken when assessing the noise effects of any construction project, i.e. the guidance provided would generally only apply to projects of a significant size, and lesser projects might not need to be assessed or might only require general consideration of noise effects and mitigation.

3.3 Guidance has been taken from BS 5228-1:2009+A1:2014; which covers noise control recommendations relating to open construction sites. It provides guidance concerning methods of predicting and measuring noise and assessing its impact on those exposed to it; it is therefore relevant to consider on this site.

3.4 Example method 1 in Annex E of BS 5228-1 sets out details of how to set threshold noise levels of potential significant effects at dwellings. Ambient noise levels on site without construction noise are rounded to the nearest 5dB and compared against the site level. If the site noise level exceeds the category value shown in the table below, then a potential significant effect is indicated.

Table L2: Construction Noise Assessment Criteria from BS5228

Assessment category and threshold value period	**Threshold value, in dB (LAeq,T)**		
	Category A [A)]	**Category B** [B)]	**Category C** [C)]
Night-time (23.00–07.00)	45	50	55
Evenings and weekends [D)]	55	60	65
Daytime (07.00–19.00) and Saturdays (07.00–13.00)	65	70	75
NOTE 1 A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level. NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise. NOTE 3 Applied to residential receptors only.			
[A)] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. [B)] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. [C)] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values. [D)] 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.			

3.5 Further to this, guidance on Section 61 agreements and code of construction practice is also set out in Appendix LF, as well as an example Code of Construction Practice. This sets out advice that contractors should be expected to follow, without prejudice to the contractor's obligations. As no detailed scheme of construction is to be produced at this stage, it is not possible to undertake a detailed analysis of construction noise emissions to existing dwellings.

3.6 If the thresholds in the above table are not exceeded, this has been determined to be no more than a Moderate Adverse short term effect. If the thresholds are exceeded, this has been determined to be a Major Adverse short term effect.

Road Network Traffic Noise (To Existing Receptors)

3.7 When assessing potential noise effects due to changes in road traffic flows as a result of a development, it is appropriate to refer to the Design Manual for Roads and Bridges (DMRB). The Manual sets out noise assessment procedures to be followed when undertaking highway works such as building new roads.

3.8 DMRB sets out thresholds at which potential effects may start to become apparent, based on changes in 18-hour daytime noise levels (0600-2400h) within the short and long terms.

3.9 The short term assessment according to DMRB is considered to be a comparison of the year of opening with and without the introduction of a development. The long term assessment, again according to DMRB, is considered to be a comparison between the year of opening and the year during which the greatest traffic flows will occur within 15 years of opening. In addition, it is appropriate to consider comparisons between future scenarios, with and without the development, as a long term assessment.

3.10 In general, calculations are carried out of Basic Noise Levels for the various scenarios, using the methodology set out in the Department for Transport document "Calculation of Road Traffic Noise" (CRTN).

3.11 The calculations are based on traffic flow data supplied by the project transport planners *RPS Group Ltd* and take account of the percentage made up of Heavy Goods Vehicles and the stated speed limit for the road. The resultant noise level figure is the $L_{A10,18h}$ dB.

3.12 The assessment is undertaken in terms of changes in the calculated Basic Noise Level, defined at 10m from the edge of the carriageway in CRTN. This does not relate directly to the noise exposure at individual residences, rather it is a reference noise level, comparison of which in various scenarios provides a good indication of the noise level changes that are expected to occur along an existing road link, where the road itself is the dominant road traffic noise source.

3.13 The changes in noise level are calculated based upon a comparison of noise generated by road traffic without development in the baseline year to the road traffic noise generated in the future year both with and without development.

3.14 In summary, the scenarios which have been assessed are detailed below:

Table L3: Road Network Noise Assessment Scenarios

Scenario Code	Short Description	Full Description
DM25	*Do Minimum 2025*	Baseline + Committed Developments only, without on-site development. (Year of Opening)
DM25+A50	*Do Minimum 2025 + A50*	Baseline + Committed Developments + New A50 Junction, without on-site development. (Year of Opening)
DS25(P1/2)	*Do Something 2025 + Phases 1 and 2*	Baseline + Committed Developments + Development Phases 1 and 2 Operational (Year of Opening)
DS25(P1/2)+ A50:	*Do Something 2025 + Phases 1 and 2 + A50*	Baseline + Committed Developments + New A50 Junction + Development Phases 1 and 2 Operational (Year of Opening)
DM30+A50:	*Do Minimum 2030 + A50*	Baseline + Committed Developments + New A50 Junction, without on-site development. (Year of Full Development Completion)
DS30(Full)+A 50+ EMP	*Do Something 2030 + Full Development + A50 + Employment*	Baseline + Committed Developments + New A50 Junction + Full Residential Development + Employment Area Complete (Year of Full Development Completion)
DS30(Full)+A 50- EMP	*Do Something 2030 + Full Development + A50*	Baseline + Committed Developments + New A50 Junction + Full Residential Development + No Employment Area (Year of Full Development Completion)
DM40	*Do Minimum 2040*	Baseline + Committed Developments, without on-site development. (Future Year)
DS40(Full)+A 50+ EMP	*Do Something 2040 + Full Development + A50 + Employment*	Baseline + Committed Developments + New A50 Junction + Full Residential Development + Employment Area Complete (Future Year)

3.15 A detailed description of the of the transportation modelling can be found in Chapter D of this Environmental Statement.

3.16 The following committed developments have been taken into account where appropriate:

- Application Ref: 05/13/00596 – Wragley Way 130 dwellings
- Application Ref: 02/15/00211 – Deep Dale Lane 50 Dwellings

3.17 The effects of a proposed junction between Deep Dale Lane and A50 (Application Ref CD19/0319/110) has also been taken into account as appropriate. It is noteworthy that at time of writing, this junction was pending consideration by Derbyshire County Council.

3.18 The following comparisons of the calculated basic noise levels have been conducted to assess the effects of the scheme in both in the short term and in the long term, taking into account the effects of the committed developments identified above as appropriate.

- Assessment 1: DM25 vs. DS25(P1/2) (Short Term Effect)
- Assessment 2: DM25+A50 vs. DS25(P1/2)+A50 (Short Term Effect)
- Assessment 3: DM25+A50 vs. DS40(Full)+A50+EMP (Long Term Effect)
- Assessment 4: DM30+A50 vs. DS30(Full)+A50+EMP (Long Term Effect)
- Assessment 5: DS30(Full)+A50-EMP vs. DS30(Full)+A50+EMP (Long Term Effect)
- Assessment 6: DM40+A50 vs. DS40(Full)+A50+EMP (Long Term Effect)
- Assessment 7: DM40 vs. DS40(Full)+A50+EMP (Long Term Effect)

3.19 The proposed road network noise assessment criteria are summarised in table L4 below.

Table L4: Road Network Noise Assessment Criteria

Change in Noise Level	Magnitude of Change in Noise Level in the Short Term	Magnitude of Change in Noise Level in the Long Term
0.0	No Change	No Change
0.1 to 0.9	Negligible	Negligible
1 to 2.9	Small	Negligible
3 to 4.9	Medium	Small
5 to 9.9	Large	Medium
10+	Large	Large

3.20 The thresholds shown above are based upon guidance provided within DMRB.

3.21 The presentation of changes in sound level in the table above to one decimal place is not a reflection of accuracy of the assessment but rather serves to provide a clear threshold between adjacent effect descriptions.

3.22 The aim shall be to ensure that the magnitude of change is limited to Small. Taking into account the sensitivity of the existing receptors, the corresponding noise effect would therefore be considered to be up to Minor Adverse in the worst case.

Noise from Fixed Plant Items (To Existing Receptors)

3.23 For fixed plant items it is appropriate to set limits at the nearest noise sensitive receivers based on the existing background noise levels around the site. An assessment of plant noise will be conducted at a later stage in the design process, when any potential mechanical services scheme is progressed, in accordance with guidance given in BS 4142:2014.

3.24 It is proposed that plant noise (in terms of rating levels) at existing residences should be designed to 5dB below the measured representative background noise level.

3.25 It is recommended however, that in instances of low background noise, it is not considered reasonable to design plant noise levels to 5dB beneath the L_{A90} background; we would in these circumstances recommend a reasonable minimum plant noise emission limit in absolute terms of 30dB(A). In the previous version of BS 4142 (1997) it noted that "rating levels below 35dB are considered very low". The current version of BS 4142 states:

"Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."

3.26 To service as an example, taking the typical loss through a partially open window of 10-15dB(A), the proposed minimum plant noise limit of 30dB(A) would result in levels no greater than 20dB(A) within any nearby property, which is 10dB(A) lower than the standard for bedrooms indicated in BS 8233:2014.

3.27 It is suggested that the only variation to this would be for emergency plant items such as sprinkler systems, smoke extract fans and emergency generators. These would be used during emergencies and to test that the systems work. It is proposed that testing of the systems is limited to daytime only and the plant noise limits for these items are relaxed to 10 dB above the existing background noise level during the testing period.

3.28 With the fixed plant designed to achieve the limits above the noise effect is expected to be Neutral/Negligible.

Road and Rail Traffic Noise (To Proposed Receptors)

3.29 The noise impact on the proposed new dwellings from existing road and rail noise sources has been considered.

3.30 The assessment of potential noise effects on the proposed new dwellings from noise sources considers the internal and external noise levels within habitable rooms and associated external amenity areas respectively. Calculations take account of the existing noise climate, as measured during the survey, along with the changes in noise levels due to the development.

3.31 As the application is based upon an Illustrative Masterplan, rather than a detailed layout, indicative facades have been assumed on the boundaries of each parcel to allow an assessment to be undertaken. This is considered to be a reasonable worst case approach.

3.32 A computerised noise model of the site (as detailed in Appendix LB) has been developed which takes into account the measured noise levels across the site, the site's topography and environmental factors such as wind direction. The use of a noise model allows of accurate calculation of expected noise levels at any point across the proposed development site.

3.33 The potential effects of the proposed A50 junction and associated link roads have also be considered within the assessment as appropriate.

3.34 The aim of the assessment was to ensure that the proposed noise sensitive receptors are adequately protected against noise from the local road and rail network, in respect to the design criteria contained within British standard BS 8233:2014 as summarised below:

- Daytime internal $L_{Aeq,16h}$ to all habitable rooms no greater than 35 dB.
- Night time internal $L_{Aeq,8h}$ to all bedrooms no greater than 30 dB.
- Aspirational daytime $L_{Aeq,16h}$ in outdoor amenity areas ideally no greater than 55 dB with noise levels above up to 60dB acceptable providing they are mitigated as far as is reasonably practicable.

3.35 The above criteria have also been applied to noise from the existing road network on proposed noise sensitive receptors to be included as part of the development.

3.36 Where the internal noise levels can be achieved, this has been determined to give rise to a Neutral/Negligible effect, where significant adverse effects are avoided. If internal noise levels are calculated to exceed the above criteria, this has been determined to be a Minor, Moderate or Substantial Adverse effect, depending on the margin by which they are exceeded.

3.37 Where the lower aspirational external noise level target can be achieved in external amenity areas, this has been determined to give rise to a Neutral/Negligible effect.

3.38 If external noise levels in external amenity areas are calculated to be between the upper and lower design targets, the effect would be Minor Adverse at worst. If external noise levels are calculated to exceed the upper criterion in

external amenity areas, a Moderate or Substantial Adverse effect may arise, depending on the context and the margin by which the target is exceeded.

Noise from Proposed Employment Area (to Existing and Proposed Receptors)

3.39 As with the proposed residential development, the layout of the proposed employment area is yet to be established and it is therefore not possible to undertake a detailed assessment of noise from this element at this time. This is because the type, location and operational regime of noise sources on the employment site is not known.

3.40 To ensure that noise from the proposed Employment area is suitably controlled, the basis has been established for setting noise limits for the site (in terms of rating noise levels, $L_{Ar,Tr}$ dB), against which future design proposals can be assessed. The basis for how limits shall be set is set out in Appendix LC of this chapter.

3.41 General guidance has also been set out to ensure the development of the employment site is approached taking into account the best practicable means of acoustic design.

3.42 In terms of limits, where the predicted rating noise emission level of the employment area development, at any given receptor, is at or below free field levels of 45 dB $L_{Ar,1\ hour}$ during the day and 40 dB $L_{Ar,15\ minute}$ during the night, no further action or assessment is necessary.

3.43 It should be noted that this rating level will include all BS 4142 penalties for tonality and distinctive features.

3.44 Where the predicted rating levels exceed the thresholds identified above, further assessment will be required, drawing from guidance within BS 4142. Rating noise level limits would be established at a level 5dB above the representative background noise level for the relevant time periods (assuming these figures are not below the thresholds in section 3.42).

3.45 It is the intention that limits derived using the rating level methodology will apply to the total combined noise level from an industrial site. This may include both B1 (light industry), B2 (general industrial) and B8 (storage or distribution) uses, all of which may include items of fixed building services plant.

3.46 To provide maximum flexibility for B8 uses, it is often desirable to set limits for B1 and B2 uses and for fixed plant associated with the B1, B2 and B8 use at a level 10 dB lower than the overall limits for the site. This allows the B8 use to operate up to the overall site limit.

3.47 When considering night time impulsive noise, where the expected noise emission from the proposed employment area is at or below 57 dB L_{Amax}, no further action or mitigation is required.

3.48 Where development gives rise to night time noise levels in excess of 57 dB L_{Amax} mitigation should be implemented to reduce noise levels to 57 dB or less, or as close to 57 dB as reasonably practicable.

3.49 Where existing noise levels already typically exceed 57 dB L_{Amax} it would be reasonable to ensure development noise levels do not exceed existing typical L_{Amax} noise levels in both level and typical rate of occurrence.

3.50 Where development noise events from sources designed specifically to attract attention (such as reversing bleepers) are concerned, night time noise levels should again not exceed 57 dB L_{Amax}. However, a penalty of up to 12 dB should be applied to account for the fact that reversing sounders are specifically designed to attract attention and they exhibit tonal and intermittent characteristics.

3.51 Where the proposed limits can be achieved, this has been determined to give rise to a Neutral/Negligible effect, where significant adverse effects are avoided.

Significance Criteria

Overview

3.52 The assessment of likely significant noise effects as a result of the Proposed Development has taken into account the construction and operational phases.

3.53 To determine the significance of the introduction of a new noise source or sensitive receptor, it is appropriate to consider not only the magnitude of change in noise climate that the relevant receptors are likely to experience, but also the relevant receptor's sensitivity.

Determining Sensitivity of Receptor

3.54 The sensitivity of affected receptors has been considered on a scale of high, medium, low or negligible.

3.55 For the purposes of this noise chapter, all existing and proposed residential receptors are considered to have "high" sensitivity.

Determining the Magnitude of Change

3.56 The magnitude of change has been considered as the change experienced from the baseline conditions at the sensitive receptor and has been considered on a scale of **large**, **medium**, **small** or **negligible**.

- **Negligible** – no significant change to conditions experienced by a receptor.

- **Small** – slight, highly localised change of conditions, with no significant consequence.
- **Medium** – limited change of conditions (by extent, duration of magnitude) which may nonetheless be considered significant in the context of the Site and/or surrounding areas.
- **Large** – considerable change of conditions (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards.

Determining the Level of Effect

3.57 The level of effect attributed to each effect has been assessed based on the magnitude of change due to the Proposed Development and then sensitivity of the affected receptor. The level of effect has been based on professional judgement and the following matrix tool which has been used to assist with this process as appropriate.

Table L5: Matrix to Support Determining the Level of Effect

		Sensitivity (or value / importance)			
		High	Medium	Low	Negligible
Magnitude of Change	Large	Substantial	Moderate	Minor	Neutral/Negligible
	Medium	Moderate	Moderate	Minor	Neutral/Negligible
	Small	Minor	Minor	Minor	Neutral/Negligible
	Negligible	Neutral/Negligible	Neutral/Negligible	Neutral/Negligible	Neutral/Negligible

3.58 For each effect, it has been concluded whether the effect is '*beneficial*' or '*adverse*'. A statement is also made when considered residential effects as to whether the level of effect is '**Significant**' or '**Insignificant**', again based on professional judgement.

3.59 The following terms have been used to define the significance of the effects identified and these can be '*beneficial*' or '*adverse*':

- **Substantial effect**: where the Proposed Development is likely to cause a considerable change from the baseline conditions and the receptor has limited adaptability, tolerance or recoverability or is of the highest sensitivity.
- **Moderate effect**: where the Proposed Development is likely to cause either a considerable change from the baseline conditions at a receptor which

has a degree of adaptability, tolerance or recoverability or a less than considerable change at a receptor that has limited adaptability, tolerance or recoverability.

- **Minor effect**: where the Proposed Development is likely to cause a small, but noticeable change from the baseline conditions on a receptor which has limited adaptability, tolerance or recoverability or is of the highest sensitivity or a considerable change from the baseline conditions at a receptor which can adapt, is tolerant of the change or/and can recover from the change.
- **Negligible**: where the Proposed Scheme is unlikely to cause a noticeable change at a receptor, despite its level of sensitivity or there is a considerable change at a receptor which is not considered sensitive to a change.

3.60 When considering the noise effects above, Neutral/Negligible or Minor Adverse effects would be expected to be consistent with the requirements of the NPPF, specifically paragraph 180, to avoid significant adverse effects and would be considered to be below the SOAEL in terms of the PPG.

3.61 It is important to note that where noise effects are concerned, any identified to be of Substantial significance may not necessarily have effects beyond a local scale i.e. in close proximity to the source of noise.

Consultation

3.62 Discussions were held with the Environmental Health Department at South Derbyshire District Council in 2013 to determine suitable internal and external noise criteria for the residential development site at Infinity Garden Village. At the time, the general principles were accepted and it is expected that the local authority would continue to adhere to the same/similar principles.

3.63 Derby City Council was also liaised with in 2013 and suitable noise criteria for the land parcels falling within Derby City Council's jurisdiction have been established. Again it is expected that the general design principles previously agreed would continue to apply.

Assumptions and Limitations

Construction Noise

3.64 The exact methods of construction are not yet known and it is therefore only possible to provide general guidance as to best practice, rather than to provide comment on specific activity types. There is a reliance on the contractors to follow the advice set out in the guidance provided in Appendix LE and LF.

Fixed Plant Items

3.65 As a scheme of mechanical services plant is yet to be devised (if applicable), it is not possible to comment on whether any required mitigation measures would meet the required specification. This exercise can however be completed later in the design stage if mechanical services plant is to be utilised and therefore is not a significant limitation. There is a reliance however, on the mechanical services designers to design to appropriate plant noise limits, as derived using the methodology set out within this chapter and its appendices.

Proposed A50 Junction

3.66 Whilst information is available with respect to the expected noise generated by the proposed new A50 junction to the proposed residences, this study was conducted by others. Where the assessment has taken this junction into account, it is limited by the accuracy of the other consultant's work.

Proposed Employment Area

3.67 As the layout, form and use of the proposed employment area is yet to be determined, it is not possible to comment definitively on mitigation potentially required to meet the required specification. This exercise would however be completed later in the design. There is a reliance on future assessments to ensure that noise emissions from the employment area meet appropriate noise limits, as derived using the methodology set out within this chapter and its appendices.

L4.0 Baseline Conditions

Existing Conditions

Baseline Road Network Traffic Data

4.1 Traffic flow information has been supplied by *RPS Ltd* and is outlined in Appendix LD. The year of opening of Phases 1 and 2 of the development has been set at 2025.

4.2 Where developments in the local area have been granted planning permission (permitted development), the change in traffic flows due to these have been included in the traffic data, details of these permitted developments are provided in section 3 of this Chapter.

Baseline Noise Survey Data

4.3 Baseline noise levels across the site and in positions near to existing sensitivities have been quantified. Surveys were completed first in 2013 and then again in 2019 to ensure the validity of the data used. Full details of the noise survey are provided within Appendix LA and the relevant key information is reproduced below for ease of reference.

4.4 Three key long-term unattended noise monitoring positions were utilised to quantify the prevailing noise climate across the site. A further eight short term attended measurement positions were utilised to provide a more detailed understanding of noise propagation across the site. These measurement position locations can be seen on the site plan attached to Appendix LA.

4.5 At position L1, the dominant noise source was road traffic on the A50 with a small contribution from vehicles moving on Deep Dale Lane.

4.6 At position L2, the dominant noise source was road traffic on the A50 with a small contribution from vehicles moving on Arleston Lane.

4.7 At position L3, the dominant noise source was train movements on the nearby railway line and to a lesser extent road traffic on the A50.

4.8 A summary of noise levels used for the purposes of assessment at each long term measurement location can be seen in the table below:

Table L6: Summary of long term noise measurement results used for the purposes of assessment

Measurement Position	Daytime $L_{Aeq,16hour}$ (dB)	Night time $L_{Aeq,8hour}$ (dB)	Typical night time $L_{Amax,f}$ (dB)
L1	65	61	72
L2	63	58	71
L3	67	63	89

4.9 Results of the short term, attended measurements are presented in Appendix LA.

Future Baseline

Future Road Network Traffic Data

4.10 Data has been provided by *RPS Ltd* for 2030, which is the point at which the remainder of the residential development (i.e. beyond phases 1 and 2) is expected to be completed (both with and without employment development). 2040 has been adopted as the future assessment year for the purpose of this assessment.

4.11 A new road junction is proposed between Deep Dale Lane and the A50. The effects of the proposed junction have been considered in a number of the traffic change noise assessment scenarios. It is noteworthy that at time of writing, this junction cannot be considered as a committed development as it has not be consented by the relevant local planning authorities.

L5.0 Potential Effects

During Construction

5.1 It is not possible to predict the construction noise impacts at this stage as full details of the proposed construction activities are unknown. However, as construction activities have the potential to generate significant levels of noise the magnitude of any noise effect could potentially be High in the short term at the closest dwellings.

5.2 Due to the temporary nature of construction activities there will be no impact in the long term.

5.3 It is noted that construction will occur over different parts of the site at different times due to the scale of the development. Large areas of the site are located well away from existing noise sensitive receptors. Therefore, the true time that existing dwellings are expected to be exposed to construction noise in close proximity is limited.

5.4 It is possible for the magnitude of changes in noise level related to construction activity to be Large. This noise source could therefore be considered to present a potential Substantial Adverse effect at existing receptors.

During Operation

Road Network Traffic Noise (To Existing Receptors)

5.5 Appendix LD shows the noise levels associated with each road traffic noise assessment scenario alongside the comparison between these and the magnitude of effect.

5.6 The magnitude of any change in noise levels has been found to be Negligible to Small in the worst case and therefore changes in road traffic as a results of the proposed development are deemed to pose no more than a Neutral/Negligible or Minor Adverse effect at on all assessed roads in both the short and long term.

Noise from Fixed Plant Items (To Existing Receptors)

5.7 Noise from fixed plant items installed on the site has a capacity to give rise to a Substantial Adverse effects without any mitigation installed.

Road and Rail Traffic Noise (To Proposed Receptors)

5.8 There is the potential for proposed dwellings to be exposed to a **Substantial** Adverse noise effects if the site layout is not optimised to provide mitigation

against these road and rail noise sources and if the envelopes are not suitable design to control noise ingress.

Noise from Proposed Employment Area (to Existing and Proposed Receptors)

5.9 There is the potential for both proposed and existing dwellings to be exposed to Substantial Adverse noise effects if the employment site layout is not optimised and no mitigation measures are implemented (i.e. bunds and screens, including screening provided by buildings themselves) to control noise from its operation.

Cumulative Impacts

Road Network Traffic Noise (To Existing Receptors)

5.10 The cumulative effects of other committed developments have been included as part of the road network traffic noise assessment. It has been determined that the potential effect when considering nearby committed developments would be limited to Neutral/Negligible to Minor Adverse in the worst case.

5.11 Whilst the proposed A50 junction cannot be considered a committed development, the effects of its introduction have been considered within the Road Network Traffic Noise assessment. It has been determined that the potential effect when considering the proposed development with the new A50 junction, would be limited to Neutral/Negligible to Minor Adverse in the worst case.

Road and Rail Traffic Noise (To Proposed Receptors)

5.12 The proposed A50 junction has the potential to affect noise levels at proposed receptors in the vicinity of the junction. Mitigation measures for the proposed residences have been considered to ensure the potential effect and proposed residences would be limited from Neutral/Negligible to Minor Adverse in the worst case.

L6.0 Mitigation and Monitoring

During Construction

6.1 Guidance on best practicable means of noise control during construction activities and an example Code of Construction Criteria and Code of Practice are set out in Appendix LE and Appendix LF respectively. This guidance could be used to form the basis of a Section 61 agreement (or similar) to control construction noise. Appendix LE also sets out suggested noise and vibration limits to be used as a benchmark for construction noise control.

6.2 In order to deal with the potential environmental effects of construction noise, a Construction, Environmental and Management Plan (CEMP) will be prepared, using advice set out in Appendix LF. Construction noise will be generally limited to the levels shown in the table below:

Table L7: Construction Noise Limits

	Total Noise Levels at Designated Noise Sensitive Locations		
Period	**Hours**	**Ambient Construction Noise Level $L_{Aeq,T}$, dB**	**Period T over which the Ambient $L_{Aeq,T}$ is applicable, hours**
Mondays to Fridays	0800-1800	75	any 4 hours
Mondays to Fridays (if permitted)	1800-2200	65	any 1 hour
Saturdays (if permitted)	0800-1300	75	any 4 hours
	1300-1800	65	any 1 hour
	1800-2200	65	
Sundays (if permitted)	0800-0900	65	any 1 hour
	0900-1700	65	
	1700-2200	65	
Any day (if permitted)	2200-0800	Construction Noise Levels subject to negotiation with EHO	Any day (if permitted)

6.3 Where the noise levels above are exceeded for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months, noise insulation, or the reasonable costs thereof, will be offered by the developer or promoter to owners as stated in BS 5228.

6.4 No additional measures are required beyond those already proposed which should be included within a CEMP. An example of the noise controls which could be introduced are set out below and in detail in Appendix LF:

- All vehicles and mechanical plant used for the purpose of carrying out the works shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order so that extraneous noises shall be reduced to a minimum.
- All compressors and generators shall be "sound reduced" models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use. All ancillary pneumatic percussion tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers. Generators shall be positioned and enclosed so as to minimise noise transmission to the inhabitants in the neighbourhood as agreed with the Employers Agent.
- All pumps shall be positioned and enclosed so as to minimise noise transmission to inhabitants in the neighbourhood.
- All machines in intermittent use shall be shut down in the intervening periods between work or, where this is impracticable, throttled down to a minimum.
- No machine shall be permitted which uses a system of dropping a heavy weight, power assisted or by gravity, for the purpose of breaking up paving or foundations.
- Access to the Site shall be such as to ensure a minimum of disturbance to persons in adjacent buildings by vehicles or plant entering or leaving the Site. No deliveries to Site shall take place outside the agreed working hours.
- Any work agreed to be carried out between 2200 and 0800 hours will be subject to agreement of noise levels with Environmental Health Officer. The Contractor shall provide details on work involved, machinery or plant used, exact location, and calculated noise levels at monitoring points.
- Any fixed or static plant operating outside normally permitted working hours shall not give rise to a 'rating level', as defined in BS4142:2014 in excess of the existing free-field background L_{A90} noise levels nearest noise-sensitive receptors (all of which are dwellings). The existing baseline free-field background noise levels are to be provided as explained earlier.

6.5 Without prejudice to the foregoing and to requirements of particular clauses in the Conditions of Contract, the Contractor shall not be permitted to carry out works as stated below, except where such work is absolutely necessary for the saving of life or property and the safety of the Works or as is required under the terms of the Contract.

- Piling, including sheet piling, by percussive methods outside the hours of 0800 to 1800 Mondays to Fridays.
- The maintenance of mechanical or other constructional plant in the proximity of noise sensitive buildings outside the hours of 0800 to 1800 on Mondays to Saturdays or at any time on Sundays and public holidays.

6.6 It is intended that if the noise levels at the nearest residential windows exceed stated thresholds for extended periods then some form of mitigation would be considered. The type of mitigation would be dependent on the offending noise source and hours of operation etc. The aim is to avoid Substantial Adverse noise effects occurring.

6.7 The construction of the proposed buildings and associated infrastructure is expected to be conventional and would not therefore give rise to significant noise effects for existing dwellings. Using best practical means of construction is expected to control the temporary noise effects are expected to be generally **Minor Adverse**.

During Operation

Road Network Traffic Noise (To Existing Receptors)

6.8 No mitigation measures are required as part of the development with respect to road network noise affecting existing sensitivities.

Noise from Fixed Plant Items (To Existing Receptors)

6.9 The basis for establishing noise limits, against which any/all future mechanical services plant to be introduced onto the site should adhere, has been established as set out in sections 3.23 to 3.28 of this chapter. A scheme of mechanical ventilation is, however, yet to be developed for any part of the scheme and therefore an assessment of noise from fixed plant items will be conducted when the mechanical services design is completed.

6.10 Plant noise limits will be set at a level 5dB below the representative background noise level at the nearest noise sensitive receptor to that plant. Plant noise limits will be established once the location of any proposed plant is known and if appropriate. Any assessment of plant noise will be undertaken in accordance with British Standard BS 4142:2014 (or more recent current version).

6.11 Where future assessment shows it to be necessary, mitigation measures would be implemented in order to meet the plant noise limits set. Such mitigation would typically take the form of acoustic barriers, louvres and attenuators for example.

Road and Rail Traffic Noise (To Proposed Receptors)

6.12 An assessment of the existing noise climate and noise generated by the proposed A50 junction operation on the proposed new dwellings has been conducted, as detailed in Appendix LB, having regard to the Illustrative Masterplan. Full details of the mitigation measures required are shown within the appendix. Relevant information is reproduced below for ease of reference.

6.13 In terms of controlling noise to habitable spaces within dwellings, the final mitigation requirements for the proposed residents will be dependent on the final layout of each development parcel.

6.14 The noise model has been used to determine the noise levels at the boundaries of the most exposed proposed residential parcels to the various noise sources around the site. Façade noise mitigation means have subsequently been determined based on these noise levels to determine what would be required in the worst case.

6.15 The most exposed location of any proposed residential façade has been identified to the south west of the site, adjacent to the A50 where the road is raised significantly above the level of the site. The level is this location is assessed to be greater than is expected at proposed residential receptors near to the proposed new A50 junction.

6.16 The table below provides the specification of the glazing which is required to meet the internal noise criteria in the most exposed possible residential location:

Table L8: Worst case required acoustic glazing specifications

	Sound Reduction Index (R dB) at Octave Band Centre Frequency (Hz)					
Location Required	125	250	500	1k	2k	4k
Habitable rooms on most exposed residential facades	29	33	44	46	49	57

6.17 The table below provides the specification for each ventilator type required in order to meet the internal noise criteria in the same most exposed location on the site:

Table L9: Required acoustic ventilator specifications

	Element Normalised Level Difference ($D_{n,e}$ dB) at Octave Band Centre Frequency (Hz)					
Location Required	125	250	500	1k	2k	4k
Habitable rooms on most exposed residential facades	48	39	44	52	66	61

6.18 Mechanical ventilation in the form of MHVR may also be used to ventilate dwellings if preferred, providing suitable attention is given to ensure noise emissions from such systems is adequately controlled.

6.19 The above specifications must be met in full and no part of the window or vent system, including frame, can allow these octave band figures to not be achieved.

6.20 The key principle here is that it has been demonstrated that it will be possible to provide even the most exposed habitable rooms with noise levels meeting the propose design criteria.

6.21 The façade mitigation measures set out within this ES chapter very much represent a worst case and it will be possible to significantly reduce the required noise mitigation measures across much of the site, once the building layout is known.

6.22 Therefore, with a suitable scheme of mitigation in place to protect the dwellings across the development, the effects of noise intrusion to the proposed dwellings will be Neutral/Negligible.

6.23 To ensure noise levels in external amenity areas meet the required design targets, it will be necessary to ensure the proposed building layout is optimised such that the buildings provide screening to their associated garden areas. In the more exposed areas of the site, it will be necessary to make used of 3 storey dwellings to provide the necessary screening, in additional to localised, low level timber screening in some areas.

6.24 The above principles are demonstrated within technical Appendix LB. The optimisation of the site layout and specification of external mitigation measures can be conducted at a later design stage.

6.25 It has been demonstrated that all external amenity areas can achieve noise levels within the aspirational design criteria, through careful consideration of dwelling orientation where required. The effects of noise to the external amenity areas of the proposed dwellings can therefore be considered from Neutral/Negligible to Minor Adverse in the worst case.

Noise from Proposed Employment Area (to Existing and Proposed Receptors)

6.26 The basis for establishing noise limits has been set out in Appendix LC. Measures will be included as necessary to ensure that all noise emissions from the proposed Employment Area are below these limits. The assessment of noise from the proposed employment area will need to be undertaken once design proposals are suitably developed. However, with the introduction of appropriate noise mitigation measures, noise levels as a result of the

introduction of the employment area could be suitably controlled to Minor Adverse.

6.27 Suitable mitigation measures are expected to include (but not be limited to) the following:

- Acoustic barriers
- Development of an appropriate site layout which provides screening to noise sensitive receptors by placing employment buildings between onsite noise sources and offsite receptors.
- Possible limitations of vehicle movements, both in terms of numbers and hours of operation.

L7.0 Residual Effects

During Construction

7.1 No residual effects are predicted because construction noise and vibration is inherently temporary in nature. Nevertheless, best practice principles will be employed in the construction methodologies to ensure that noise emissions are minimised.

7.2 With the best practice principles taken into account, the temporary effect of construction activity will be expected to be limited to **Minor Adverse** in the worst case.

7.3 Construction effects are therefore assessed as insignificant.

During Operation

Road Network Traffic Noise (To Existing Receptors)

7.4 No actionable **mitigation** measures are required and residual impacts are assessed as being **Neutral/Negligible to Minor in the worst case.**

7.5 Traffic noise effects are therefore assessed as insignificant.

Noise from Fixed Plant Items (To Existing Receptors)

7.6 Providing all plant to be included as part of the development as a whole is designed to plant noise limits based on the methodology set out in in Appendix LC, the residual effect of fixed plant items will be **Neutral/Negligible**.

7.7 Fixed plant noise effects are therefore assessed as insignificant.

Road and Rail Traffic Noise (To Proposed Receptors)

7.8 Taking into account the mitigation strategy previously outlined and as detailed in Appendix LB, the residual effect of noise from existing local road traffic and rail vehicle movement to proposed sensitives is expected to be **Neutral/Negligible to Minor in the worst case.**

7.9 Road and rail traffic noise affecting proposed receptors is therefore assessed as insignificant.

Noise from Proposed Employment Area (to Existing and Proposed Receptors)

7.10 Providing the proposed employment area is designed in such a way that appropriate noise limits (the basis for which is set out in Appendix LC) are met, the residual effect of the Employment Area will be **Neutral/Negligible**.

7.11 Effects related to noise from the proposed employment area, affecting proposed receptors is therefore assessed as insignificant.

L8.0 Summary & Conclusions

8.1 Assessments have been carried out to consider the potential noise impacts of construction activity, changes in traffic flows on the local road network, fixed plant items and the proposed employment area on existing residences. Noise from the proposed employment area has also been considered to proposed residents.

8.2 Noise impacts during the construction phase have been considered. Example Construction Noise criteria have been set out, and best practicable means have been suggested to minimise the noise impacts as far as is possible and practical. Recommendations have been made with respect to periods during which construction activity may occur. Allowing for this, the impact is assessed as being Minor Adverse in the worst case, and Temporary.

8.3 The noise effects at existing residences due to changes in traffic flows on the local road network associated with the development have been assessed. The assessment takes into account the cumulative effects of other nearby developments. In both the short and long term, a Minor Adverse impact is assessed in the worst case to noise sensitive receptors along the local road network.

8.4 Noise limits have been established for all/any mechanical services plant to be included as part of the development. Once and if a scheme of plant has been determined, mitigation measures will be implemented as appropriate to ensure the limits are met. With the noise limits being met, the noise effect of any/all proposed mechanical services plant can be considered Neutral/Negligible.

8.5 Potential effects upon proposed residences within the development have been considered in terms of existing road and rail traffic noise. Noise from both sources will be mitigated as an inherent part of the layout and design of the proposed development to ensure a suitable noise environment is provided for future occupiers.

8.6 The envelopes of the proposed dwellings are required to offer sufficient levels of noise mitigation to ensure the proposed internal noise limits are met. With the internal and external noise limits met, the noise effect of any/all proposed mechanical services plant can be considered Neutral/Negligible.

8.7 Noise limits have been established for the operation of the proposed employment area. Once the design of the employment area has been suitably developed, mitigation measures will be implemented as appropriate to ensure the limits are met. With the noise limits being met, the noise effect of the proposed employment area can be considered Neutral/Negligible.

8.8 The following summary of effects table below sets out what are expected to be the worst case effects in all instances/assessment scenarios:

Table L10: Summary of Effects

Receptor	Effects	Mitigation	Residual Effects
During Construction			
Existing residences	Substantial Adverse	Best practice construction methods and adhering to Construction Management Plan.	Minor Adverse
During Operation - Road Network Traffic Noise			
Existing residences	Neutral/Negligible to Minor Adverse	None Required.	Neutral/Negligible to Minor Adverse
During Operation - Noise from Fixed Plant Items			
Existing residences	Substantial Adverse	Silencers, screens, enclosures etc. to ensure plant noise limits are met.	Neutral/Negligible
During Operation - Road and Rail Traffic Noise			
Proposed residences	Substantial Adverse	Optimisation of site layout, localised acoustic screening, acoustically rated glazing and ventilation/MHVR as appropriate.	Neutral/Negligible to Minor Adverse
During Operation - Noise from Proposed Employment Area			
Existing and proposed residences	Substantial Adverse	Optimisation of site layout, localised acoustic screening, possible restrictions to employment area operation.	Neutral/Negligible

L9.0 Abbreviations & Definitions

1. $L_{Aeq,T}$ - The notional steady sound level (in dB) which over a stated period of time (T), would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq}.

2. L_{Amax} - The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the "fast" sound level meter response.

3. L_{A10} and L_{A90} - If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly, L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

   L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_n.

4. $L_{Ar,Tr}$ - The A-weighted, rating noise level attributed to a given source over a particular time (T), inclusive of acoustic feature corrections such as for tonality, impulsivity etc.

L10.0 References

1. National Planning Policy Framework (NPPF), Department for Communities & Local Government, 2018
2. Noise Policy Statement for England (NPSE), Department for Environment, Food & Rural Affairs, 2010
3. BS 5228-1:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites. Noise
4. BS 4142:2014 - Methods for rating and assessing industrial and commercial sound
5. BS 8233:2014 - Guidance on sound insulation and noise reduction for buildings.
6. Design Manual for Roads and Bridges – Department for Transport
7. Calculation of Road Traffic Noise 1988 – Department for Transport

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter M: Agriculture and Soils

June 2019

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M1.0 Introduction

1.0 This Chapter of the Environmental Statement ("ES") has been prepared by Land Research Associates on behalf of Hallam Land Management ("the Applicant"). This Chapter provides information on the agricultural use and quality of land of the Site and the potential effects of the Proposed Development, and the likely significance of such effects during its operational and construction phases.

About the Author

1.1 The chapter has been prepared by Dr Mike Palmer, Chartered Soils Scientist and Director of Land Research Associates, with over ten years' experience of assessment of development effects on soils and agricultural land.

M2.0 Policy Context

Local

Local Plan Part 1

2.1 The development plan comprises the South Derbyshire District Local Plan, which was adopted in November 2017. The Derby City Local Plan - Part 1 Core Strategy was adopted in January 2017.

2.2 A list of the Local Plan policies which are relevant, at least in part, to soils and agricultural matters, are set out below and further details are provided in ES Chapter A. Such development plan policies have been taken into account in relation to the Proposed Development.

- South Derbyshire Local Plan Part 1 Policy BNE5: Planning permission for development outside settlement boundaries will be granted where it *'…will not unduly effect on: landscape character and quality, biodiversity, best and most versatile agricultural land, and heritage assets'*.

- Derby City Local Plan Part 1 Policy CP19: *'The biodiversity and geodiversity assets across the City will be protected, enhanced, managed, restored, strengthened and created in a manner appropriate to their significance. The Council will: ensure that development will protect, enhance and restore the biodiversity and geodiversity value of land and buildings'.*

National

National Planning Policy Framework

2.3 The applicable legislative framework is summarised as follows from the National Planning Policy Framework (2019):

'Planning policies and decisions should contribute to and enhance the natural local environment by...

a) ...protecting and enhancing soils (in a manner commensurate with their... identified quality in the development plan); and

b) ...recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land….where significant development of agricultural land is demonstrated

to be necessary, areas of poorer quality land should be preferred to those of a higher quality.[1]

Planning Guidance

2.4 The applicable guidance is summarised as follows:

- The Government's Planning Practice Guidance, which advises that soil is an essential finite resource that provides important 'ecosystem services'.
- The Government-produced 'Safeguarding our Soils' strategy, through which Defra has published a code of practice on the sustainable use of soils on construction sites.[2]

M3.0 Assessment Methodology & Significance Criteria

Scope

3.1 Most of the land within the Site is greenfield and either in current agricultural use, or has the potential to be easily returned to agricultural use (e.g. fallow areas or horse paddocks). Built development involves the permanent loss of agricultural land, with potential effects on the long-term productive capability of the agricultural sector both locally and nationally.

3.2 The site includes natural soils, which represent a valuable finite resource separate from agricultural production (i.e. these functions may exist regardless of whether the land is used for agriculture). These functions include absorbing rainfall to mitigate surface flooding, supporting habitats and soft landscaping.

Assessment Methodology

3.3 The soils and agricultural quality of the Site were assessed via a detailed survey in accordance with current industry best practice and in compliance with the guidelines issued by the statutory authority on these matters (Natural England). Full details are provided in Appendix M1.

Significance Criteria

3.4 There is no nationally agreed methodology for classifying the effects of development on agriculture or soils and the approach used in this Chapter has been developed by Land Research Associates Ltd. over a number of years. Effects of a project can be: minor, moderate or major adverse/beneficial[1] and may result in significant effects on a receptor; or negligible. Effects that are deemed to be significant for the purposes of this assessment are those that are described as being moderate or major adverse.

Sensitivity of Receptors

3.5 Best and Most Versatile (BMV) agricultural land (i.e. Grades 1 and 2 and Subgrade 3a on MAFFs 1988 ALC System) is considered to be a finite national resource, is given special consideration in national policy, and can be considered to be of higher sensitivity than Subgrade 3b, and Grades 4 and 5. In areas of the country where BMV land is widespread, such as the South Derbyshire District, the best land (i.e. Grades 1 and 2) is considered of higher

[1] Beneficial = Resulting in advantageous or positive effects on a receptor.

sensitivity than Subgrade 3a. The loss of lower quality land is considered of lower importance under the planning system of England and Wales.

3.6 All natural soils are a finite resource, but where sites are to be developed, their quality as a resource for reuse varies: medium and coarse loamy soils are regarded as being of a higher value for reuse and of the highest sensitivity due to the fact that these soils are most effective at mitigating the effects of flooding; thereby are of highest quality for reuse in gardens and planting schemes (the most likely to meet British Standards criteria for use at other sites). Lower quality soils, such as sandy or clayey topsoils, are susceptible to damage and are considered to be of less valuable if lost. Permeable coarse or medium textured subsoils are reusable for planting schemes (e.g.to support tree growth) and have a greater function in mitigating the effects of flooding than heavy and slowly permeable subsoils. In some instances, soils have important properties that make them able to support rare habitats (e.g. species diverse calcareous grassland or lowland heath habitats).

3.7 The sensitivity criteria used in the assessment of effects on the two receptors are summarised in Table M1.

Table M1: Sensitivity of Receptors

Sensitivity	Agricultural land in the South Derbyshire District	Soil Resource
High	Grades 1 & 2	Permeable coarse loamy and medium loamy soils, or other soils capable of supporting valuable habitats.
Medium	Subgrade 3a	Fine textured or sandy topsoils not capable of supporting valuable habitats. Mixed permeable and slowly permeable subsoils.
Low	Subgrade 3b and Grades 4 & 5	Damaged or contaminated soils. Slowly permeable subsoils.

Magnitude of Effect

3.8 The magnitude of effect on agricultural land will depend on the amount of BMV land to be taken by the Proposed Development. Town and Country Planning only requires Natural England to be consulted on a development that involves the loss of not less than 20 ha of grades 1, 2 or 3a agricultural land.[3]

3.9 Consequently, a magnitude of loss smaller than this threshold is considered to have a small effect on the national stock of BMV land. Losses of >80 ha

of BMV land are equivalent to the size of a medium to large farm and the magnitude of effect is considered to be large. This judgment-based classification is provided in Table M2.

3.10 The magnitude of effect on topsoil resources makes the assumption that, as a valuable finite resource, the requirement should be to protect topsoils from damage. However, since built developments often generate large surpluses of topsoil, the primary requirement is considered to be that sufficient topsoil should be protected to complete all onsite landscaping/greenspace requirements (provided the baseline resource is suitable for the proposed uses). Failure to do so is regarded as a large magnitude effect. If all topsoil is protected from damage, the effect is regarded as negligible. As few built developments are likely to require more than 50% of topsoil for reuse, losses below this figure are regarded as minor.

3.11 Subsoil compaction under greenspace areas increases flood risk (and is not typically accounted for in SUDS design). Severe compaction is also likely to adversely affect the success of landscaping/ecological planting schemes. Magnitude is considered as a percentage of the development scheme. Compaction of greater than 10% of the Site is considered as a high magnitude as it is likely to result in tangible increases in runoff volumes, of a magnitude that could affect the efficacy of SUDS design capacity.

Table M2: Magnitude of Effects on the (two) Receptors

Magnitude	Agricultural Land	Soil Resource
Large	Irreversible loss of >80 ha of BMV land.	Loss of >80% of topsoil resources and insufficient topsoil protected for on-site uses. Subsoil compaction of >10% of site.
Moderate	Irreversible loss of 20-80 ha of BMV land.	Loss or irreversible damage to 50-80% of topsoil resources. Compaction of 5-10% of subsoils.
Small	Irreversible loss of 5-20 ha of BMV land.	Loss or irreversible damage to <50% of topsoil resources. Compaction of <5% of subsoils.
Negligible	Irreversible loss of <5 ha of BMV land OR loss of subgrade 3b, Grade 4 or Grade 5 land.	Only minor disturbance of soils within the site.

Significance of Effects

3.12 The significance of any beneficial or adverse effects can be assessed as either 'major' or 'moderate' (i.e. significant)', 'minor' or 'negligible' (i.e. not significant) according to the magnitude of the effect of the Proposed Development and the sensitivity of the receptor (as set out in Table M3).

Table M3: Significance of Effects

Magnitude	Sensitivity		
	High	Medium	Low
Large	Major	Major	Moderate
Moderate	Major	Moderate	Minor
Small	Moderate	Minor	Minor
Negligible	Minor	Negligible	Negligible

Consultation

3.13 The Chapter has been carried out in accordance with the standard response usually issued from Natural England in relation to the protection of BMV land and soil resources (although no consultation has taken place to date).

Assumptions and Limitations

3.14 There are no published or widely-accepted assessment criteria for impacts on agricultural land resources (best and most versatile land) or soil resources. The assessment method used by Land Research Associates has been developed in-house over a number of years. Impact magnitudes for loss of best and most versatile land relates to consultation thresholds in Technical Information Note 049 (TIN049), published by Natural England to provide general guidance.[4]

M4.0 Baseline Conditions

Existing Conditions

Soils

4.1 The site was found to comprise mainly clayey slowly permeable soils that are variably calcareous in upper parts. Small areas on higher ground have permeable upper subsoils over reddish clay at depth (as described fully in Appendix M1).

Agricultural land

4.2 The site contains land of predominantly subgrade 3b quality on wetness limitations. Where land has permeable upper subsoils wetness restrictions are less limiting to provide land of subgrade 3a quality. The distribution of land classification grades is shown by Map 2 of Appendix M1.

Table M4: Areas occupied by different land grades

Grade/Subgrade	Area (ha)	% of the land
Subgrade 3a	23.7	15
Subgrade 3b	126.1	82
Non agricultural	4.7	3
Total	**154.5**	**100**

Future Baseline

4.3 No change to the existing baseline is predicted if the Proposed Development does not take place.

M5.0 Potential Effects

During Construction

Agricultural land

5.1 The loss of the agricultural land resource will be progressive through phased construction; therefore the effect of the development will increase in magnitude as the project continues from small to moderate once over 20 ha of the site is developed. This effect on a medium sensitivity receptor (subgrade 3a land) represents a moderate adverse effect of the proposed development.

Soils

5.2 The Proposed Development could directly result in the permanent loss of all topsoils during stripping and stockpiling if not carefully managed, meaning insufficient resources will be available to complete landscaping.

5.3 The proportion of proposed built development within the site is approximately 42%, of which 60% is assumed to comprise sealed surfaces (typical for residential development). The remaining 60% of the Proposed Development comprises greenspace (green infrastructure, parks, sports provisions, allotments and SUDS attenuation basins). Therefore, a maximum of approximately 75% of the site area including land intended for greenspace and gardens could be compacted. Such compaction would adversely affect drainage, and would lead to increased surface water flood risk (beyond that mitigated by proposed SUDS schemes). It would also restrict rooting depth and affect the success of proposed planting schemes.

5.4 This is a large loss of a medium sensitivity resource and represents a major adverse effect of the proposed development.

During Operation

Agricultural land

5.5 Post completion, there will be a permanent loss of 149 ha of agricultural land of which 23.7 ha is within the best and most versatile category (of subgrade 3a quality). This moderate loss of a medium sensitivity resource represents a

potential moderate adverse effect of the proposed development on the agricultural land resource.

Soil resources

5.6 Any adverse effects caused during construction are likely to persist where compaction is severe, although over time some recovery of soil function will occur under re-established vegetation in landscaped parts. Damage or loss of the high sensitivity topsoil resources and compaction of the permeable subsoils caused during construction are permanent potential major adverse effects which will persist post completion, including all effects in developed areas of the site.

During Decommissioning

5.7 There are no relevant effects on soils or agriculture.

Cumulative Effects

5.8 Soil and agricultural land loss from an individual site should be considered on a site by site basis (against the benefits of the scheme) and therefore it is not considered there are any relevant cumulative effects to the Proposed Development. Therefore, the effects of the Proposed Development remain negligible and moderate adverse for soil resources and agricultural land respectively.

M6.0 Mitigation and Monitoring

During Construction

Agricultural Land

6.1 Mitigation for the effect of the loss of agricultural land to built development is not possible.

Soil resources

6.2 Mitigation for loss or damage of soil resources requires the adoption of a Soil Management Plan, undertaken by a suitably qualified practitioner in accordance with the principals outlined in the Construction Code of Practice for Sustainable Use of Soils on Construction Sites, which will detail:

- Depth and method of topsoil stripping and stockpiling;
- Identification of landscaping topsoil requirements and assessment of suitability and availability of on-site resources; and
- Means of subsoil protection from compaction damage and remedial measures (such as ripping/subsoiling) to remove damage.

During Operation

Agricultural Land

6.3 Post completion, land use of the site will permanently change from agricultural to urban; no mitigation is possible.

Soil Resources

6.4 The loss of soil functions (ability to support plant life, to absorb excess rainfall etc.) under sealed surfaces cannot be mitigated. However, adherence to the Soil Management Plan will mitigate construction damage such as compaction to landscape and public open space areas.

During Decommissioning

6.5 No further mitigation during decommissioning is necessary.

M7.0 Residual Effects

During Construction

Agricultural Land

7.1 The permanent loss of 149 ha of agricultural land, of which 23.7 ha is within the BMV category, cannot be mitigated against and is determined a moderate adverse effect.

7.2 Adherence to a detailed site-specific Soil Management Plan written by a soil expert will facilitate protection of the entire topsoil resource and prevent any significant subsoil compaction. The effects of the Proposed Development on soil resources would then be regarded as negligible and therefore not of significance.

During Operation

7.3 The residual effects on soil and agriculture during operation do not differ from those during construction.

During Decommissioning

7.4 The residual effects on soil and agriculture during de-commissioning do not differ from those during construction.

M8.0 Summary & Conclusions

8.1 In summary, the Proposed Development will have a negligible effect on soil resources following the implementation of a Soil Management Plan which will protect the entire topsoil resource and prevent compaction of subsoils. There will be a moderate adverse effect on agricultural land through the permanent loss of 23.7 ha of BMV (subgrade 3a quality) land. This effect cannot be mitigated against.

Table M5: Summary of Effects

Receptor	Effects	Mitigation	Residual Effects
During Construction			
Agricultural land	Progressive loss of use – **Moderate adverse**	None possible	Permanent loss of use – **Moderate adverse**
Soil resource	Loss of topsoil resource and compaction of subsoil – **Major adverse**	Adhere to Soil Management Plan	Soil resources protected – **Negligible**
During Operation			
Agricultural land	Permanent loss of use – **Moderate Adverse**	None possible	Permanent loss of use - **Moderate Adverse**
Soil resource	Soil resources protected through Management Plan – **Negligible**	Soil Management Plan	**Negligible**
During Decommissioning			
Agricultural land	N/A	N/A	N/A
Soil resource	N/A	N/A	N/A

M9.0 Abbreviations & Definitions

1. BMV – Best and most versatile land
2. SUDS – Sustainable Urban Drainage System

M10.0 References

1. [1] Ministry of Housing, Communities & Local Government, (2019). *National Planning Policy Framework*, *(Chapter 15, Paragraph 170). Available at:<* https://www.gov.uk/government/publications/national-planning-policy-framework--2>
2. [2] Defra (September, 2009). *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites*. Available at: <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf>
3. [3] Town and Country Planning (2015). *Article 18, Schedule 4 of the Town & Country Planning Order (Development Management Procedure)*.
4. [4] Natural England, (2012). *Agricultural Land Classification: protecting the best and most versatile agricultural land,* Technical Information Note 049.

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter N: Socio Economics

June 2019

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N1.0 Introduction

1.1 This Chapter of the Environmental Statement ("ES") has been prepared by Planning and Design Group on behalf of Hallam Land Management ("the Applicant"). This Chapter assesses the potential Socio-Economic impacts of the Proposed Development, and the likely significance of such impacts during its operational and construction phases.

1.2 This Chapter describes the assessment methodology; the baseline socio economic conditions currently existing; the likely significance of effects; the mitigation measures required to prevent, reduce or offset and significant adverse effects and the likely residual effects after these mitigation measures have been employed and how the proposal can be delivered in a way that meets the objectives of the National Planning Policy Framework and local plan policy as these relate to the socio economic & health considerations.

About the Author

1.3 Planning and Design Group (UK) Limited (P&DG) is a planning and urban design consultancy with extensive experience of the identification, promotion and securing of development opportunities through the planning system.

1.4 P&DG has demonstrated competence in the identification of social and economic impacts arising from the development of a wide spectrum of land uses at differing scales including residential, employment and recreational/leisure uses, alongside measures to avoid, remedy or mitigate any actual or potential effects arising, both through formal EIA and non-EIA processes.

1.5 P&DG's contribution to this EIA has been undertaken by Mrs Claire Adie BA(Hons) MA MRTPI and Mr David Peck BA(Hons) MRRP MRTPI, both Chartered Members of the Royal Town Planning Institute.

N2.0 Policy Context

National

National Planning Policy Framework

2.1 The National Planning Policy Framework is a significant material consideration. It sets out that the purpose of the planning system is to contribute to the achievement of sustainable development. Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and mutually supportive in order to secure net gains across each of the different objectives – an economic objective, a social objective and an environmental objective (NPPF Paragraphs 7 and 8).

2.2 So that sustainable development is positively pursued, the NPPF at paragraph 10 establishes a presumption in favour of sustainable development.

2.3 Paragraph 38 of the NPPF deals with decision making seeking to secure developments that will improve the economic, social and environmental conditions of an area.

2.4 A key objective of the NPPF is building a strong, competitive economy by ensuring planning policies and decisions help create the conditions in which businesses can invest, expand and adapt. The NPPF at Paragraph 80 is unequivocal that significant weight should be placed on the need to support economic growth and productivity, building on the strengths of an area, countering any weaknesses and addressing the challenges of the future.

2.5 Paragraph 91 states that planning policies and decisions should aim to achieve healthy, inclusive and safe places, which:

'a) promote social interaction, including opportunities for meetings between people who might not otherwise come into contact with each other – for example through mixed-use developments, strong neighbourhood centres, street layouts that allow for easy pedestrian and cycle connections within and between neighbourhoods, and active street frontages;

b) are safe and accessible, so that crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion – for example through the use of clear and legible pedestrian routes, and high quality public space, which encourage the active and continual use of public areas; and

c) enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling'.

2.6 Consideration should be given to the Government's Industrial Strategy White Paper (November 2017). This Strategy *'sets out a long-term plan to boost the productivity and earning power of people'*. It seeks to assist businesses to *'create better, higher-paying jobs with investment in the skills, industries and infrastructure of the future'*. This is relevant to the Proposed Development in so much as it will require and represent a significant investment in infrastructure, provide employment opportunities and require people with appropriate skills.

Local

Infinity Garden Village – Policy Overview

2.7 IGV straddles the local authority boundaries for SDDC and DCC such that there are multiple policies supporting the need for and steering the layout and infrastructure to support IGV. Key policies are set out below.

2.8 The South Derbyshire Local Plan Part 1 was adopted in June 2016 and the Local Plan Part 2 was adopted in November 2017. The Local Plan (Part 1 and Part 2) deals with the proposals for the amount and location of future housing, employment and infrastructure for the period from 2011 to 2028. The Plan outlines South Derbyshire's economic vision, which is:

> *"To promote greater economic wellbeing in South Derbyshire, in order that it becomes a healthier, more prosperous and safer place to live with better jobs and prospects for local people and businesses."*

2.9 The Plan aims to achieve this vision by implementing three key objectives:

- Raising productivity by enabling people and business in South Derbyshire to become more competitive and innovative.
- Ensuring sustainability by providing the infrastructure for businesses and communities to thrive in South Derbyshire.
- Achieving equality by helping people in South Derbyshire to realise their full potential.

2.10 The Plan then lists a number of ambitions which will be followed in the pursuit of following the three objectives. The ambitions relevant to the Proposed Development are:

- Attracting inward investment and encouraging reinvestment by existing businesses.
- Providing business support and innovation assistance, particularly in key growth sectors.
- Improving accessibility to opportunities, particularly employment and training.
- Providing sites and premises for future employment needs, co-ordinating provision with transport and other infrastructure.
- Overcoming employability barriers to entering the workforce, particularly amongst people facing multiple challenges.
- Raising aspirations and expectations, particularly amongst young people.

2.11 A priority action listed in South Derbyshire's Local Plan is the development of Infinity Park in Derby, which will focus on advanced engineering sectors, including aerospace, rail and automotive manufacturing. The Plan states that the South Derby Integrated Transport Link, flood alleviation, and other Infrastructure works will assist in the delivery of employment space, information and communication technology, business and technology support.

2.12 Chapter 5 of the Local Plan addresses housing, stating that the scale and distribution of housing growth within the area from 2011 to 2028 is a key policy area, with resulting implications for other policy areas in the Local Plan. The Plan also says that as a fast-growing District, housing in South Derbyshire is in high demand and the policies in the Plan seek to ensure that new housing is delivered whilst balancing the needs of existing and future residents in terms of accessibility to jobs and services. Policy H15: Wragley Way (South of Derby) allocates the site for housing.

2.13 In part 2 of South Derbyshire's Local Plan, Policy INF13 identifies Southern Derby and Infinity Garden Village. It states that development proposals and cross boundary collaboration will by supported in this area for a mix of uses as part of the Infinity Garden Village development. It states that in order to implement this development comprehensively and support the required infrastructure delivery, a joint development framework document will be prepared.

2.14 The Derby City Local Plan - Part 1 Core Strategy was adopted in January 2017. The three policies most relevant to the Infinity Garden Village are:

- Policy AC15: Land South of Wilmore Road, Sinfin (Infinity Park Derby)
- Policy AC18: Wragley Way
- Policy CP24: Transport Infrastructure

2.15 The emerging Infinity Garden Village (IGV) Development Framework Document was produced by South Derbyshire District Council to deliver development proposals for IGV. The IGV concept emerged from various components of proposed growth on the southern edge of Derby committed in the Local Plans of both Derby City and South Derbyshire, including the Adopted Derby City Local Plan Part 1, and Adopted South Derbyshire Local Plan Part 1 and Part 2 as follows:

- Around 1,230 new homes on land at Wragley Way, Sinfin supported by a primary school, local centre and an extensive network of green and blue infrastructure.
- Around 117 hectares of new employment space as an extension to Infinity Park, Derby.
- A new secondary school.
- New transport infrastructure, including the Southern Derby Integrated Transport Link and a new junction on the A50.

2.16 The Development Framework Document sets out a vision for the delivery of the IGV proposals, which fundamentally is to create a sustainable community to the south of the City of Derby, delivering around 2,100 new homes, at least 5,000 new jobs and supporting new infrastructure and community facilities, including primary and secondary schools and a new local centre, all set within high quality green and blue infrastructure to provide the village with its own distinct character.

2.17 The Document also identifies a Movement Framework, which focusses on the delivery of new key elements of infrastructure, including the new junction on the A50, into which the South Derbyshire Integrated Transport Link will link to facilitate more direct movements to and from the strategic road network and potentially provide mitigation on the wider network.

2.18 The applications provide for development across those parts of the SDDC Policy H15 allocation for which planning permission has not yet been sought, a first phase of employment development as supported by IGV, and supporting infrastructure.

N3.0 Assessment Methodology & Significance Criteria

Assessment Methodology

3.1 The overall assessment focusses on effects manifested at a local level (immediate to the site and surrounding Wards), District level (within South Derbyshire and Derby City) and, where relevant, regionally, referring to published government and local authority data.

3.2 The existing socio-economic baseline conditions have been established from information provided by the District and County Councils, including review of the Local Plan evidence base, Office for National Statistics data and consultation responses in respect of the planning application submitted by Derbyshire County Council to construct a new junction on the A50 (DCC ref. CD9/0319/110).

3.3 The assessment of the baseline position focusses on key socio-economic receptors including: demographics employment; economic conditions; key local and community services; and facilities. The potential impacts of the Proposed Development, and their significance, are assessed against these key receptors. Opportunities for the mitigation of adverse effects and the enhancement of beneficial effects are examined, including any built-in mitigation elements of the scheme.

Significance Criteria

3.4 Identification of the significance of socio-economic effects is informed by relating the sensitivity of identified receptors to change or effect with the predicted magnitude of change or effect, as set out in Table 1 below. 'Effects' range from 'substantial' to 'negligible', and may be positive (beneficial), neutral or negative. The Significance Matrix is a tool to aid professional qualitative judgements within the assessment process.

3.5 As there are no generally accepted criteria for assessing the significance of socio-economic effects, these have been assessed based on the scale of the increase over the baseline position, as well as the nature and context of their effects. Where relevant, the location of the impact and its likely duration has been taken into account.

3.6 Duration of effects is considered as to whether they are temporary or permanent. All operational effects are considered to be permanent unless otherwise stated. Temporary effects are determined to be: short term (less than 5 years); medium term (5-10 years); or long term (more than 10 years).

Table N1: Significance Matrix

		Sensitivity of Receptor / Environment to Change or Effect			
		High	**Medium**	**Low**	**Negligible**
Magnitude of Change / Effect	High	Substantial	Moderate to Substantial	Minor to Moderate	Negligible
	Medium	Moderate to Minor	Moderate	Minor	Negligible
	Low	Minor to Moderate	Minor	Negligible to Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Area of Impact

3.7 The Area of Impact varies according to the type of effect but is primarily expressed at the local (Ward) level or district level.

Consultation

3.8 Consultation responses from statutory agencies to application ref. CD9/0319/110 have been reviewed.

3.9 Consultation has taken place with Derbyshire County Council (DCC) Children's Services, as the Local Education Authority, to establish the demand for school places that would be generated by the Proposed Development, along with the means by which that demand could be met.

3.10 The requirement to address school capacity has been subject to discussions with the County and City Authorities over an extended period. Most recently correspondence dated 4th April 2018 confirmed the requirements for primary and secondary provision. Sue Pegg, Development Manager, stated *'I can confirm that for 2000 houses the Authority would be looking for a 2 form entry school to accommodate up to 420 pupils.'* Therefore, a new primary school will be required as part of the Proposed Development.

3.11 Within the City, the City of Derby Academy has the physical capacity to expand. Within the South Derbyshire Local Plan, as part of the Infinity garden Village proposals, land has been designated to the east of the site for a new secondary school.

3.12 The local Clinical Commissioning Group were consulted to establish if a new health centre was required. The NHS work on the basis of one GP for every 2,000 – 2,500 people. The Proposed Development providing 1,850 dwellings, with an average occupancy of 2.5 people/dwg, equates to approx. 5,000 people, generating a need for 2 GP's worth of medical 'demand'. Clearly, this is insufficient to justify a whole new health centre; as such it was established the Proposed Development would not generate a need for a new on-site health centre.

Assumptions and Limitations

3.13 This chapter focusses on those socio-economic factors considered to be most relevant to the assessment of the actual or potential significant effects of the Proposed Development. It is therefore generally limited to consideration of: demographics; services and facilities required to support sustainable communities; health and well-being; economic factors, including employment and skills. The outline nature of the planning application results in some details of the Proposed Development not being known at this time, e.g. detailed employment mix. This consequently limits the scope of assessment of some effects.

3.14 The Area of Impact assessed is limited to the geographical extent set out above.

3.15 The National Statistics data obtained during the desk-based study of baseline conditions is aggregated at Ward and District level and provides by necessity an overview of selected social and economic parameters. It is considered to provide a reasonable and realistic insight into key socio-economic issues affecting the local area.

3.16 The consultation responses provided in response to application CD9/0319/110 represent the view of those consultees at the time of consultation by DCC. Due to changed circumstances, it is possible that alternative views may be expressed in response to the Proposed Development.

N4.0 Baseline Conditions

Existing Conditions

4.1 This section sets out social and economic conditions relevant to the site and the Proposed Development, having regard to the Proposed Development's Area of Impact and for the periods: Existing Conditions; Construction Phase; Completion of Proposed Development.

Existing Conditions

The Site

4.2 The site is largely allocated for housing development supported by a primary school, local centre and extensive network of green and blue infrastructure in the South Derbyshire Local Plan (Policy H15) and Derby City Local Plan (Policy AC18). It also forms part of the wider Infinity Garden Village - Policy (INF13).

4.3 The site forms a series of agricultural fields that extend from the built edge of Derby (Stenson Fields and Sinfin) up to the A50 (Derby-by-pass). The only built form comprises Ashlea Farm (with outbuildings) which is currently tenanted on eastern side of the site. The site is comparatively flat, with the southernmost fields very gently rising to the well-treed corridor of the A50. The site is bordered by housing to the north which includes Mulberry Place (Davidsons development) which is being completed, Stenson Fields development and by housing off Wragley Way. The Derby-Birmingham railway line forms the site western boundary. To the east is agricultural land.

Stenson, Aston and Sinfin Wards

Population, Economic Activity and Health

4.4 The site lies within Stenson and Aston Wards, within the District of South Derbyshire and Sinfin Ward, within Derby City.

4.5 There were 4,328 usual residents in Stenson Ward at Census day 2011. Aston Ward had 6,666 usual residents and Sinfin Ward had 15,128 usual residents at Census day 2011.

4.6 The site falls within four Lower Super Output Areas (LSOAs), South Derbyshire 003A, South Derbyshire 004C, South Derbyshire 003B and Derby 029E.

4.7 South Derbyshire 003A is ranked 18,270 out of 32,844 LSOAs in England; where 1 is the most deprived LSOA. This is amongst the 50% least deprived neighbourhoods in the country.

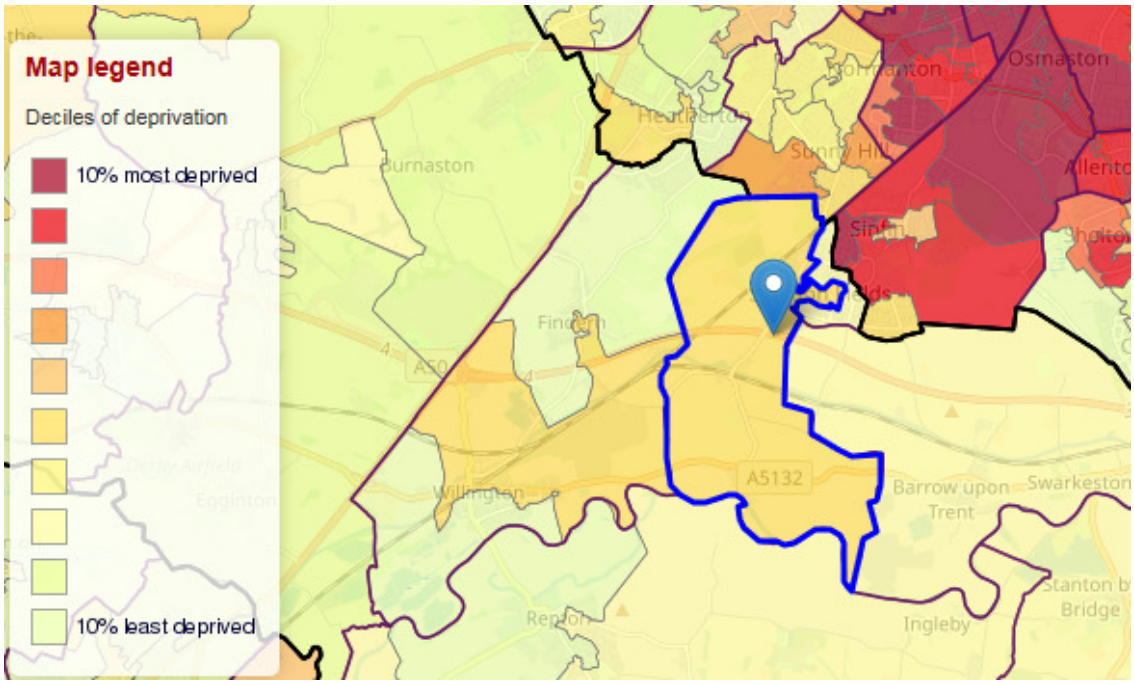
4.8 South Derbyshire 004C is ranked 25,498 out of 32,844 LSOAs in England; where 1 is the most deprived LSOA. This is amongst the 30% least deprived neighbourhoods in the country.

4.9 South Derbyshire 003B is ranked 24,156 out of 32,844 LSOAs in England; where 1 is the most deprived LSOA. This is amongst the 30% least deprived neighbourhoods in the country.

4.10 Derby 029E is ranked 4,658 out of 32,844 LSOAs in England; where 1 is the most deprived LSOA. This is amongst the 20% most deprived neighbourhoods in the country.

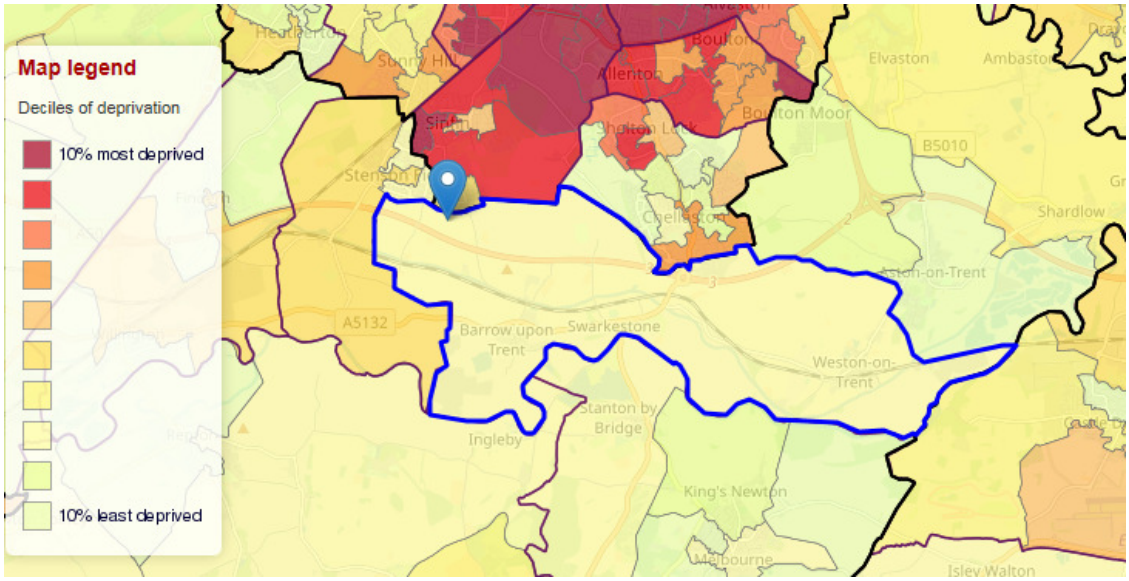
4.11 Figures N1, N2, N3 and N4 identifies the boundaries of Stenson, Aston and Sinfin Wards and their relative deprivation.

Figure N1: Multiple Deprivation Map (Stenson)



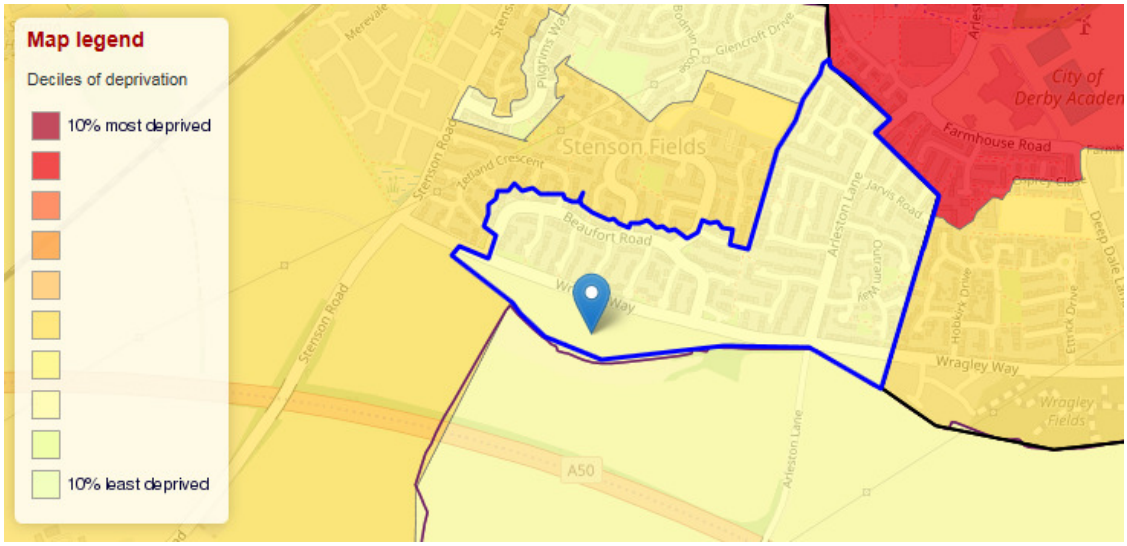
(Source: http://dclgapps.communities.gov.uk/imd/idmap.html)

Figure N2: Multiple Deprivation Map (Aston)



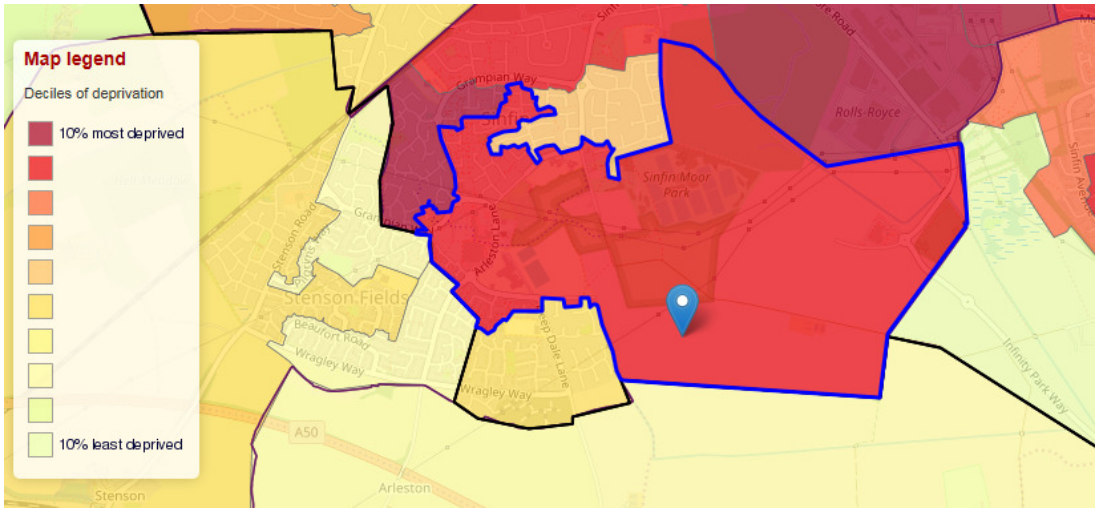
(Source: http://dclgapps.communities.gov.uk/imd/idmap.html)

Figure N3: Multiple Deprivation Map (Stenson)



(Source: http://dclgapps.communities.gov.uk/imd/idmap.html)

Figure N4: Multiple Deprivation Map (Sinfin)



(Source: http://dclgapps.communities.gov.uk/imd/idmap.html)

4.12 Economically the Labour Market Profile for Stenson Ward shows that 83.2% of residents are economically active, with 5.2% of residents unemployed. 16.8% of residents are economically inactive, only 3% are long-term sick or disabled.

4.13 Acton Ward the Labour Market Profile shows that 82.6% of residents are economically active, with 3.6% of residents unemployed. 17.4% of residents are economically inactive, only 2.1% are long-term sick or disabled.

4.14 Sinfin Ward the Labour Market Profile shows that 70.5% of residents are economically active, with 13.3% of residents unemployed. 29.5% of residents are economically inactive, with 7.8% are long-term sick or disabled.

4.15 By comparison, in England, the percentage of people who are economically active yet unemployed is 4.1% and economic inactivity is 20.9%. Stenson and Acton Wards show better than the percentages for England, however Sinfin does worst than the percentages for England. This is reflected in the Index of Multiple Deprivation.

4.16 In terms of health, people's health in South Derbyshire is varied compared with the England average. About 11% (2,000) of children live in low income families. Life expectancy for both men and women is similar to the England average. Although, life expectancy is 5.1 years lower for men and 6.2 years lower for women in the most deprived areas of South Derbyshire than in the least deprived areas.

Housing

4.17 Detached (around 770) or semi-detached (700) properties dominate the housing type in the Stenson Ward. Similarly, in Acton Ward the properties predominately detached (around 1,600) or semi-detached (around 600).

4.18 In Sinfin Ward semi-detached properties dominate the housing type, either inter-war or 1970's or 1980's.

4.19 Within the Derby Strategic Housing Market Assessment 2013 (SHMA), Derby Fringe, including Stenson and Aston Wards, are identified as a Sub-Market Area. Within this Sub-Market Area, home ownership in 2011 was 68.3% (South Derbyshire 75.8%), with the proportion of social renting being 15.8% (South Derbyshire housing stock in public sector ownership is 9.8%, regional average of 16.2%).

4.20 The vacancy rate in South Derbyshire is 3.4%. This is lower than the HMA, regional and national percentages.

Education

4.21 Of all usual residents in Stenson Ward, aged 16 and over, 12% have no qualifications. Compared to South Derbyshire at 13.9% and England at 15% is this comparably lower. 28% have 4 qualifications or more, this is below the national average of 29.7%.

4.22 Of all usual residents in Aston Ward, aged 16 and over, 9% have no qualifications. 39.3% have 4 qualifications or more. This is above the national average at 29.7%.

4.23 Of all usual residents in Sinfin Ward, aged 16 or over, 26.5% have no qualifications. This is the highest percentage of any qualification category and compares unfavourably to 15% for England as a whole.

Schools

4.24 There are a number of infants, junior and primary schools located within the 'ring' of existing residential areas around the site. These include: Ash Croft Primary Academy, Redwood Junior School, Grampian Primary Academy, Stenson Fields Primary Community School. All of these schools are within 2km of the centre of the site (straight line distance). The closest schools to the site are Stenson Fields Primary Community School (approx. 600m) and Ash Croft Primary Academy (approx. 1km) (both straight line distances).

4.25 Stenson Fields Primary Community School has capacity for 420 pupils and has 390 pupils on roll currently. Other schools have higher roll capacities but are generally at or near capacity, with rolls projected to increase.

4.26 Secondary schools serving the site include: City of Derby Academy (approx. 1km) and Derby Moor Academy (approx. 2.5km) (both straight line distances). City of Derby Academy has a net capacity of 1,050 with 775 pupils on role (2016 figures).

Public Open Space and Sport

4.27 Areas of informal open space including children's equipped play areas are generally interspersed with built development across the Wards. Playing fields are also available at: Fox Close, Stenson Fields. Shallow Dale Road offers more equipped space with a MUGA and Eggesford Road offers equipped play.

4.28 A privately-operated gym at Rolls-Royce Leisure Fitness Centre offers a wide variety of sports activities.

Other Local Services and Facilities

4.29 The well-established and popular Sinfin District Centre is in close proximity to the site, being a 10 minute walk away (0.8 km / 0.5 mile) from the closest edge of the site (Arleston Lane/Wragley Way junction). It offers a wide range of retail, financial and community facilities including:

- Asda superstore
- Post Office
- Pharmacy
- Optometrists
- Travel Agents
- Hair Salon
- Building Society
- Petrol Filling Station
- Estate Agents
- Bookmakers
- Medical Centre
- Church
- Library
- Public House
- Social Club

4.30 In addition, there are local shopping parades closer to the site, off Deep Dale Lane on Kelso Walk and on Falcon Way.

South Derbyshire District

Housing

4.31 South Derbyshire's housing offer is focused more towards larger properties and has much fewer 1-bed properties (5%), with a third of the stock made up of 2-bed properties and 62% with 3 or more bedrooms. This is greater than across the HMA, where 58% of properties have three or more bedrooms in 2012.

4.32 The Derby Strategic Housing Market Assessment 2013 (SHMA) estimated what type and amount of housing is required in South Derbyshire. It estimated the greatest level of overall housing need and demand (market and affordable) is for 3- and 4-bedroom properties, suitable for family housing.

4.33 The 2011 Census identified that a quarter of households in the District contain older persons. The SHMA found a particularly large projected increase in the older person population in South Derbyshire by 54.9% in 2031, suggesting a need to increase the supply of accessible and adaptable dwellings and wheelchair user dwellings.

Employment

4.34 Over 30,000 people work in the District as a whole (South Derbyshire District Council Employment Land Review 2007). On balance, South Derbyshire is a net exporter of labour; its resident workers exceed the jobs located in the District by over 12,500, travelling to Derby and East Staffs.

Summary

4.35 Key existing baseline conditions for the site and immediate locality can be characterised as being:

- Series of agricultural fields and Ashlea Farm.
- Stenson and Aston Wards have below average levels of economically inactivity. Stenson however has above average levels of unemployment.
- Stenson and Aston Wards achieve relatively well in educational achievements.
- Sinfin Ward has above average levels of deprivation measured in terms of unemployment, economic inactivity and educational achievement.
- Limited diversity of housing stock, with above average levels of home ownership and public owned housing for social renting.

- Housing stock that needs to suit the needs of an increasing aging population.
- Local services and facilities that meet some day-to-day needs, and higher order services can be accessed a short distance from the site.
- Primary schools are operating at or near to capacity, secondary schools have greater residual capacity.

Construction Phase Baseline

4.36 During the construction phase of the Proposed Development, the baseline will to an extent fluctuate according to the type and phase of work being undertaken. This section sets out key considerations in that regard.

Employment

4.37 The primary source of employment during the construction phase will be in construction-related trades. Initial build out rates on the site will be lower but it is anticipated that 3 outlets would be established, with each delivering 50 dwellings per annum. Peak delivery from the site is likely to exceed 150 dwellings per year. This however could increase subject to market demand as well the construction of additional affordable housing units. It is typically held that 2 full time year-long equivalent jobs are created per new dwelling constructed, on this basis it is anticipated the number of construction jobs on the site supported by the residential elements of the Proposed Development would be 300 full time equivalent positions per annum, extending for at least a decade. Additional employment would be generated by the construction of the other elements of the Proposed Development.

4.38 Demand from construction workers employed on the site would increase the demand for local services, such as cafés.

Future Baseline

4.39 At point of completion of the Proposed Development, the socio-economic baseline of the site will have changed significantly. Particular influences on resultant changes will be: new dwellings occupied by new residents; new local services and facilities; increased demand for local services and facilities; new employment opportunities; improved access to open space.

Demographic Profile

4.40 The construction of up to 1,850 dwellings will provide for at least 1,850 households to become established on the site. Household size will vary, but

based on an average household size of 2.5 persons per dwelling, this would result in a permanent resident population of 4,625 people. The age profile of the site's new residents will be influenced by the type of housing mix. This is not known at this Outline stage. New build developments offering a mix of housing types typically however, at least initially, express a younger-than-average age profile, with a higher proportion of younger couples and families with children. Providing dwellings that specifically seek to meet the needs of older households may, however, help maintain a more balanced demographic across the completed development.

4.41 The ratio of people aged 65 and over in Derbyshire is anticipated to increase to three out of ten people within the next 25 years, according to Sub-National Population Projections (2016-base). This may influence the type of housing that developers may seek to build on the site.

Employment Opportunities

4.42 There will be new employment opportunities within the non-residential elements of the Proposed Development including: pub, drive-through restaurant, shops and facilities, school, petrol filling station, employment units. It is difficult to quantify these opportunities at this (outline) stage as the detail of those uses has not been fixed and no operators confirmed. The overall number of jobs that could be available will provide a variety of jobs types at different skill levels.

4.43 There will also be employment opportunities generated by the demand by householders for domestic services, e.g. cleaning, garden maintenance, childcare.

Visitor Economy

4.44 The Proposed Development will lead to an increase in the number of day visitors, making use of the leisure and recreation facilities (community facilities, local centre, restaurant, public open space). As such, the Visitor Economy will be larger than at present.

Local Services and Facilities

4.45 New local services and facilities within the Proposed Development will be available for use by new and existing residents. These could include: local retail, other facilities, pub, petrol filling station, drive-through restaurant, primary school.

Education and Schools

4.46 A new 2-form entry primary school will form part of the Proposed Development, providing improved educational capacity.

4.47 Using DCC's standard multipliers, it is estimated that the Proposed Development would generate demand for school places as follows: 380 primary school places, 285 secondary school places, 114 post-16 places.

Local Housing Market

4.48 The construction of up to 1,850 dwellings will make a significant contribution to the local housing stock. The new housing will be higher quality homes (built to higher standards of energy efficiency and requiring less maintenance) than generally available in the locality. There will be an increased variety of dwelling types.

Economic Activity

4.49 General levels of economic activity will increase as a result of new business becoming established on the site and the demands for services and goods from new households. For reasons set out above, it is difficult at this time to be precise as to how this may be expressed in financial terms.

Health and Well-Being

4.50 The development of the area, will have positive, if difficult to measure, influences on community well-being with the delivery of Garden Village Principles as general levels of health and well-being can be expected to be higher through improved access to greenspace for recreation, sport and exercise. New development will help to deliver a greater choice of open space, with a mix of formal, informal and equipped spaces.

N5.0 Potential Effects

During Construction

Phasing

5.1 A phased approach to construction is proposed, generating construction related employment continuing for a significant period of time. It is expected that Infinity Garden Village as a whole will be developed over a period of between 10 and 20 years. The residential element will likely be completed in advance of full build out of the employment areas.

5.2 Residential development will be phased such that necessary infrastructure is provided at the required time. The total construction phase of the residential element could therefore exceed a decade, although there would be fluctuations in the type and intensity of activity through this period.

5.3 Land east of the A50 junction will form a first phase of employment development as part of a wider employment development, forming an extension to the existing Infinity Park. It will ultimately be connected to the SDITL to both east (through to Infinity Park Way) and west (the new A50 junction).

Construction Jobs

5.4 Based on the expectations set out in Section 4 above (Construction Phase Baseline), it is anticipated that the Proposed Development would support around 300 full time equivalent jobs per annum, for at least a decade for the residential element alone. Additional jobs would be created by construction of the other elements of the Proposed Development.

5.5 As no construction contracts have yet been let, it is not possible to define with certainty where the employees may be drawn from, i.e. whether they live locally or further afield. Regardless of the construction firm(s) (national or local) that may be involved in building the proposed dwellings and other buildings, based upon experience it would be reasonable to expect that a proportion of the construction jobs created by the Proposed Development would be taken up by locally-based workers. National construction firms sometimes use their own permanent workforce on projects, but also employ contractors – with a proportion of construction workers drawn locally.

5.6 On the basis of the upper estimate of jobs that may be created at any one time, and the high levels of cross-district boundary commuting, it is highly

unlikely that all labour could be sourced from within South Derbyshire District, and some need to be sourced from the City, such as Derby.

5.7 In addition to direct construction industry employment, it is likely that some businesses in the local area (and beyond) would benefit from the trade linkages that would be established during the construction of the scheme, thereby supporting additional indirect and induced employment.

5.8 Having regard to the above, the construction effects of the Proposed Development – from a socio-economic perspective – are anticipated to be temporary, medium-term and **moderate beneficial**.

During Operation

Employment Effects

Direct Employment

5.9 The level of direct employment associated with the Proposed Development has been estimated largely through the application of relevant employment densities (the ratio between job numbers and floorspace) for each of the employment generating uses proposed. It draws upon data from the HCA Employment Density Guide (2015).

5.10 Whilst the Proposed Development has set out a proposed mix of land uses, the flexibility sought within the outline planning application is such that the exact mix of uses will only be agreed as part of future reserved matters application(s). Based upon the quantum and mix of floorspace currently proposed at the site, it is estimated that the development could support the creation of at least around 973 direct jobs. This is summarised in Table N1.

Table N1: Employment densities and job creation by use

Proposed Use	Quantum	Employment Density	Jobs
primary school	2 form entry	16 jobs per 1 form entry	32
employment floor space	Maximum 51,100 sqm (GIA)	1 job per 77 sqm (primarily regional distribution centre)	664
local centre (including community hall, retail and other local services and facilities)	1,900 sqm (GIA)	1 job per 15 sqm (blended average)	127
leisure and recreation uses including pub/restaurant and petrol filling station	1,650 sqm (GIA)	1 job per 11 sqm (Use Classes A1, A3-A4 floorspace measure)	150
Total			**973**

Source: HCA Employment Density Guide 2015 / P&DG Analysis

5.11 The new jobs would be expected to be a mix of both full time and part time positions.

Net Additional Employment

5.12 It is possible that the Proposed Development could displace some existing local jobs, as a result of firms relocating to new premises on the site from existing locations nearby, or due to a loss of trade from existing businesses as a result of new development creating increased competition. It is anticipated however that any such effects will be limited.

5.13 The District as a whole is considered to have a good choice of restaurants and public houses. As such, it is anticipated that any trade diversion effects resulting from the Proposed Development's public house or drive-through restaurant will be spread across a large number of existing facilities, thereby minimising any potential job displacement.

5.14 The increase in resident population as a result of the Proposed Development will create additional demand for local shops and services (including community facilities). The primary focus of the Proposed Development's retail and other services and facilities uses is to meet the needs of the residents of the site, the wider Infinity Garden Village and immediate surrounding areas. The intention is that these services and facilities provide a local 'hub', rather than service a significantly wider catchment. Being located along the SDITL however, these local services may be attractive to passing traffic. Overall, it is not expected that the Proposed Development's services and facilities would draw any significant levels of trade away from existing retail centres. This

should also help to minimise any job displacement impacts with respect to retail and leisure uses to be delivered on the site.

5.15 It is not at this time possible to accurately quantify the potential job displacement effects. They are however likely to be low.

Indirect and Induced Employment

5.16 Indirect jobs will be supported by spending on goods, supplies and services by individuals and companies based at the site with firms in the local area. The spending of wages by both residents and employees on site and those within the supply chain will also support induced employment in local shops and services. Given the outline status of the Proposed Development, no detailed predictions of expenditure data is available. They would however be a positive effect and could support additional jobs in the local area.

5.17 It is considered that the economic and employment effects of the Proposed Development are likely to be permanent and **moderate beneficial** in scale.

Population Effects

5.18 Given the outline nature of the planning application for the Proposed Development, the mix of proposed dwellings in not known. The estimated average household size set out in Section 4 above (i.e. 2.5 persons per dwelling) is quite possibly an over estimate. Based on that assumption however, the Proposed Development would result in a permanent increase in the resident population of 4,625 people.

5.19 This additional population figure assumes that all residents of the Proposed Development are not already resident in the area. Some of the new homes will likely be occupied by existing local residents, either buying first homes or moving from existing properties – moving 'up' or scaling 'down' the housing ladder. It is difficult to estimate what proportion of new residents would be moving locally in this way. Those leaving existing properties would, in the main, be freeing up a dwelling for occupation by other new residents, adding to the total population locally (the exception being 'hidden households' that were previously sharing a property with another household, for example couples living with one set of parents until they had sufficient funds for a deposit on a property of their own).

5.20 For the purposes of this assessment, and assessing 'worst case' impacts, the estimate of 4,625 new site residents is used and all of the population increase is assumed to be additional to the local area.

5.21 This population increase would be relatively small for the District: The population of South Derbyshire is 95,000 and projected to rise to over 123,000 by 2035 [source: South Derbyshire Local Plan Part 1]. The increase in population of the site would represent only 6.6% of the Borough's projected 2035 population. The significance of the impact of this increase will depend on its implications for other factors, such as access to local health and education services. Such impacts will not necessarily be negative provided adequate levels of community infrastructure are provided to meet additional needs generated by the Proposed Development. In addition, the income and spending of the additional residents in the local economy will increase local Gross Value Added (GVA), with positive impacts on the local economy. On this basis, the effects of the Proposed Development with respect to population are considered to be permanent and **negligible** effect in scale at the District level but **moderate** effect at the local (Ward) level.

Local Labour Market Effects

5.22 As described earlier, the Proposed Development is anticipated to generate a total of 973 gross direct jobs on-site (based on assumptions made for the mix and quantum of individual uses which could come forward as part of the mixed-use development). It can be expected some of these jobs would be full time and some part time. The new jobs would span a number of sectors, with opportunities across a range of skills levels and roles.

5.23 Having regard to the type of employment opportunities to be generated by the Proposed Development, it is anticipated that some of these will be aligned with the type of employment opportunities being sought by local residents within the Area of Impact. The Proposed Development will, when fully operational, give rise to employment across broad sectors such as retail, leisure, healthcare and education.

5.24 The Proposed Development offers the potential to create employment opportunities for local residents who are currently out of work.

5.25 In light of the above, it is considered that the local labour effects of the Proposed Development are likely to be permanent and **moderate beneficial** in scale.

Housing Effects

5.26 The main impact on the local housing market will be an increase of up to 1,850 dwellings to the current housing stock. The type and tenure mix of the dwellings will be subject to later agreement.

5.27 The Proposed Development would therefore provide over 14% of the District's total 12,618 new dwellings housing requirement between 2011 and 2028 [source: South Derbyshire Local Plan Part 1].

5.28 The new dwellings would enhance the quality of housing choice in the area.

5.29 On this basis, the effects on housing generally are considered to be positive and of moderate magnitude within the context of the Borough, and positive and **moderate to substantial significant beneficial** effect at Ward level.

Education

5.30 Using DCC's standard multipliers, it is estimated that the Proposed Development would generate demand for school places as follows: 380 primary school places, 285 secondary school places, 114 post-16 places. Whilst the final impact of the Proposed Development on education provision in the local area will depend upon the number of additional children of school age generated by the additional dwellings, the availability of spare school places in the area, and general trends in school children numbers in the area over the period of housing delivery, DCC has confirmed that existing primary schools in the local area would not have sufficient existing capacity or the ability to expand to accommodate all children from the site. DCC has indicated that existing secondary schools would be capable of expansion to provide additional places to meet the needs of children from the Proposed Development.

5.31 Demand for school places from the adjacent Deep Dale Lane developments, whilst not an impact of the Proposed Development, will contribute to cumulative impacts.

5.32 Whilst some local schools would likely have some spare capacity in the early phases of development, both at primary and secondary school stage, there is insufficient existing capacity to serve the completed Proposed Development.

5.33 The Proposed Development is considered to present a permanent and **substantial adverse** effect on both primary and secondary school capacity provision. The cumulative effect of adjacent development also impacts on this.

Health Facility Effects

5.34 As previously described, the gross increase in resident population as a result of the Proposed Development is estimated as 4,625. At a typical provision

rate of 2,000 patients per GP, this would imply a need for two additional GP's in the local area.

5.35 Anecdotal evidence suggests capacity issues at local health centres, with delays in securing appointments. Drawing upon this and the identified additional demand for GP services, it is considered that the Proposed Development will have a **moderate adverse** effect on the provision of local health care (GP) facilities within the local area.

Sport, Open Space and Recreation Effects

5.36 It is estimated that the Proposed Development could increase the local population by approximately 4,625 residents. This is likely to increase demands on the existing provision of sport, open space and recreation facilities.

5.37 The Proposed Development will include significant areas of informal open space along with equipped children's play areas. Open space within the Proposed Development will connect with open space within the adjacent Deep Dale Lane development. Formal playing pitches are not currently proposed but could be made available as part of the proposed primary school site, subject to detailed design and agreement with the school governors. Formal sports playing pitches are available in proximity to the site, i.e. at Fox Close, Stenson Fields. Shallow Dale Road offers more equipped space with a MUGA and Eggesford Road offers equipped play.

5.38 Having regard to existing provision and the scale of additional projected demand, the effect of the Proposed Development with respect to formal sports facilities is considered to be permanent, **negligible to minor**. With respect to open space and outdoor recreation facilities, the effect is likely to be permanent and **moderate beneficial** in scale.

Community Facility Effects

5.39 The estimated increase in the site's population by around 4,625 residents will give rise to some increased pressure on other existing community facilities, such as libraries, nurseries, community halls, leisure facilities and emergency services.

5.40 There is a reasonable level of existing provision in the area at present, including medical centre, church, library and social club in or nearby Sinfin District Centre. It is a reasonable expectation that the proposed primary school would become a focus for some community or out-of-school activities, along with the proposed community hall.

5.41 The effects with respect to community facilities are likely to be permanent and both **neutral and negligible** in scale.

During Decommissioning

5.42 The potential effects during decommissioning have not been considered as the Proposed Development will not be decommissioned. As such, the predicted effects of the operation of the development without mitigation will last into the long term.

Summary

5.43 The significance and duration of the effects identified were evaluated against the significance criteria matrix. Effects were assessed as positive (beneficial), neutral (neither positive nor negative) or negative (adverse) and their magnitude classified as 'minor', 'moderate', or 'major' or 'negligible'. Due to their nature, all operational effects are considered to be permanent unless otherwise stated. In terms of temporary effects, their duration is determined on the basis of short term (less than 5 years), medium term (5-10 years); or long term (more than 10 years). The significance of these effects, without mitigation, is summarised in Table N2.

Table N2: Summary Impacts

Theme/Area	Timescale	Effect	Significance
Construction employment effects	Temporary (medium term)	Beneficial	Moderate
Operational employment effects	Permanent	Beneficial	Moderate
Population effects	Permanent	Neutral	Negligible
Local Labour Market effects	Permanent	Beneficial	Moderate
Housing effects	Permanent	Beneficial	Moderate (District) Moderate to Substantial (Ward)
Primary education effects	Permanent	Adverse	Substantial
Secondary education effects	Permanent	Adverse	Substantial
Health Facility effects (GP Provision)	Permanent	Adverse	Moderate
Sports Facility effects	Permanent	Adverse	Negligible to Minor
Open Space and Outdoor Recreation Facility effects	Permanent	Beneficial	Moderate
Community Facility effects	Permanent	Neutral	Negligible

Consideration of Alternatives

5.44 In the event that the Proposed Development does not come forward on the site ('no development' scenario), having regard to the assessment of potential socio-economic effects, it is assumed that the range of beneficial effects identified above will not be generated. The site and indeed the wider Area of Impact would not experience the beneficial effects associated with increased employment through the construction and operational phases, and beneficial effects relating to the local labour market and housing. In the event of a no development scenario, a new primary school would not come forward on the site, which would place additional pressures on existing primary schools if the adjacent Deep Dale Lane development did some forward (it does not include a new primary school) and the projected population increases. Additionally, through the absence of an increase in population associated with the development of 1,850 new dwellings, a no development scenario would lead to no additional pressure placed on existing health infrastructure.

N6.0 Mitigation and Monitoring

During Construction

Construction Employment

6.1 The construction employment opportunities to be created by the Proposed Development will lead to moderate beneficial effects, although temporary (medium term) in duration. However, the implementation of the following initiatives could maximise the economic benefits of the scheme felt locally, including:

- Providing employment and training opportunities for local residents, through requiring or encouraging contractors to sign up to 'local labour clauses';
- Encouraging procurement opportunities for local businesses to source products and services locally where possible and practical; and
- Establishing links with local businesses to offer training and employment opportunities via work experience and apprenticeship schemes.

6.2 The implementation of these measures would be subject to discussions with SDDC and other relevant bodies.

During Operation

Employment Effects

6.3 The operational employment effects are likely to be moderate and positive in nature and permanent in duration and will not therefore give rise to a need for mitigation measures. However, the anticipated local economic benefits may be maximised by measures to encourage local recruitment for the new employment opportunities offered in the longer-term operation of the development.

Education Capacity

6.4 The Proposed Development has been assessed as giving rise to a substantial adverse and permanent effects in relation to school capacity. The provision of a new primary school and expansion of off-site secondary schools would mitigate this effect in full.

6.5 Through a Section 106 Agreement a suitable financial contribution can be agreed towards education provision.

Health Facilities

6.6 The Proposed Development has been assessed as giving rise to a moderate adverse and permanent effect in relation to local health facilities. It is expected that a financial contribution will be required towards improved GP capacity off-site, as it is recognised that the level of 'need' (in terms of requirement for additional GPs) solely from this Proposed Development or across the entire IGV is unlikely to warrant the delivery of a new health facility (a facility with only one or two GPs would not be 'viable').

During Decommissioning

6.7 The potential effects during decommissioning have not been considered as the Proposed Development will not be decommissioned.

N7.0 Residual Effects

During Construction

7.1 No significant negative effects are anticipated during the construction period after mitigation.

During Operation

7.2 Following appropriate financial contribution towards local healthcare facilities, any negative effects likely to arise from the Proposed Development will be effectively neutralised.

7.3 Following delivery of a new primary school on the site and a financial contribution towards expansion of off-site secondary school, any negative effects likely to arise from the Proposed Development will be effectively neutralised.

7.4 The duration, scale and significance of these residual effects (making allowance for mitigation) are summarised in Table N3.

Table N3: Summary Residual Impacts

Theme/Area	Timescale	Effect	Significance
Construction employment effects	Temporary (medium term)	Beneficial	Moderate
Operational employment effects	Permanent	Beneficial	Moderate
Population effects	Permanent	Neutral	Negligible
Local Labour Market effects	Permanent	Beneficial	Moderate
Housing effects	Permanent	Beneficial	Moderate (District) Moderate to Substantial (Ward)
Primary education effects	Permanent	Beneficial	Substantial
Secondary education effects	Permanent	Neutral	Substantial
Health Facility effects (GP Provision)	Permanent	Neutral	Moderate
Sports Facility effects	Permanent	Adverse	Negligible to Minor
Open Space and Outdoor Recreation Facility effects	Permanent	Beneficial	Moderate
Community Facility effects	Permanent	Neutral	Negligible

During Decommissioning

7.5 The potential effects during decommissioning have not been considered as the Proposed Development will not be decommissioned.

N8.0 Summary & Conclusions

8.1 The Proposed Development will deliver up to 1,850 new dwellings as part of a residential-led development that will also include retail, employment uses, community uses, primary school, open space, and associated infrastructure, helping to meet the housing need and other development needs of the District. The Proposed Development will have a positive impact on the local economy by supporting new construction jobs during the development phase and providing jobs during the operational phase due to new employment uses, retail and other local services including a new school, community facilities on site.

8.2 The scale of housing growth will deliver beneficial impacts by helping to diversify the existing stock within the local area, with the possibility of also contributing towards meeting the need for affordable homes.

8.3 The Proposed Development will also give rise to a positive effect with respect to primary education facilities, through the provision of a new primary school that will create additional capacity within the local area.

8.4 The provision of open space and recreational facilities across the Proposed Development will provide benefits to new and existing local residents through improved, convenient access to high quality greenspace.

8.5 Employment opportunities both during construction and operational phases of the Proposed Development will give rise to positive effect on the local jobs market.

8.6 Potential adverse effects on secondary school capacity will be neutralised through expansion of those facilities (funded in part by S106 contribution).

8.7 Potential adverse effects on health facility capacity will be neutralised through funding provision for the expansion of those facilities.

8.8 Having regard to existing (and proposed) provision and the scale of additional demand generated by the Proposed Development, the scheme will give rise to neutral effects with regards to other community facilities.

8.9 The only potential adverse effect of the Proposed Development, from a socio-economic perspective, relates to off-site sports facility provision, though this effect would be negligible to minor.

8.10 Based on the preceding sections, the most significant socio-economic impacts of the Proposed Development are likely to include:

- Supporting over 300 temporary direct construction jobs per annum across over a decade of build period, with further indirect and induced employment impacts in the supply chain and related services;
- The creation of permanent, on-site employment opportunities, estimated to be over c.973, with further indirect and induced employment impacts supported in the local economy;
- Provision of up to 1,850 new homes, with the scope for some to be affordable homes, thereby improving housing choice;
- Provision of new local retail and service facilities, community and education facilities to complement the delivery of new residential development; and
- Provision of new open space.

N9.0 Abbreviations & Definitions

1. DCityC – Derby City Council
2. DCC – Derbyshire County Council
3. IGV – Infinity Garden Village
4. NPPF – National Planning Policy Framework
5. SDDC – South Derbyshire District Council
6. SHMA - Strategic Housing Market Assessment
7. S106 – Section 106 Agreement

N10.0 References

1. There are no references additional to those highlighted in the chapter

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter O: Cumulative Effects

June 2019

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O1.0 Introduction

1.1 This Chapter draws together the individual outputs of the Environmental Statement (ES); defines inter-relationships between these assessments and other development in the area surrounding the site; establishes whether there are any other residual effects on the identified sensitive receptors which may require additional mitigation not previously identified.

1.2 There may also be other indirect effects arising from the development when considered with other proposals or schemes in the surrounding area. These effects may also give rise to the need to consider additional mitigation measures, albeit necessary to consider the likelihood of those other schemes proceeding and the ability, or necessity, of the developer to mitigate any such effects for other sites.

1.3 Sensitive receptors have been identified in individual chapters of the ES. Regard has been had to the sensitivity of the identified receptors to ensure consideration is then given to those which area potentially the most sensitive to impact, taking into account the extent of the effects arising. The professional judgement of those undertaking the EIA, as well as topic specific criteria, legislation or guidelines, has been used to identify the degree of sensitivity.

1.4 Consideration of the impacts arising from the construction / site preparations works and operational phase of the Proposed Development has been undertaken within each of the technical chapters, and is also addressed in the assessment of the cumulative effects arising from the Proposed Development.

O2.0 Summary of Effects and Sensitive Receptors

2.1 This section summarises the key residual environmental effects identified in the ES and those sensitive receptors most likely to be affected. It is with regard to those receptors that the analysis of any additional impacts associated with the cumulation of effects has been carried out.

2.2 This approach accords with EIA legislation and best practice which focuses on the main or significant effects arising from the development.

2.3 Table 2.1 provides a summary of the main residual effects (post incorporation of mitigation measures as identified in Chapters D to L) that could be expected to arise during the period of construction/site preparation and operation.

Table 0.1 Summary of Residual Effects

Environment Topic	Summary of Residual Effects
Effects During Construction / Site Preparation A range of effects have been identified during the construction / site preparation period, many of which are assessed as having negligible or minor adverse residual effects once mitigation measures are incorporated into a site management plan has been taken into account.	
Transport	Moderate increase in HGV movements resulting from the construction process. Upon completion of the A50 junction and associated highway infrastructure the HGV's associated with the construction of the site will be directed to use this junction reducing trips along Stenson Road; however, during the initial phases of construction of development the Residual impact on the local area will be **Minor – adverse**
Water Environment	The construction period of the development is relatively short when compared to the overall life of the proposed development and as such any residual impact would be considered to be short-lived. During the construction phase some sediment would inevitably escape the installed containment measures, but the volume of sediment entering the water environment would be minimal and would have a minor adverse impact on the watercourse and nearby sewerage infrastructure.

Environment Topic	Summary of Residual Effects
	In the event of an accidental spillage or leak of hydrocarbons or other hazardous substances were to occur, mitigation should limit the impact. Measures should be in place as part of the CEMP to deal with such eventualities, and so the impact would be **minor adverse**.
Ground Conditions	Following the implementation of applicable impact avoidance and mitigation measures, all potential geological and soil related effects associated with the construction of the Proposed Development are assessed as being **not significant (negligible)**.
Heritage and Archaeology	Impact on as yet unknown below ground archaeological remains - **Negligible** effect in the long-term at the local level which is **not significant**. Impact on designated heritage assets (Listed Buildings, Conservation Areas, Registered Park and Garden and Scheduled Monuments) - **Negligible** effect in the short-term at the national level, which is **not significant**.
Landscape and Visual Impact	Construction works would be a direct impact upon the site with some indirect impacts on its immediate context. The level of effects would not be permanent. A more marked direct effect would occur on the landscape receptor of the site and its immediate area as a result of the **High -Medium** magnitude of change (impact) of Proposed Development upon it.
Ecology	There will be residual effects from the loss of mature trees until such a time as other mature trees reach similar maturity in the medium – long term. This is considered to be **negligible** given the extent of retained trees. Residual impacts will arise from the loss of the woodland habitat at Willow Wood until such a time as other new woodland reaches similar maturity in the medium – long term. This is a **minor adverse effect** in the short term only. The establishment of bat 'hop-overs' to maintain connectivity along breached foraging and commuting routes will reduce the impact of any habitat fragmentation although there will be a short term **minor adverse** impact at a site level only, until hop-overs mature and re-establish connectivity along

Environment Topic	Summary of Residual Effects
	retained routes and whilst bats habituate to new routes. This will be minimised by the early creation of hop-overs in the scheme. In the medium-long term, residual impacts will be **negligible.** Loss of potential ground nesting vegetation which cannot be replaced within the Scheme will lead to residual impacts for skylark of **minor significance** at a local level at the Proposed Development. Residual impacts may be expected in the short term for other breeding birds through loss of nesting and foraging habitat in the form of woody habitats. Other similar habitat will be retained and residual impacts are **negligible.** Upon maturation significant new habitat will be available to these species and **positive minor effects,** may be expected.
Air Quality	With appropriate mitigation in place, the residual effects will normally be '**not significant'**. The IAQM guidance does, however, recognise 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. During these events, short-term dust annoyance may occur, however, the scale of this would not normally be considered sufficient to change the conclusion that overall the effects will be **'not significant'**.
Noise	With the best practice principles taken into account, the temporary effect of construction activity will be expected to be limited to **Minor Adverse** in the worst case. Construction effects are therefore assessed as **insignificant**.
Agriculture and Soils	The permanent loss of 149 ha of agricultural land, of which 23.7 ha is within the BMV category, cannot be mitigated against and is determined a **moderate adverse** effect. Adherence to a detailed site-specific Soil Management Plan written by a soil expert will facilitate protection of the entire topsoil resource and prevent any significant subsoil compaction. The effects of the Proposed Development on soil resources would then be regarded as **negligible** and therefore **not of significance**.

Environment Topic	Summary of Residual Effects
Socio Economics	**No significant negative effects** are anticipated during the construction period after mitigation.
Effects During Operation	
Transport	Moderate increase in vehicle movements resulting from the development. Improved accessibility for pedestrians and cyclists, strengthening linkages with existing footway links and existing residential areas. The Residual impact will be **Minor -Beneficial**.
Water Environment	The operational period in its nature is long term and with the submitted design will incorporate SuDS designed to reduce surface water run-off rates and provide surface water treatment and channel pluvial flows towards positively drained areas. Betterment will be provided on the current situation therefore residual effect on water quality or surface water runoff will be considered **minor beneficial**. Any impact on the foul sewer network will need to be addressed in consultation with Severn Trent Water under a S106 agreement. Connection may need to be made with the proviso of network improvements and enabling works subject to the undertaking of sewer modelling of the existing network. As the regulatory water authority, it is their prerogative to ensure that an appropriate connection can be established any residual effect on the foul network can be therefore be considered to be **negligible**.
Ground Conditions	Following the implementation of applicable impact avoidance and mitigation measures, all potential geological and soil related effects associated with the operation of the Proposed Development are assessed as being **not significant (negligible).**
Heritage and Archaeology	Impact on as yet unknown below ground archaeological remains - N/A. Impact on designated heritage assets (Listed Buildings, Conservation Areas, Registered Park and Garden and Scheduled Monuments) - **Negligible effect** in the short-term at the national level, which is **not significant**.
Landscape and Visual Impact	The operation effects would result in a **Substantial-Moderate Adverse** level of effect and significance upon

Environment Topic	Summary of Residual Effects
	the site and its immediate context. Over time, as the green Infrastructure matures and establishes, to include planting that provides compensatory measures, it is assessed that the level of effects and significance would diminish such that the long-term residual effects would be **Moderate Adverse**. These effects (and level of significance) would continue to lessen in the much longer term. For residents on the southern edge of Sinfin and Stenson Fields, the level of effect and significance would be **Substantial-Moderate Adverse.** In the longer term this will reduce to a Moderate Adverse effect/level of significance on account of the screening and filtering effects that would be achieved by the proposed planting. These effects and level of significance would continue to lessen in the much longer term as the green infrastructure matures.
Ecology	The nature of the habitats and facilities at Sinfin Moor LNR and LWS, mean that it is likely that the new community will use these sites for some recreational activities. Given the extent of on site provision likely to meet everyday needs, residual effects on the nearby sites are considered to be **negligible**. Once new habitats have matured it is anticipated that there will be an overall increase in biodiversity at the site, of value to a range of local species, either using the site already, or with the potential to use the site. In the medium to long term as habitats and mature **minor-moderate positive residual effects** would be expected for biodiversity.
Air Quality	The residual effects will be the same as those described above and are therefore **not significant**.
Noise	Road Network Traffic Noise (To Existing Receptors): No actionable mitigation measures are required and residual impacts are assessed as being N**eutral/Negligible to Minor** in the worst case. Traffic noise effects are therefore assessed as insignificant. Noise from Fixed Plant Items (To Existing Receptors): Providing all plant to be included as part of the development as a whole is designed to plant noise limits

Environment Topic	Summary of Residual Effects
	the residual effect of fixed plant items will be **Neutral/Negligible**. Fixed plant noise effects are therefore assessed as insignificant. Road and Rail Traffic Noise (To Proposed Receptors): Taking into account the mitigation strategy, the residual effect of noise from existing local road traffic and rail vehicle movement to proposed sensitives is expected to be **Neutral/Negligible to Minor** in the worst case. Road and rail traffic noise affecting proposed receptors is therefore assessed as insignificant. Noise from Proposed Employment Area (to Existing and Proposed Receptors): Providing the proposed employment area is designed in such a way that appropriate noise limits are met, the residual effect of the Employment Area will be **Neutral/Negligible**. Effects related to noise from the proposed employment area, affecting proposed receptors is therefore assessed as insignificant
Agriculture and Soils	The residual effects on soil and agriculture during operation do not differ from those during construction.
Socio Economics	Following appropriate financial contribution towards local healthcare facilities, any negative effects likely to arise from the Proposed Development will be effectively **neutralised**. Following delivery of a new primary school on the site and a financial contribution towards expansion of off-site secondary school, any negative effects likely to arise from the Proposed Development will be effectively **neutralised**.

Summary of Sensitive Receptors

2.4 The technical assessments contained within the ES have identified a range of sensitive receptors which have varying degrees of sensitivity to the environmental impact and change as a result of the proposed development. Those receptors potentially sensitive to the effects identified in Table 2.1 are identified below:

- Road Users/Accessibility
- Local Residents
- Local Labour Force/Businesses
- Local Highway Network
- Construction / Site Workers
- Watercourses
- Ground Conditions
- Landscape Character
- Views and Visual Amenity
- Archaeology
- Heritage Assets
- Local Habitat and Fauna

O3.0 Other Cumulative Effects

3.1 Assessment should be carried out to determine whether cumulative effects arise from the Proposed Development when considered with other schemes identified in proximity to the Site.

3.2 The objective is to identify whether impacts from several developments which individually might be insignificant could, when considered together, cause a significant indirect and cumulative impact requiring mitigation.

Schemes Assessed

3.3 Best practice dictates that cumulative assessments of this nature should have regard to those schemes which are 'reasonably foreseeable' (i.e. usually those under construction or with planning permission). This is further clarified in the Planning Practice Guidance (Environmental Impact Assessment) which states that:

"The local planning authorities should always have regard to the possible cumulative effects arising from any existing or approved development"

3.4 The assessment is also only capable of being carried out based on the information available at this time.

Infinity Garden Village

3.5 Various schemes have been identified for potential consideration in this EIA, notably the sites benefiting from planning permission for residential development within Derby City, to the east and west of Deep Dale Lane, along with the extant application for 100 dwellings on land to the east of Deep Dale Lane, within South Derbyshire. Together, these form part of the wider Infinity Garden Village proposals. Where relevant, those proposals have been considered within the individual topic chapters, in addition to the wider IGV proposals.

3.6 Consideration of cumulative effects within the individual topic chapters is reviewed below.

Transport

3.7 The assessment carried out as part of that chapter demonstrates that the roads within the assessment area will not be adversely affected by the proposed development or cumulatively with other developments; as such there will be no significance in terms of Cumulative Effects.

Water Environment

3.8 The NPPF, Planning Practice Guidance and Non-Statutory Technical Standards for Sustainable Drainage ensure all new developments are upheld to the same standards with regard to flood risk, in that risk is not increased to third parties and where possible betterment is sought. Therefore, only positive cumulative effects will be encountered when assessing other schemes in the locality.

Ground Conditions.

3.9 It is considered that there will be minimal cumulative effects on ground conditions and contamination resulting from the Proposed Development and cumulative schemes related to the IGV considered as part of the assessment, as each development will incorporate appropriate mitigation measures.

Heritage and Archaeology

During Construction

3.10 The proposed development will destroy any below ground archaeological assets within the sites. Therefore, there will be no cumulative effects with other sites or developments elsewhere. It is not considered that there will be any cumulative impacts on designated heritage assets of the proposed development in conjunction with other developments in the area or in combination with other impacts from the proposed development (synergistic impacts).

During Operation

3.11 There will be no cumulative effects with other sites or developments elsewhere. It is not considered that there will be any cumulative impacts on designated heritage assets of the proposed development in conjunction with other developments in the area or in combination with other impacts from the proposed development (synergistic impacts).

Landscape

3.12 The Proposed Development forms part of the wider proposals of Infinity Garden Village. With the Proposed Development and the Infinity Garden Village project in place there would be an additional level of change and effect on landscape character and visual amenity through the construction and operational phase. This includes a high magnitude of change on the landscape of the site. It is expected that primary and secondary mitigation measures would be in place for the Infinity Garden Village. This is expected to include conservation of those landscape features of particular value, and compensatory and enhancement measures delivered by green infrastructure. It is expected that a CEMP would be in place to ensure good working practices for landscape character and visual amenity. It is anticipated that a Landscape

& Ecological Management Plan (LEMP), or similar, would be produced to ensure that the green infrastructure is appropriately managed in the long term. This could form a planning condition or part of a S106.

3.13 Overall, it is judged that the cumulative effects of the Proposed Development coming forward in conjunction with the Infinity Garden Village project would result in varying degrees of change and effects on differing landscape and visual receptors. Given the capacity of this landscape to absorb change, and on the assumption that appropriate design and mitigation measures would be adopted to minimise effects, it is judged that the cumulative effects on landscape character and visual amenity are unlikely to result in any unacceptable long-term harm.

Ecology

3.14 Cumulative effects of the Proposed Development coming forward in conjunction with the IGV would result in varying degrees of change and effects on the identified ecological receptors.

3.15 Features of greater interest at the Proposed Development are to be retained and enhanced through both the design and mitigation measures as described.

3.16 Within the red line of the residential application, the A50 link road proposals will lead to the additional loss of a number of hedgerow sections, mature trees and ditches to be culverted which would otherwise be retained with the residential application to which this assessment relates.

3.17 It is anticipated that primary and secondary mitigation measures would be in place for the IGV and A50 link road to reduce any adverse effects on nature conservation and biodiversity arising from these developments to acceptable levels, including through appropriate design, with mitigation and compensatory measures where necessary leading to biodiversity enhancements. It is expected that a CEMP, or similar would also be in place to ensure good working practices for habitats and fauna and that a Green Infrastructure and Biodiversity Management Strategy or Plan, (or similar) would ensure that the green infrastructure is appropriately managed in the long term, delivered via a planning condition or as part of a S106.

3.18 The Site and surrounding areas to be developed are largely intensively managed farmland of limited ecological value. On the assumption that each proposed or anticipated forthcoming development incorporates appropriate mitigation to reduce effects, overall effects will be no greater than any individual effect identified for this Proposed Development and would be

unlikely to result in any long-term significant harm for the vast majority of receptors.

3.19 However, loss of farmland at the Proposed Development would lead to minor impacts on breeding skylark at a local level which cannot be mitigated within the Scheme. The cumulative loss of the wider farmland habitats to the A50 and IGV, has the potential to result in a permanent, up to moderate adverse effect on breeding skylark.

3.20 Cumulatively, the ability to deliver a significant extent of new green infrastructure as a result of development at this scale, provides opportunity for integrated and diverse habitat creation and enhancement across the whole of the IGV, bringing biodiversity benefits to the local area. Up to moderate positive effects could be expected once the whole GI has successfully established and matured.

Air Quality

3.21 The traffic data used in the assessment includes the contribution of cumulative developments to predicted traffic flows in the without development and with development future assessment scenarios. The air quality assessment is therefore intrinsically cumulative and the cumulative effects are the same as those described.

Noise

Road Network Traffic Noise (To Existing Receptors)

3.22 The cumulative effects of other committed developments have been included as part of the road network traffic noise assessment. It has been determined that the potential effect when considering nearby committed developments would be limited to Neutral/Negligible to Minor Adverse in the worst case.

3.23 Whilst the proposed A50 junction cannot be considered a committed development, the effects of its introduction have been considered within the Road Network Traffic Noise assessment. It has been determined that the potential effect when considering the proposed development with the new A50 junction, would be limited to Neutral/Negligible to Minor Adverse in the worst case.

Road and Rail Traffic Noise (To Proposed Receptors)

3.24 The proposed A50 junction has the potential to affect noise levels at proposed receptors in the vicinity of the junction. Mitigation measures for the proposed residences have been considered to ensure the potential effect and proposed residences would be limited from Neutral/Negligible to Minor Adverse in the worst case.

Agriculture and Soils

3.25 Soil and agricultural land loss from an individual site should be considered on a site by site basis (against the benefits of the scheme) and therefore it is not considered there are any relevant cumulative effects to the Proposed Development. Therefore, the effects of the Proposed Development remain negligible and moderate adverse for soil resources and agricultural land respectively.

Socio Economic

3.26 Demand for school places from the adjacent Deep Dale Lane developments, whilst not an impact of the Proposed Development, will contribute to cumulative impacts.

3.27 Whilst some local schools would likely have some spare capacity in the early phases of development, both at primary and secondary school stage, there is insufficient existing capacity to serve the completed Proposed Development.

3.28 The Proposed Development is considered to present a permanent and substantial adverse effect on both primary and secondary school capacity provision. The cumulative effect of adjacent development also impacts on this.

O4.0 Summary & Conclusion

4.1 This chapter has considered the relationships between the technical assessments and any other development in the area surrounding the site.

4.2 The majority of the residual effects outlined within the construction phase are considered to be temporary or a minor adverse impact and mitigation and monitoring measures as described will further reduce the impact on affected receptors. Whilst there are a small number of minor adverse residual effects during the operation, these effects will generally reduce through appropriate mitigation overtime.

4.3 Consideration has also been given to the potential for cumulative effects when the proposed development is considered alongside identified emerging and recently constructed developments identified in the surrounding area, primarily Infinity Garden Village. The majority of the technical assessments have concluded that the cumulative effects of the proposed development combined with neighbouring development will be negligible and non-significant.

O5.0 Abbreviations & Definitions

IGV – Infinity Garden Village

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter P: Mitigation and Monitoring

June 2019

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P1.0 Introduction

1.1 The Environmental Statement ('ES') has identified a series of mitigation and ongoing monitoring and / or management measures which are designed to limit or remove any significant adverse environmental effects of the proposed development.

1.2 Schedule 4, Part (7) of the Town and Country Planning (Environmental Impact Assessment ('EIA')) Regulations 2017 ('2017 EIA Regulations') requires an ES to provide a description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements.

1.3 The Planning Practice Guidance ('PPG') confirms that *'mitigation measures proposed in an Environmental Statement are designed to limit or remove any significant adverse environmental effects of a development. Local planning authorities will need to consider carefully how mitigation measures proposed in an Environmental Statement are to be secured'*.

1.4 In accordance with Regulation 26(3) of the 2017 EIA Regulations, the PPG further states that *'if planning permission or subsequent consent is to be granted, the local planning authority or Secretary of State must consider whether it is appropriate to impose monitoring measures'.*

1.5 This chapter will present the mitigation and monitoring measures proposed throughout the ES, and the mechanism for securing these. This is identified to assist in the ongoing consideration of the ES and to assist South Derbyshire District Council (SDDC) and Derby City Council (DCityC) in forming its reasoned conclusion of the Proposed Development.

1.6 Most of the measures are standard best practice processes but are summarised below for completeness, while others are specific to the development. All measures are capable of being secured via a planning condition or obligation.

P2.0 Mitigation and Monitoring

2.1 The following section sets out the mitigation measures proposed throughout the technical chapters of the ES, including those measures 'in-built' into the design as part of the EIA process, and those which can be secured via planning condition or obligation.

Incorporated Mitigation Measures

2.2 As set out in this ES, the iterative process of EIA has resulted in the inclusion of a range of incorporated mitigation measures into the design of the Proposed Development. These are aspects of the design which have been specifically included in the scheme design, and are assumptions on which the assessment and resultant additional mitigation has been based

2.3 This includes the following:

- Minimum ground levels and floor levels to mitigate flood risk to the site.
- Incorporation of flood water detention ponds, in response to potential flood risk.
- Provision of on-site attenuation areas within the Proposed Development in response to the increased surface water drainage on site.
- The delivery of part of the South Derby Integrated Transport Link and related junction improvements.
- Provision for the construction of a new junction on the A50, and other sections of the South Derby Integrated Transport Link.
- The retention of existing trees and hedgerows, and the planting of new trees, hedgerows and other landscaping.
- Provision for the construction of a new 2 form entry primary school.

2.4 The above measures are in-built features of the submitted scheme, and serve to mitigate potential effects on environmental receptors that might otherwise result in significant effects or require additional mitigation measures.

Mitigation and Monitoring

2.5 Mitigation measures that have been identified within the relevant technical chapters in the ES are set out below for the Construction and Operational stages of development. It is anticipated that these measures will be secured via planning condition or obligation.

Transport

During Construction

2.6 As part of the construction phases of the works, a lorry routing plan will be produced and conditioned. This is to be provided to minimise the impact of HGVs associated with the construction phase of the surrounding area

Physical Measures

2.7 The proposed development will include the provision of a new link road which will connect to the Infinity Park link road and the proposed A50 junction. Along the link road a number of new access points will be provided which will be primarily simple priority junction arrangements with the exception for three key junctions which include:

- A new staggered signalised junction at the new Link Road/ Arleston Lane junction; and
- A new signalised junction on the new link road approximately west of the new A50 junction arrangement.

2.8 The development proposal will also include a new 2 form entry Primary School and Local Centre which will be situated central to the development site, with vehicular access being made via the Arleston Lane/ new Link Road (SDITL) junction. A new five arm roundabout at the Wragley Way/ Stenson Road junction.

2.9 New footway and cycleway routes will be provided along the proposed link road and throughout the development site and incorporate new controlled crossing points at key locations.

2.10 Off-site junction improvements will include:

- Stenson Road/ Warwick Avenue (Junction Ref.A) – new signalised junction arrangement.
- Grampian Way/ Arleston Lane/ Asda (Junction Ref. B) – widening on both the Arleston Lane and Grampian Way north arms.
- Grampian Way/ Lynwood Road (Junction Ref.C) – widening on the Sinfin Lane (north) and Grampian Way arms.
- Stenson Road/ Grampian Way (Junction Ref. G) – widening of all arms at the junction.

Accessibility Improvement Measures

2.11 In order to encourage residents and visitors to the site to use more sustainable modes of transport, the development proposed will include contribution towards.

- Diversion of existing bus services to the site & new bus routes to link with the City Centre
- Site Wide Travel Plan
- New footway/cycleway links to connect the development area to the local facilities and employment areas as well as linking with the existing footway network.

2.12 The proposed road and access arrangements are illustrated on the plan attached as Figure D1 and Appendix D1, and are provided in greater detail in the TA. The above measures will be secured through the S106/S278/S38 agreements.

Water Environment

During Construction

Flood Risk Mitigation

2.13 It is recommended that any site offices, welfare facilities and other temporary structures related to the construction activity are located in Flood Zone 1 wherever possible. This will avoid areas at risk of flooding thereby eliminating the risk posed to those activities.

2.14 As part of a Construction Environment Management Plan (CEMP), a section on Flood Management and Evacuation will be prepared. To include site supervisors signing up to the Environment Agency's FloodLine Warnings service to receive early alerts of the potential flooding to occur and providing appropriate actions for workers to take on receipt of a flood warning, or realisation of flooding on site.

Water Quality

2.15 Appropriate site management will ensure the significance is reduced to as low as reasonably possible. Providing haul roads or key routes through the site to track vehicles and heavy plant will minimise the mobilisation of sediment reducing the potential for it to enter the water environment.

2.16 Damping down the site of any soil stripping or earthworks will limit mobilisation by wind, but appropriate bunding should be provided as

appropriate to deter the resulting runoff from entering sewers, drains or the watercourses.

2.17 A suitable method statement will be required for any works in or near the watercourses to support the appropriate Land Drainage Consent application(s). This should include specific measures for managing sediment mobilisation.

During Operation

Management of Flood Risk

2.18 As part of the revised hydraulic modelling, it was considered that upgrades to the culverts beneath Stenson Road and Arleston Lane are proposed to alleviate flood risk posed to the development. Potential options, including the blockage scenarios and have been undertaken and are detailed within the supporting Flood Risk Assessment Report BWB reference: WRA-BWB-ZZ-XX-RP-YE-0002_FRA.

2.19 Any new culvert crossings have been designed to minimise the potential risk associated with blockage, ensuring future resilience by accounting for climate change. Suitable mitigation measures are recommended as part of the FRA to ensure built development is made safe from the impacts of flooding, including these blockage scenarios.

Management of surface water runoff (flood risk)

2.20 There is inherent mitigation by design as part of the proposed surface water drainage strategy. Inclusion of a network of sustainable drainage systems, a proposed restriction on low and allowance for blue-green infrastructure will ensure flood risk is managed while also improving the water quality of any associated discharge.

Ground Conditions

During Construction

2.21 During the construction phase, the Proposed Development includes earthworks related to site levelling and bunding, soil stockpiling, and the exposure of other new areas of ground, such as site compounds. Measures will be undertaken in these areas as appropriate, in line with CIRIA C741 Good Practice on Site (4th edition 2015) and with a Construction Environment Management Plan (CEMP), so as to minimise the potential for the movement of sediments into surface watercourses.

2.22 It is highly unlikely that a pollutant linkage associated with the Proposed Development would impact upon surface water receptors due to the lack of contamination present on Site.

2.23 Lubricants and refuelling facilities will be positioned away from the most sensitive receptors at the Site (surface watercourses) and stored in an appropriate manner, with secondary containment and contingency/emergency procedures (such as spill kits) in place should leaks or spillages occur. Guidance within EA PPG2: Above Ground Oil Storage Tanks should be adhered to with respect to any on site oil storage during the construction phase. This shall limit the potential for effects to occur and limit the magnitude should effects occur.

2.24 There will be an increased potential for direct human exposure to contamination identified in shallow soils through ingestion, direct contact or inhalation of contaminated soil or dust by construction workers in the short term during construction works. To mitigate against such risks construction workers and services personnel shall follow guidance stated in 'HSG 66 Protection of Workers and the General Public during Development of Contaminated Land' and CIRIA Report C670, Site health handbook during construction works. Adequate standard personal protective equipment and the development of basic hygiene measures will be undertaken.

2.25 To mitigate the risks associated with the generation of contaminated dusts during remediation works (unlikely to be required) and earthworks being undertaken on the Site, exposed areas will be dampened down during the construction work in order to reduce the amount of dust generated. In addition, the levels of dust generated will be monitored throughout the works. This would be set out within the CEMP.

2.26 In the event that previously unanticipated contamination is identified, advice from a specialist should be sought immediately. Suspected contaminated materials should be stockpiled separately for subsequent analysis, and if necessary, off-site disposal under appropriate Duty of Care.

2.27 In order to reduce the impact upon the RIGS site, it is recommended that prior to development or during earthworks, the opportunity is taken take a detailed record of the underlying geology in areas that will be sterilised by the presence of buildings. Additionally, where cut and fill exercises are required, it is recommended that these are kept as small as possible, with a watching brief during excavation works in order to record the sedimentary sequences and fossil assemblages.

During Operation

2.28 Significant sources of contamination are unlikely to be present at the Site, however there is a possibility that contaminants are present within the localised Made Ground deposits which could represent a risk to future site users. In areas of proposed gardens or soft landscaping, a clean capping topsoil layer would sever the pathway to human health receptors. Subject to testing, this could be sourced from the existing topsoil at the Site that would be stripped from under the development footprint.

2.29 Potentially elevated ground gases could be present in localised areas of Made Ground. Where ground gasses are present, the risk could be mitigated via installation of appropriate levels of gas protection measures.

Heritage and Archaeology

During Construction

Non-Designated Archaeological Assets

2.30 It is anticipated that a limited programme of archaeological works will be required to mitigate archaeology within the site. This may, in the first instance, take the form of a programme of trial trenching.

2.31 The archaeological mitigation strategy will be discussed and agreed with the archaeological advisor to Derbyshire County Council prior to any ground works commencing on site.

Designated Heritage Assets

2.32 There are no mitigation measures required during construction.

During Operation
Non-Designated Archaeological Assets

2.33 The archaeological potential of the site will have been assessed and recorded prior to construction. Therefore, no mitigation measures are required during operation.

Designated Heritage Assets

6.1 There are no mitigation measures required during operation.

Landscape and Visual Impact

Mitigation by Design

2.34 The provision of green infrastructure is an integral part of the Proposed Development and is a primary mitigation measure (i.e. actions undertaken by the EIA process to influence the design and layout of the Proposed Development). Green infrastructure is network of multi-functional green space, which is capable of delivering a wide range of environmental and quality of life benefits.

2.35 For the Proposed Development this includes retained woodland, hedges and mature trees. It also includes new landscape planting, habitat creation and natural green space, as well recreational open space and walking and cycling routes. Landscape features within the site that are retained are identified on the Parameter Plan together with the proposed new green infrastructure. This includes a substantial area of green space, habitats and planting along the southern boundary of the site, and interconnected green corridors within the site.

2.36 The proposals include compensatory planting that seeks to mitigate for the loss and disruption of hedgerows and trees as a result of the Proposed Development. This includes the planting of species rich hedgerows and new broadleaved trees and woodland. This structural landscape framework, which will expand upon the retained hedges and trees, is identified on the Parameter Plan.

Additional Mitigation

2.37 Additional mitigation, or secondary mitigation, is beyond that of the design and layout of the Proposed Development. From a landscape and visual perspective, the following will be implemented.

During Construction: Construction & Environmental Management Plan (CEMP)

2.38 The CEMP will include a variety of measures to minimise impacts of the Proposed Development on the environment. In terms of landscape character this will include the protection of vegetation that is to be retained in accordance with BS 5837 Trees in Construction. With regards to visual amenity this will include the use of site hoardings to screen construction activities, appropriate locations for site huts and compounds away from sensitive landscape and visual receptors, and strict measures for lighting.

During Operation: Landscape Management

2.39 Through the planning process/S106 agreement, measures will be put in place with regard to the approval and implementation of the new green infrastructure, as well as its on-going management. This includes the approval of reserved matters applications that address landscape design. To ensure that the green infrastructure becomes established and provides long term mitigation and enhancements it will managed in the long term, either by the local authorities or by a private management company. The details of this will be developed through the planning process.

Enhancements

2.40 As well as providing compensatory mitigation measures, the proposed green infrastructure provides long term benefits for landscape character, biodiversity and recreation. New woodland planting, for example, will help to 'soften' and filter views of the built development for visual receptors that have views of the Proposed Development, as well as providing new wildlife habitats and also assisting with climate change. New areas of open space will provide public access and space for recreation.

Ecology

During Construction

2.41 A Construction Environmental Management Plan (CEMP) or similar will be put in place to ensure best working practices are adopted during construction to ensure that impacts are reduced to an acceptable level.

Designated Sites

2.42 No works will be undertaken within 5m of the Sinfin Moor Lane Stream LWS and Willow Wood and Drain SoI without a pre-commencement survey for the presence of water vole, which may be affected by works in order to avoid impacts or identify suitable mitigation necessary prior to commencement.

Habitats

2.43 The majority of habitats to be lost are not IEF and do not require direct mitigation. Design has avoided as much habitat loss of IEF as possible within the proposed GI. Overall the design of the GI will mitigate the small scale losses of IEF habitats identified through the provision of new native species hedgerows and broadleaved woodland, delivering significant biodiversity benefits as a whole above this.

2.44 Overall GI proposals will include a mix of public open space sports/play areas, allotments, flood attenuation and semi-natural habitats, integrated with and linked to the existing retained habitats at the Site, which will be restored and enhanced as part of the GI. GI will provide a habitat mosaic with enhanced habitat connections around the site. The main green space will lie along the southern boundary with smaller green ways east-west through the site, including along the line of the Barrow Drain and Willow Wood and Drain SoI. Green corridors will also provide habitat linkages north-south to link these areas. Flood attenuation habitats in the north of the site, adjacent to Sinfin Moor LNR, will create another area of semi-natural space, linked to the off-site habitats, with habitat links to the southern GI areas along the new A50 link road. Biodiverse habitats to be created will include new native broadleaved woodland and woodland edge habitats; scattered and dense scrub and individual trees, with species-rich native hedgerows. Grassland will include species-rich neutral meadow grassland (such as of a MG5 Cynosurus cristatus-Sanguisorba officinalis type), tussock and wet grassland (MG4 Alopecurus pratensis- Sanguisorba officinalis type mixes.

2.45 The GI will be publically accessible, with clear paths providing walking and cycling routes to minimise the potential for the creation of desire lines and avoid more sensitive habitats. The use of denser planting and natural obstacles will further naturally limit access into selected habitats to promote their biodiversity and prevent disturbance and degradation. Interpretation boards would highlight the habitats and wildlife that may be seen and encourage a sense of community ownership.

2.46 Habitat creation will be undertaken in accordance with any landscape specifications and habitat creation prescriptions at the appropriate time of year and following recommended guidance to ensure its effective creation and initial establishment. Willow Wood and Drain SoI will benefit from initial restoration works to enhance its value.

Fauna

Bats

2.47 All potential bats roosts which will be directly affected by the development will be assessed to determine the presence of any actual bat roosts through aerial assessment where Health and Safety allows, or nocturnal assessment. In order to ensure legal compliance and ensure removal works are undertaken in an appropriate manner to compensate and mitigate loss, a European Protected Species derogation licence will be required form Natural England for any confirmed roost. Mitigation required in this instance would be likely to include the erection of replacement roost habitat commensurate with the status of the identified roost loss, in the form of three bat boxes per roost lost, precautionary working methods for the removal of the trees and timing of works. Where no roosts are confirmed but potential roosting habitat is to be lost, mitigation will include the provision of bat boxes on nearby retained trees as replacement potential habitat. Implementation of the above will ensure that the FCS is maintained for the local population during construction.

2.48 Bats make transitory use of suitable tree roost sites and as such there is a risk that other trees supporting suitable features may become occupied, in the interim between this assessment and works occurring. Therefore in order ensure legal compliance further survey should be carried prior to works that will directly affect any tree with potential to support roosting bats to ascertain roosting potential/evidence at the time, including through aerial assessment where health and safety allows. Providing that trees have low roosting potential or further survey indicates no bats are present the tree/s will be sectionally felled by experienced arborists. In the event bats are confirmed then the works will be halted until an appropriate derogation licence is put in place as described for above for known roosts. Although not currently anticipated, any other mature tree subsequently to be removed should be checked from ground level, to ascertain any potential for roosting bats at that time and appropriate actions put in place as above as condition may change over time.

2.49 Where construction works will occur adjacent to new or retained foraging and commuting habitat , night working will not be undertaken to avoid the potential for disturbance when bats are active (April – mid-October).

Birds

2.50 Mitigation will be implemented to ensure legal compliance and that no breeding birds are harmed during construction. Therefore to avoid

disturbance to nesting birds, site clearance works including the removal of woody vegetation/trees and ground flora will be conducted where possible outside the bird breeding season, which runs March – August (inclusive).

2.51 If clearance is planned for the bird breeding season, it will be preceded by a nesting bird survey conducted by an experienced ecologist. This will involve observing any vegetation to identify birds exhibiting nesting behaviour and / or searching for active nests. Should any active bird nests be identified then an exclusion zone would need to be retained until the chicks had fledged as determined by the supervising ecologist.

Badger

2.52 Although not an IEF, badger are known to use the site with four small low status setts and limited activity recorded.

2.53 Overall the GI proposals will create large areas of new habitat opportunities for foraging and sett creation, linked with other suitable habitats off-site and will provide positive benefits for this species.

2.54 Prior to any works on site a pre-commencement survey will be undertaken to ascertain the current status of badger activity and identify any changes to mitigation required.

2.55 All retained setts not subject to a temporary closure licence will be protected by a fenced stand-off (appropriate to the size of the sett) to ensure that the sett is protected for the duration of the construction phase and subject to a watching brief by an ecologist to ensure the setts remain undisturbed.

2.56 Best practice measures will be also adopted to avoid the risk of harm to badgers which may be using the Site's habitats. During construction, this will include precautionary surveys in advance of site clearance and covering any large pipes, pits or trenches that are left open overnight, or where appropriate providing an adequate means of escape, such as sloping profile or plank. Badger fencing may also be used where necessary to avoid the risk of badgers entering the construction area and to guide individuals towards foraging habitat and commuting routes.

2.57 Construction operations should be restricted to daylight hours where they are in proximity to semi-natural habitats in order to reduce the potential for adverse effects through disturbance to badger.

Water vole and otter

2.58 All watercourses with the potential to support water vole and otter will be subject to a pre-commencement survey prior to works, where these are anticipated to be within 5m of the water-course, and appropriate mitigation put in place should water vole have subsequently colonised these areas or otter evidence recorded.

During Operation

Habitats

2.59 The Development provides the opportunity to enhance the overall biodiversity of the Site, with the creation of the new semi-natural areas extending the existing retained habitats, creating a larger more ecologically viable habitat complex of greater species richness and diversity for flora and fauna. Together with landscaped buffers and attenuation facilities this will improve ecological connections at the Development, positively contributing to the effectiveness and functionality of wider ecological networks beyond the Site's boundaries as far is possible given its location surrounded by roads to the west in particular.

2.60 A conservation-led Green Infrastructure and Biodiversity Strategy or similar will be provided for the Development. This will provide the over-arching aims and objectives for on Site habitat creation and management aimed at benefiting biodiversity over the long-term, including details of management responsibilities and mechanisms to secure the long term management and setting out the framework for ongoing management and monitoring.

2.61 Phased detailed Biodiversity Creation and Management Plans (BMP) or similar, will be produced as necessary covering all habitats to be created and managed at the Site as each phase which includes part of the GI develops, coherent with the overall strategy for the wider GI. These will set out the targeted objectives and detailed management prescriptions for each habitat type or feature, the monitoring requirements and a five year work programme. The requirement for these will be delivered through a suitably worded condition or other appropriate planning mechanism. These measures will seek to benefit local fauna which use or could use the Site. The plan would be a 'living document', with a programme of monitoring and feedback, to ensure that the on-going management is flexible and responds to change. Annual reviews and updates will be submitted and agreed by LPA, the Applicant, and any other parties, as agreed and will be as set out within the approved Management Plan.

2.62 The Applicant will retain the responsibility for the on Site habitats, ensuring they are created and managed by an experienced landscape contractor or management for the life of the Development, or until such a time as the open space is passed via legal mechanism into the control of a third party, as agreed by the LPA and/or any other relevant party.

2.63 A full consideration of the potential for hydrological impacts post-development is considered in detail within Chapter E Water Environment. Implementation of the proposed sustainable drainage system would ensure that the rate and amount of water run-off are unaltered, i.e. not significantly altered above existing greenfield rates. A reduction in water quality of surface run-off is also unlikely due to the implementation of appropriate measures within the SUDS proposals.

2.64 Delivery of the extensive GI will largely mitigate effects of recreational pressure on nearby designated sites. Willow Wood and Drain SoI on site will form an integral part this and adverse effects avoided, through habitat restoration, sensitive management and access control along designated footpaths.

Fauna

Bats

2.65 The design of lighting will minimise light-spill onto adjacent habitats, including potential roosts and potential foraging or commuting habitat that is regularly used by the local bat population. Implementation of a sensitive lighting regime, which follows industry best practice guidance and recommendations with regard to bats, will be achieved through a combination of the following summarised measures:

- Avoiding unnecessary lighting;
- Timed lighting to light areas only when necessary
- Low-level and / or hooded lamps to minimise light-spill, where possible;
- Low-intensity (sodium lamps or similar) lighting, where possible; and
- Strategic planting or landscaping to shield sensitive areas.
- Mitigation for the breaching of hedgerows will be implemented through the establishment of bat 'hop-overs' to maintain this foraging and movement corridor. These will comprise heavy standard trees located either on each side of the hedgerow gaps and between the two spines of the new roundabout for the larger breaches associated with this. The hop-overs will be sensitively lit within any health and safety parameters for vehicular traffic at junctions, and managed to raise bat flight lines above the height of traffic.

2.66 The design provides mitigation for the small scale loss of the foraging and commuting habitat with a significant increase in linear wood-edge habitat created around the site, which will also provide both foraging and commuting habitat, linked to other habitats in the local area. GI will provide a valuable foraging resource for bats overall, with the associated complex of woodland, edge features, open water and grassland, In addition new attenuation facilities will provide potential new foraging habitat closely associated to movement corridors. A range of bat boxes will be provided for bats across the site to increase potential roosting habitat as the scheme matures.

Birds

2.67 The retention and appropriate management of 2m wide grassy margins adjacent to hedgerows will ensure suitable habitat is retained for the farmland species such as linnet and yellowhammer.

2.68 A range of bird boxes aimed at providing enhancements for notable species that occur locally will provide additional nesting habitat whilst the scheme matures. A range of hole-nesting bird boxes will be erected across the site on suitable retained trees and hedgerows, with 32mm and 28mm hole sized boxes used. A kestrel box will provide additional nesting habitat for this species.

Badger

2.69 Design will ensure that all retained badger setts are buffered and protected from potential disturbance with an increase in dense scrub planting around them to limit disturbance including from dogs. New habitats will significantly improve opportunities for foraging and sett creation.

Air Quality

Construction Impacts

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

2.71 The site has been identified as a High Risk site during earthworks construction and trackout, as set out in A1. Comprehensive guidance has been published by IAQM (2016) that describes measures that should be employed, as appropriate, to reduce the impacts, along with guidance on monitoring

during demolition and construction (IAQM, 2012). This reflects best practice experience and has been used, together with the professional experience of the consultant who has undertaken the dust impact assessment and the findings of the assessment, to draw up a set of measures that should be incorporated into the specification for the works.

2.72 The mitigation measures should be written into a dust management plan (DMP). The DMP may be integrated into a Code of Construction Practice or the Construction Environmental Management Plan, and may require monitoring.

2.73 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.

During Operation

2.74 The assessment has demonstrated that the Proposed Development will not cause any exceedances of the air quality objectives and that the overall effect of the Proposed Development will be 'not significant'. The Proposed Development is predicted to lead to adverse impacts at a small number of receptor locations and therefore it is appropriate to consider mitigation to ensure the predicted adverse impacts are minimised or prevented.

2.75 Mitigation measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law). The local air quality plan that the Council is required to produce in order to address limit value exceedances in its area will also help to improve air quality; the proposed implementation of a CAZ by Derby City Council can also reasonably be expected to lead to significant improvements, which are not directly accounted for in the assessment.

2.76 It is further recommended that measures to reduce private vehicle trips and encourage low-emission and sustainable transport will be delivered by the Proposed Development through the investment in infrastructure (e.g. pedestrian and cycle facilities and electric vehicle charging) and development of a Travel Plan. It is anticipated that measures can be identified during reserved matters applications.

Noise

During Construction

2.77 Guidance on best practicable means of noise control during construction activities and an example Code of Construction Criteria and Code of Practice are set out in Appendix LE and Appendix LF respectively of the ES. In order to deal with the potential environmental effects of construction noise, a Construction, Environmental and Management Plan (CEMP) will be prepared, using advice set out in Appendix LF. Construction noise will be generally limited to the levels shown in the table below:

2.78 An example of the noise controls which could be introduced are set out below and in detail in Appendix LF:

- All vehicles and mechanical plant used for the purpose of carrying out the works shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order so that extraneous noises shall be reduced to a minimum.
- All compressors and generators shall be "sound reduced" models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use. All ancillary pneumatic percussion tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers. Generators shall be positioned and enclosed so as to minimise noise transmission to the inhabitants in the neighbourhood as agreed with the Employers Agent.
- All pumps shall be positioned and enclosed so as to minimise noise transmission to inhabitants in the neighbourhood.
- All machines in intermittent use shall be shut down in the intervening periods between work or, where this is impracticable, throttled down to a minimum.
- No machine shall be permitted which uses a system of dropping a heavy weight, power assisted or by gravity, for the purpose of breaking up paving or foundations.
- Access to the Site shall be such as to ensure a minimum of disturbance to persons in adjacent buildings by vehicles or plant entering or leaving the Site. No deliveries to Site shall take place outside the agreed working hours.
- Any work agreed to be carried out between 2200 and 0800 hours will be subject to agreement of noise levels with Environmental Health Officer. The Contractor shall provide details on work involved, machinery or plant used, exact location, and calculated noise levels at monitoring points.

- Any fixed or static plant operating outside normally permitted working hours shall not give rise to a 'rating level', as defined in BS4142:2014 in excess of the existing free-field background L_{A90} noise levels nearest noise-sensitive receptors (all of which are dwellings). The existing baseline free-field background noise levels are to be provided as explained earlier.

During Operation

Road Network Traffic Noise (To Existing Receptors)

2.79 No mitigation measures are required as part of the development with respect to road network noise affecting existing sensitivities.

Noise from Fixed Plant Items (To Existing Receptors)

2.80 The basis for establishing noise limits, against which any/all future mechanical services plant to be introduced onto the site should adhere, has been established as set out in sections 3.23 to 3.28 of the ES Noise chapter.

Road and Rail Traffic Noise (To Proposed Receptors)

2.81 An assessment of the existing noise climate and noise generated by the proposed A50 junction operation on the proposed new dwellings has been conducted, as detailed in Appendix LB, having regard to the Illustrative Masterplan. Full details of the mitigation measures required are shown within the appendix.

Noise from Proposed Employment Area (to Existing and Proposed Receptors)

2.82 The basis for establishing noise limits has been set out in Appendix LC. Measures will be included as necessary to ensure that all noise emissions from the proposed Employment Area are below these limits. The assessment of noise from the proposed employment area will need to be undertaken once design proposals are suitably developed.

2.83 Suitable mitigation measures are expected to include (but not be limited to) the following:

- Acoustic barriers
- Development of an appropriate site layout which provides screening to noise sensitive receptors by placing employment buildings between onsite noise sources and offsite receptors.

Agriculture and Soils

Agricultural Land

2.84 Mitigation for the effect of the loss of agricultural land to built development is not possible.

Soil resources

2.85 Mitigation for loss or damage of soil resources requires the adoption of a Soil Management Plan, undertaken by a suitably qualified practitioner in accordance with the principals outlined in the Construction Code of Practice for Sustainable Use of Soils on Construction Sites, which will detail:

- Depth and method of topsoil stripping and stockpiling;
- Identification of landscaping topsoil requirements and assessment of suitability and availability of on-site resources; and
- Means of subsoil protection from compaction damage and remedial measures (such as ripping/subsoiling) to remove damage.

During Operation

Agricultural Land

2.86 Post completion, land use of the site will permanently change from agricultural to urban; no mitigation is possible.

Soil Resources

2.87 The loss of soil functions (ability to support plant life, to absorb excess rainfall etc.) under sealed surfaces cannot be mitigated. However, adherence to the Soil Management Plan will mitigate construction damage such as compaction to landscape and public open space areas.

Socio Economics

During Construction

Construction Employment

2.88 The construction employment opportunities to be created by the Proposed Development will lead to moderate beneficial effects, although temporary (medium term) in duration. However, the implementation of the following

initiatives could maximise the economic benefits of the scheme felt locally, including:

- Providing employment and training opportunities for local residents, through requiring or encouraging contractors to sign up to 'local labour clauses';
- Encouraging procurement opportunities for local businesses to source products and services locally where possible and practical; and
- Establishing links with local businesses to offer training and employment opportunities via work experience and apprenticeship schemes.

2.89 The implementation of these measures would be subject to discussions with SDDC and other relevant bodies.

During Operation

Employment Effects

2.90 The operational employment effects are likely to be moderate and positive in nature and permanent in duration and will not therefore give rise to a need for mitigation measures. However, the anticipated local economic benefits may be maximised by measures to encourage local recruitment for the new employment opportunities offered in the longer-term operation of the development.

Education Capacity

2.91 The Proposed Development has been assessed as giving rise to a substantial adverse and permanent effects in relation to school capacity. The provision of a new primary school and expansion of off-site secondary schools would mitigate this effect in full.

2.92 Through a Section 106 Agreement a suitable financial contribution can be agreed towards education provision.

Health Facilities

2.93 The Proposed Development has been assessed as giving rise to a moderate adverse and permanent effect in relation to local health facilities. It is expected that a financial contribution will be required towards improved GP capacity off-site, as it is recognised that the level of 'need' (in terms of requirement for additional GPs) solely from this Proposed Development or across the entire IGV is unlikely to warrant the delivery of a new health facility (a facility with only one or two GPs would not be 'viable').

P3.0 Means of Securing Mitigation

3.1 This section sets out the means by which the mitigation proposed throughout the ES can be secured.

3.2 Mitigation and monitoring identified throughout the ES will be secured in part, through the implementation of the following plans and strategies:

- **Construction Environmental Management Plan** ("CEMP"), or equivalent will be prepared and agreed with the local planning authority. The CEMP will set out the methods, including the minimum requirements as agreed between the construction contractor(s) and the LPA, by which construction will be managed to avoid, minimise and mitigate any adverse effects identified within the technical chapters.
- **Written Scheme of Investigation** (if required) will be agreed with Derbyshire County Council's archaeologist prior to commencement.
- **Construction Traffic Management Plan** would be developed to minimise the potential effects from construction traffic.
- A **Flood Risk Management Strategy** would be applied through the detailed design process to ensure adequate protection of the proposed development from identified risks.
- A **Surface Water Drainage Strategy** would be applied through the detailed design process to ensure adequate provision for surface water drainage so as to avoid risks to the proposed development. This would have regard to opportunities to integrate drainage infrastructure within areas of greenspace.
- A **Travel Plan** will be agreed with Derbyshire County Council, in consultation with Derby City Council, prior to occupation.

Other Planning Conditions

3.3 It is anticipated that other mitigation and monitoring identified through the ES, which does not fall within the remit of specific monitoring of mitigation document, will be secured via issue-specific planning conditions.

P4.0 Summary

4.1 This ES sets out the findings of an EIA of both 'residential' and 'employment' development proposals for: up to 1,850 dwellings, a 2 form entry primary school, a local centre (including community hall, retail and other local services and facilities), public house, drive-through restaurant, petrol filling station, strategic highway infrastructure including new junction on the A50 and associated road links, public open space including children's play provision, surface water drainage infrastructure, landscaping, earthworks and ancillary supporting infrastructure; and employment uses, and related road links, surface water drainage infrastructure, landscaping, earthworks and ancillary supporting infrastructure, on land adjacent to existing development on the southern edge of Derby

4.2 The ES has assessed the potential for the effects in relation to the following environmental matters:

- Transport
- Water Environment
- Ground Conditions
- Heritage and Archaeology
- Landscape and Visual Impact
- Ecology
- Arboriculture
- Air Quality
- Noise
- Agriculture and Soils
- Socio Economics

4.3 The ES has also considered the possibility of impacts arising from either synergistic or cumulative effects. This chapter summarises the range of mitigation and monitoring measures have been identified throughout the Environmental Statement.

4.4 These measures are largely capable of being enforced through planning conditions, either as part of management documents as standalone conditions or obligations, financial contributions secured via s106 agreement, or other non-financial obligations

P5.0 Abbreviations & Definitions

IGV	Infinity Garden Village
CEMP	Construction Environmental Management Plan
GI	Green Infrastructure
WSI	Written Scheme of Investigation