

Hanwood Park

(East Kettering Sustainable Urban Extension)

EIA Scoping Report

Request for Scoping Opinion under Town & Country Planning
(Environmental Impact Assessment)
Regulations 2017

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On behalf of **Hanwood Park LLP**

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1.0 INTRODUCTION

- 1.1 This report presents the proposed scope of an Environmental Impact Assessment (EIA) for an outline planning application for the Hanwood Park development of up to 5,500 dwellings and related development ('the Proposed Development'), formerly known as the East Kettering Sustainable Urban Extension, which was originally approved by Kettering Borough Council ('the Council') in 2010 following a previous EIA and Scoping Opinion. The proposed development has been commenced but the 10-year time period to submit all the reserved matters pursuant to the outline permission (KET/2015/0967) expires on 31st March 2020. Hence, the need for a resubmission and accompanying EIA to ensure that the development is delivered in accordance with the North Northamptonshire Joint Core Strategy 2011-2031 (principal element of the Development Plan), meets Government objectives in the National Planning Policy Framework (NPPF), supports the Council's five-year housing land supply and contributes towards the consented Garden Communities for North Northamptonshire.
- 1.2 The precise extent of the site boundary for the Proposed Development has yet to be decided (given that development has been already approved and partly completed) but would not exceed that encompassed by the previously approved red line boundary shown at Appendix 1.
- 1.3 The Scoping Report has been compiled by David Lock Associates in conjunction with the consultant team – Peter Brett Associates, now part of Stantec, Lockhart Garratt, RPS and LRA – and is submitted on behalf of Hanwood Park LLP, as the principal promoter and lead developer ('Developer') of the Proposed Development.
- 1.4 The Scoping Report is submitted to Kettering Borough Council (KBC) with a request for an EIA Scoping Opinion under Regulation 15 of the *Town and Country Planning (Environmental Impact Assessment) Regulations 2017* ('the EIA Regulations').
- 1.5 The EIA Regulations require that any development proposal falling within the description of a "Schedule 2 development" will be required to be the subject of EIA, where such development is likely to have "significant" effects on the environment, by virtue of factors such as its nature, size or location (as screened under Schedule 3 of the Regulations). An EIA of this Proposed Development is considered to be necessary, given that it is a large scale "urban development project" (part 10(b) of Schedule 2), which is likely to have "significant" environmental effects and in light of the planning history and previous EIA.

- 1.6 The Scoping Report has been prepared to assist the Council in identifying the issues which should be addressed in the EIA by considering what potential effects the Proposed Development could have on the environment and whether these effects are likely to be significant.
- 1.7 The Scoping Report sets out the proposed framework within which the EIA will be undertaken and the topic areas, proposed methodology and information that will be contained within the Environmental Statement ('ES'). The Council will need to take into account the views of the statutory and other consultees on this Scoping Report in issuing a formal Scoping Opinion.
- 1.8 The purpose of the EIA is to identify likely "significant" effects that may arise, by comparing the baseline conditions with the predicted situation once the proposals are in place. The significance of effects during the construction phase of the development will also be considered.
- 1.9 It is also relevant to consider any significant "cumulative" effects which can be reasonably predicted as likely to arise from the Proposed Development in combination with other development proposals.
- 1.10 The developments that are proposed to be taken into account in the assessment of cumulative effects include:

Table 1.1 – "Cumulative" assessment developments

Site	Policy/Application reference to which it relates	Description of development
Kettering South (Symmetry Park)	Policy 37 of the NNJCS	B1 & B2 Employment (Partially consented KET/2018/0965)
Rothwell North SUE	Policy 38 of the NNJCS	700 Dwellings & B1 & B2 Employment
Kettering Energy Park	Policy 26 of the NNJCS	Solar Farm
West Corby SUE	Policy 32 of the NNJCS	4,500 Dwellings and B1 & B2 use
Cransley Park	Policies 23 & 29 of the NNJCS	Employment potential expansion
Station Quarter	Policy 23 & 29 & Kettering Town Centre Action Plan	Employment (Retail, Leisure)
A14 Junction 10a	Infrastructure Delivery Plan (Jan 2015)	Strategic Highway Infrastructure

WeWaA	Infrastructure Delivery Plan (Jan 2015)	Strategic Highway Infrastructure
Kettering Energy Park	KET/2014/0037	Solar Farm
Land at Westhill, Kettering	KET/2016/0607	151 dwellings
A14 Junction 10 Business Park	KET/2018/0774	Employment (B1, B2 & B8)
Kettering North	Policy 36 of the NNJCS	Employment (B1, B2, B8 & D2)
Rushden East SUE	Policy 33 of the NNJCS	2,500 dwellings and employment
Land off Barton Road, to rear of Barton Seagrave School	KET/2017/0906	Sports Hall & MUGA
Land at Cockerell Rd Corby	Policy 34 of the NNJCS	Employment (B1, B2 & B8)
Nene Valley Farm, Rushden	Policy 35 of the NNJCS	Employment (B1, B2 & B8)
Land west of Gypsy Lane	KET/2015/0551	Residential development of up to 350 dwellings and associated access

N.B. The degree to which these developments will be assessed for each chapter, will be identified by the relevant consultants within those specific chapters.

- 1.11 At the request of the strategic and local highway authorities, the transport assessment will take account of a wider range of reasonably foreseeable projects included in relevant transport models. The noise and air quality assessments, insofar as they are underpinned by data arising from the transport assessment, will also, where appropriate, take account of that wider range of projects.
- 1.12 Where “significant” effects are identified, the EIA process should then establish mitigation measures to avoid or reduce these impacts.

The Consultant Team

- 1.13 This report has been prepared by DLA in conjunction with Peter Brett Associates (now part of Stantec), Lockhart Garratt, Land Research Associates & RPS. DLA will co-ordinate the EIA and manage the preparation of the ES. DLA is a Town Planning and Urban Design consultancy and a member of the Institute of Environmental Management and Assessment (IEMA), an organisation established to promote best practice in EIA and related disciplines. This EIA will be undertaken in accordance with the best practice guidelines issued by the IEMA.

- 1.14 In co-ordinating the EIA, DLA will manage the inputs of several specialist consultancies undertaking surveys and assessments of particular effects of the Proposed Development. Table 1.2 sets out the proposed structure of the report of the EIA – the Environmental Statement (ES), identifying the consultancy assessing each proposed EIA topic and contributing each respective ES chapter:

Table 1.2 – Chapter Author Table

Chapter	Topic	Lead Author
1	Introduction	David Lock Associates
2	The Site and the Proposed Development	David Lock Associates
3	Planning Policy Context	David Lock Associates
4	Socio-Economic Effects	David Lock Associates
5	Human Health	Peter Brett Associates (now part of Stantec)
6	Transport (Including Transport Assessment & Travel Plan)	Peter Brett Associates (now part of Stantec)
7	Air Quality	Peter Brett Associates (now part of Stantec)
8	Noise & Vibration	Peter Brett Associates (now part of Stantec)
9	Landscape and Visual Impact	Lockhart Garratt
10	Ecology and biodiversity	Lockhart Garratt
11	Cultural Heritage	RPS
12	Agriculture and Soil Resources	Land Research Associates
13	Hydrology	Peter Brett Associates (now part of Stantec)
14	Ground Conditions	Peter Brett Associates (now part of Stantec)
15	Waste	Peter Brett Associates (now part of Stantec)
16	Climate Change	Peter Brett Associates (now part of Stantec)
17	Conclusion	David Lock Associates

Scope of the ES

- 1.15 The ES will include chapters on each topic identified as potentially being significantly affected by the Proposed Development. Chapters will be supported by figures and technical appendices. The ES will be structured as follows:

Volume 1: Text – Comprises the main ES text; and

Volume 2: Plans and appendices – contains the figures and appendices as referred to in Volume 1.

- 1.16 A separate Non -Technical Summary will present the principal findings of the EIA in non-technical language to make the findings readily accessible to the members of the public.
- 1.17 The assessments will be based upon a Strategic Master Plan (Development Framework Plan), Phasing and Parameter Plans and the description of development, which will include maximum amounts of development.
- 1.18 The ES will also contain a description of the Site and the Proposed Development and will outline the relevant Development Plan/planning policy context. Policy documents considered will include the North Northamptonshire Joint Core Strategy 2011- 2031. Specific policies relevant to particular topics will be considered in the topic chapters concerned along with relevant Government guidance, including advice in the NPPF and Planning Practice Guidance and other technical advice, where appropriate
- 1.19 The topic specific chapters will be organised in a consistent format and will cover:

Introduction: Identifying the topic under consideration;

Assessment Methodology: The proposed scope and method of the assessment, including approaches to surveys and data, identifying the criteria used to assess the significance of the effects of the Proposed Development together with any uncertainties or limitations encountered;

Legal & Policy Framework: Summarising policy, legislation and guidance relating specifically to the topic under consideration;

Baseline Conditions: A description of the baseline conditions pertinent to that topic, indicating any likely significant changes in those conditions into the future if the Proposed Development does not proceed (“the projected future baseline”)

Potential Effects: Identification of likely “significant” effects in the absence of mitigation measures, during both the construction and operational/occupation stages of the Proposed Development;

Mitigation Measures: Proposed measures which are necessary to avoid or reduce any significant potential adverse effects, beyond the measures inherent within the Proposed Development;

Residual Effects: Identification of any residual effects of the Proposed Development, taking account of the mitigation measures proposed and assessing the significance of those residual effects; and

Cumulative Effects: Identification of any effects which might arise from the Proposed Development in combination with other nearby reasonably foreseeable development proposals, specifically those set out in Table 1.2 above.

- 1.20 In accordance with best practice in EIA, the significance of particular effects of the Proposed Development is determined by the interaction between the magnitude of predicted impacts and the sensitivity of the receptors affected by those impacts. Four levels of significance will be identified: "major", "moderate", "minor" and "negligible". These evaluations will be specific to each discipline in the ES and will involve the use of recognised standards, industry guidance and professional judgement.
- 1.21 Any beneficial effects will be noted, as well as adverse ones. Where any temporary, short- or medium-term, indirect, secondary or interactive effects are predicted, these too will be recorded. All assessments of the significance of effects will take account of proposed mitigation measures, although any significant potential effects in the absence of such measures will also be recorded.
- 1.22 Utilities, whilst included in the ES for the original outline application submission for the Hanwood Park development, is not strictly an environmental impact topic but will still be covered in any event through a Utilities Statement to be provided with the outline planning application documentation.
- 1.23 The remaining sections of this EIA Scoping Report reflect the proposed structure of the ES set out in Table 1.2.

2.0 THE SITE AND THE PROPOSED DEVELOPMENT

The Site

- 2.1 The site consists of land at Hanwood Park, formerly known as the East Kettering SUE, which lies to the east of the town of Kettering and Barton Seagrave. The sustainable urban extension has been commenced with dwellings constructed, a new primary school, utilities and primary infrastructure, including new access points, primary streets and associated works currently under construction.
- 2.2 In a clockwise direction from Junction 10 on the A14, the boundary of the site follows the backs of properties fronting or relating to Barton Road and Warkton Lane, and then the eastern edge of the Ise Lodge estate. The boundary then crosses Warkton Lane and continues along the northern edge of the Ise Lodge estate, before crossing the Ise Valley to re-join the existing urban area of Kettering at Elizabeth Road.
- 2.3 The northern boundary allows for the proposed access from Elizabeth Road and related development, before following part of the corridor reserved for the anticipated Weekley Warkton Avenue (WeWaA) albeit that WeWaA does not form part of the Proposed Development nor is it included within the site boundary. The boundary then follows part of the proposed primary street network before re-joining the corridor reserved for the WeWaA, if this is necessary following the transport assessment being undertaken as part of this EIA. The southern boundary generally follows the northern extent of the A14. Potential highway improvements at the A14 existing Junction 10 and proposed for Junction 10a are also excluded from the red line site boundary and the description of development. Junction 10a will be the subject of a separate EIA, if necessary, and a Development Consent Order application, as it exceeds relevant thresholds, is a trunk road and the responsibility of Highways England.
- 2.4 Properties on Cranford Road, Hayfield Lodge and around The Grange are excluded from the application site.

Site Area

- 2.5 The total Site Area extends to about 332 hectares (820 acres) and lies on the eastern edge of the existing urban area of Kettering and Barton Seagrave. References to the Site Area within topic chapters and appendices, as well as depictions of the Site on appended plans, may reflect a slight variation from the Site Area set out as part of this Scoping Report. Whilst the Site Area within the scoping represents the maximum development quantum of the site, the outline application site area and red line boundary may be reduced to take into account the consented

and constructed development as indicated in Paragraph 2.9 but will not extend beyond the site area as indicated on Appendix 1 - Site Location Plan.

Physical Characteristics

- 2.6 Except where already developed as part of the Hanwood Park development, the site is largely intensive arable farmland. There is some semi-improved pasture land to the north west along the Ise Valley and on the urban edge to the south east. There are also paddocks and allotments on the urban edge.
- 2.7 The site has a gently undulating topography to the east and south, with a central shallow valley running north-south and a valley running west-east, which join to form the more substantial valley of the Alledge Brook. There is a plateau or ridge along the line of Warkton Lane, from which the ground slopes more significantly westwards down to the Ise Valley.
- 2.8 The buildings at Poplars Farm are still used for storage. There is also an agricultural barn in the north eastern part of the site.
- 2.9 In addition, some parts of the wider SUE are complete and/or underway including:
- Primary School within Parcel PS4 with temporary access from Cranford Road;
 - Surface Water Attenuation Pond within the Central Bowl open space;
 - Access D (Off Deeble Road);
 - Access E (Off Barton Road/Near Warkton Lane);
 - Access F (Off Barton Road & A14 Roundabout);
 - Access (c) Deeble Road/Windmill Avenue;
 - Access (e) Barton Road/Windmill Avenue;
 - Access (g) Barton Road/Cranford Road;
 - Barratts/David Wilson/Hallam: Parcels R7, R9 & R10 for 347 dwellings;
 - Persimmon Homes: Parcels R23 & R26 for 342 dwellings; and
 - Associated utilities and services including gravity foul, pumping station and foul mains to serve the wider development

The Proposed Development

- 2.10 The Proposed Development is shown on the Strategic Master Plan (Appendix 2). The application is in Outline form with all matters reserved except for access, for the following development:
- Up to 5,500 homes, at varying densities, averaging 35 units per hectare net and organised into a range of neighbourhoods.

- A mixed-use district centre, comprising shops, restaurants and cafes, community and local leisure facilities, offices and a health centre, as well as homes, to meet the needs of the community as a whole and accessible to existing residents.
- Three smaller local centres, to meet the day-to-day needs of each residential area, including one or more local shops, other local facilities and homes.
- A secondary school and three primary schools to meet the needs of the community. The secondary school would be located adjacent to the district centre and the primary schools would be located both there and adjacent to local centres. The schools would also provide playing fields and the secondary school may provide other facilities for community use.
- A business village and separate employment gateway for office and other business (B1) uses, located adjacent to Junction 10 and the anticipated Junction 10a on the A14 respectively and offering a variety of business accommodation. Further office space would be provided in the district centre.
- A hotel and associated ancillary leisure facilities, adjacent to the anticipated Junction 10a and to proposed parkland.
- A health clinic, adjacent to the district centre.
- informal parkland and a more formal parkland adjacent to the proposed district centre; and two recreation grounds, in the south and north of the plan area respectively.
- A land use schedule (reflecting the previously approved land use schedule) is attached as Appendix 3.

2.11 The formal Description of Development is:

"5,500 dwellings, schools, district and local centres, healthcare, employment, formal and informal open space including play facilities, roads and associated infrastructure."

2.12 The EIA will assume the construction of the Proposed Development will continue under the current extant outline planning permission, with the Proposed Development being completed by 2031, which is the end date of the North

Northamptonshire Joint Core Strategy and the emerging Local Plan Part 2. This delivery timescale requires annual housing completions to average just under 400 dwellings, which is realistic and readily achievable in the light of build rates experienced on developments of comparable scale elsewhere.

- 2.13 The EIA Regulations require any alternatives to the Proposed Development that have been studied by the prospective applicant to be outlined and the reasons for their rejection to be set out. The allocation of the site for development and its advanced stage of delivery means it is not appropriate for the applicant to study potential alternative sites. However, the EIA will include a consideration of potential alternative forms of development on the Site, with reference to the evolution of the design of the Proposed Development. The 'no development' scenario will also be addressed in the EIA through the proposed topic-level assessment of the "projected future baseline".

3.0 PLANNING POLICY CONTEXT (DEVELOPMENT PLAN)

- 3.1 This third chapter of the ES will introduce planning policy of relevance to the Proposed Development as a whole. This includes not only the statutory Development Plan but also relevant parts of the Government's *National Planning Policy Framework (NPPF)* and *Planning Practice Guidance*. In addition, relevant elements of the emerging *Kettering Borough Site Specific Part 2 Local Plan* will be covered; the Part 2 Plan has completed its Regulation 18 consultation to-date.
- 3.2 The Development Plan comprises the *North Northamptonshire Joint Core Strategy 2011-2031* (adopted July 2016) and relevant "saved" policies from the *Local Plan for Kettering Borough*, adopted January 1995. The site is shown in Figure 16 of the Joint Core Strategy, as a "Committed Principal Sustainable Urban Extension (SUE)". It is outlined in supporting text that the principal SUEs include between 2,500 and 5,500 dwellings together with employment and supporting infrastructure and services.
- 3.3 Relevant policy specific to particular assessment topics will be outlined in the "Relevant Policy" section of each topic chapter.
- 3.4 The conformity of the Proposed Development with relevant planning policy, as well as the weight to be placed on different elements of the Development Plan and policy framework, will be addressed in the freestanding Planning Statement.

Strategic Master Plan

- 3.5 The Strategic Master Plan (Appendix 2) set outs a masterplanning approach for the Site, requiring the landowners to design a "well connected place" and bring forward a comprehensively planned mixed use development. Therefore, each phase of the development needs to have an awareness of how it fits into the wider allocated site. Phasing Plans have previously been approved and are attached as Appendix 4.

4.0 SOCIO-ECONOMIC EFFECTS

4.1 This chapter of the ES will identify and describe the nature and significance of the effects likely to arise in relation to the socio-economic impacts of the Proposed Development. Likely impacts on social and economic conditions will arise directly from the residential population, new housing, new employment and commercial areas and other economic and social facilities.

Methodology – Data Sources

4.2 Published statistical information and bespoke research sources will be consulted to establish existing conditions and indicate where the Proposed Development is likely to have an impact in the future. Consultation with appropriate bodies will be undertaken to establish current baseline conditions with respect to facilities and capacities. Planning policies and other local strategies relevant to the provision of housing, employment, services and social/community facilities will be identified. Baseline information and data will be obtained and reviewed at various geographical scales including Housing Market Area wide, district wide and local wards. This will cover:

- Population and housing statistics
- Crime, health & education statistics
- Employment data and principal employment locations; and
- Social and community facilities

4.3 The socio-economic assessment of the Proposed Development will analyse its effects on the following:

- the local population, including its age structure;
- the local housing stock, including housing affordability;
- the local economy, including temporary construction jobs, permanent on-site employment, additional expenditure generation, labour market implications and fiscal impacts;
- local social and community infrastructure, including:
 - education capacity at nursery, primary and secondary levels;
 - healthcare capacity at GP, dental and hospital levels;
 - recreational capacity, including in respect of parks, green space, play areas and sports facilities; and
 - the capacity of other community services, including adult social care, community learning, libraries and youth services; and
- retail provision and investment in nearby existing centres.

- 4.4 The socio-economic impact of the Proposed Development will be evaluated by:
- Projecting the likely population and demographic mix of the development;
 - Assessing the levels of housing required in the area, including affordable housing needs;
 - Assessing the effect of the economically active elements of the residential population on the labour market and employment (including construction jobs, direct and indirect jobs); and
 - Assessing the effect of the development on social infrastructure, including education, health, community facilities, recreational/leisure facilities and emergency services.
- 4.5 Published sources of economic and social data will be used alongside consultations with the Council and other service providers where necessary. As a result of these assessments, any necessary mitigation measures will be identified to ensure adequate and/or enhanced facilities and services provision for both existing and future residents of the area. Residual impacts will then be evaluated. The cumulative effects will be considered in combination with other reasonably foreseeable development proposals in the area as identified.

Summary

- 4.6 The socio-economic effects of the Proposed Development are anticipated to be largely beneficial, subject to the timely delivery of additional social and community infrastructure made necessary by the Proposed Development, to avoid undue pressure being placed on existing local infrastructure. That timely delivery can be secured by suitably worded conditions on any grant of planning permission, as well as via appropriate thresholds for infrastructure delivery/contributions through a s106 planning obligation, as with the current outline planning permission/s106 obligation.

5.0 HUMAN HEALTH

- 5.1 The EIA Regulations require identification of likely significant effects of development on human health.
- 5.2 The established definition of health from the World Health Organisation (WHO) is that "health is a state of complete physical, social, and mental wellbeing and not simply the absence of disease or infirmity".
- 5.3 The definition of health reflects the understanding that an individual's inherited traits interact with lifestyle, community, environmental, social and economic factors as well as a much wider range of issues to determine their health outcomes. Many of these 'determinants' can be influenced by the quality of people's living and working environments and are therefore relevant to the design and location of development, such as that proposed at Hanwood Park.
- 5.4 Therefore, it is considered that in establishing the effects of the scheme on human health, the wider determinants of health should be considered.
- 5.5 The NHS London Healthy Urban Development Unit's (HUDU) Healthy Urban Planning Checklist (April 2017) provides a useful framework for assessing health impacts.
- 5.6 A Health Impact Assessment (HIA) will form an Appendix to the ES. The methodology for the HIA will use the HUDU checklist themes to guide the assessment. This covers four main themes: Healthy Housing, Active Travel, Healthy Environment, and Vibrant Neighbourhoods.

Methodology – Data Sources

- 5.7 The HIA will use a systematic approach to identify the differential health and wellbeing impacts of the proposed development, both adverse and beneficial. It will also look at how different groups are likely to be affected in different ways, and therefore how health inequalities might be reduced or widened by the Proposed Development, with a particular focus on vulnerable groups that may be inequitably affected by the development.
- 5.8 Additionally, the HIA aims to demonstrate the development's response to creating a place that can support health and wellbeing, as well as identifying potential impacts. The opportunities taken to integrate health and wellbeing considerations into future stages of planning and delivery of the development will also be demonstrated.
- 5.9 The health baseline will include both a local health profile and local health priorities and will be identified through:
- A review of local policies and strategies of relevance e.g. the JSNA;
 - Review of local health data e.g. Public Health England health profiles;

- Review of relevant baseline established through the EIA e.g. capacity of local facilities and labour market statistics to be identified in the socio-economic assessment; and
- Consultation undertaken as part of wider planning application.

5.10 The baseline will be used to inform the following:

- Identification of receptors for the assessment;
- Identification of Specific Vulnerable Groups for assessment; and
- Health determinants of relevance / headings for assessment.

5.11 The HIA will draw on applicable plans and strategies related to health and wellbeing that cover the area to identify the priorities for health that will need to be addressed. From a preliminary review of relevant documents, the following has been identified for review:

- Northamptonshire County Council Health and Wellbeing Dashboard;
- Northamptonshire County Council Health and Wellbeing Strategy 2016 to 2020;
- Northamptonshire Joint Strategic Needs Assessment;
- Local Authority Profile, Kettering, 2019;
- Local Authority Health Profile, Kettering 2018;
- Public Health England, Local Health;
- Consumer Data Research Centre Maps;
- 2011 Census data;
- Relevant baseline from environmental assessments; and
- Outputs of public and stakeholder consultation.

LPA/ Statutory Consultee discussions

5.12 Consultation with the Council on this proposed scope for the HIA is proposed. Any other consultation with relevant stakeholders as part of the wider planning application and EIA will be drawn upon within the HIA e.g. the Clinical Commissioning Group (CCG).

Legislation/ Policy

National Planning Policy

National Planning Policy Framework

- 5.13 The revised National Planning Policy Framework (NPPF) published in 2019 acknowledges the importance of considering health impacts during the planning process and covers many issues that are directly related to the determinants of health.
- 5.14 The NPPF identifies the three mutually dependent roles that the planning system needs to consider delivering the “presumption in favour of sustainable development”. The role of particular relevance to health is the ‘social role’. Paragraph 8 of the NPPF states the planning system should support “strong, vibrant and healthy communities... by creating a high-quality built environment, with accessible local services that reflect the community’s needs and support its health, social and cultural well-being.”
- 5.15 The NPPF also acknowledges that planning policies and decisions should aim to achieve health, 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.” (Paragraph 91)

Planning Practice Guidance

- 5.16 The Planning Practice Guidance (PPG) includes guidance on the importance of addressing health and wellbeing through planning.

- 5.17 The PPG (para. 002 Reference ID: 53-002-20140306 (Revision Date 06 03 2014) identifies a range of issues that should be considered through the decision-making process in relation to health and wellbeing, including:

“Development proposals can support strong, vibrant and healthy communities and help create healthy living environments which should, where possible, include making physical activity easy to do and create places and spaces to meet to support community engagement and social capital;

The healthcare infrastructure implications of any relevant proposed local development have been considered;

Opportunities for healthy lifestyles have been considered (e.g. planning for an environment that supports people of all ages in making healthy choices, helps to promote active travel and physical activity, and promotes access to healthier food, high quality open spaces, green infrastructure and opportunities for play, sport and recreation);

Potential pollution and other environmental hazards, which might lead to an adverse impact on human health, are accounted for in the consideration of new development proposals; and

Access to the whole community by all sections of the community, whether able-bodied or disabled, has been promoted.”

National Guidance and Strategies

The Marmot Review (2010)

- 5.18 Fair Society, Healthy Lives: A Strategic Review of Health Inequalities in England Post-2010 (The Marmot Review) was published on 11 February 2010 (Institute of Health and Equity, 2010). This was the culmination of a yearlong independent review into health inequalities in England. Six policy objectives were developed:

- Give every child the best start in life;
- Enable all children, young people and adults to maximise their capabilities and have control over their lives;
- Create fair employment and good work for all;
- Ensure healthy standard of living for all;
- Create and develop healthy and sustainable places and communities; and
- Strengthen the role and impact of ill health prevention.

- 5.19 The Marmot Review reported on a substantial body of evidence on the influence the built environment has on the determinants of health. According to the Commission

on the Social Determinants of Health, “Where people live affects their health and chances of leading flourishing lives. Communities and neighbourhoods that ensure access to basic goods, that are socially cohesive, that are designed to promote good physical and psychological wellbeing and that are protective of the natural environment are essential”.

- 5.20 In turn, the manner in which settlements are planned and designed contributes significantly to the health of the people who live in them. Bad planning and design results in poor health outcomes; conversely, good planning and design can be positively health-enhancing.

Steps to Health Planning: Proposals for Action (2011)

- 5.21 This guidance document (Martin Birley, 2011) prepared by Michael Marmot as part of the Spatial Planning and Health Group (SPAHG) sets out 10 principal issues that show the influence of spatial planning on physical and mental health. The report includes a checklist of these 10 principles that should be used in scoping to identify the potential health impacts of a proposal. These principles include:

- Mix of land use;
- Street layout and connectivity and active travel;
- Access to public and other services;
- Safety and security;
- Open space and green space;
- Affordable and energy efficient housing;
- Food access;
- Air quality and noise; and
- Access to employment.

Local Planning Policy

Adopted North Northamptonshire Joint Core Strategy 2011-2031

- 5.22 The Core Strategy was adopted on 14th July 2016. The vision for the Strategy is for North Northamptonshire to set an example for construction-based innovation and low carbon growth. The area is recognised for its safe, healthy, affordable and attractive location. Kettering will be the focus for healthcare in the region. The Strategy looks to successfully deliver enhanced quality of life for all residents, which includes supporting initiatives that build stable, safe, healthy, and strong communities, as well as development that promotes well-being and health. The following policies are in relation to health:

- Policy 7 – Community Services & Facilities states that developments should seek to support existing and/or enhance community services and facilities which provide for health & wellbeing.
- Policy 8 – North Northamptonshire Place Shaping Principles states development should ensure quality of life and safer and healthier communities, through protecting amenities, and preventing unacceptable levels of soil, air, light, water or noise pollution, or land stability; and
- Policy 10 – Provision of Infrastructure states that development should create safe, healthy environments;
- Policy 19 – Green Infrastructure, which seeks the delivery of Green Infrastructure networks which maintain and enhance quality of life and healthy lifestyle benefits; and
- Policy 30 – Housing Mix seeks to promote a mix of housing types and tenures which respond to different needs.

The Local Plan Part 2 for Kettering

5.23 Part 2 of the Local Plan includes site specific proposals, for areas within the borough of Kettering. The document is currently in draft for consultation stage, which is to be adopted in September 2020. The following relevant policy is outlined in this draft Plan:

- Policy TCE6 – Protection of Local Services and Facilities states that development should protect and enhance local services and facilities, which include health care facilities.

5.29 Outlined in the Plan are the aims of the Council’s Housing Strategy 2015-2020, which includes ensuring decent, safe and healthy homes. Within some of the allocations throughout the Plan, the need to ensure there will be no unacceptable risks to human health, especially in relation to contaminated land, is highlighted. It is also identified how green infrastructure can contribute to promoting healthy lifestyles and wellbeing.

Assessment of Baseline

5.24 The following section provides an initial overview of baseline information that is available from local and regional strategies.

- 5.25 The Joint Strategic Needs Assessments (JSNAs) were prepared by Northamptonshire County Council and Nene and Corby Clinical Commissioning Groups via the Health and Wellbeing Board and identify the current and future health and social care needs of the local community and are a fundamental part of planning and commissioning (buying) services at a local level. The evidence in the JSNA for Northamptonshire points to three key challenges for Kettering:
- Smoking prevalence;
 - Obesity within the family; and
 - Educational attainment.
- 5.26 According to the Public Health England Local Authority Health Profile, health indicators across Kettering are varied compared to England averages, with some indicators similar (life expectancy, diabetes diagnosis, deprivation, and smoking prevalence) and some worse than England averages (emergency hospital admissions for self-harm and alcohol related admissions).
- 5.27 The site is located within the Wards of Queen Eleanor and Buccleuch, Ise Lodge, and Barton. Deprivation is a key health indicator. Overall deprivation, in terms of income, child poverty, and older people in the three wards are all significantly better than England.
- 5.28 Lower Super Output Areas (LSOAs) are small geographical areas within Wards. The site is located within the LSOA of Queen Eleanor and Buccleuch E00137801, Ise Lodge E00137967, and Barton E00137785. Census 2011 data indicates that across these 3 LSOAs, the percentage of people describing their health as very good (50%), good (29%), fair (10%), bad (3%) and very bad (1%). This largely aligns with the England averages, which are: very good (47%), good (34%), fair (13%), bad (4%) and very bad 1%).

The overall approach

- 5.29 A matrix format will be used setting out assessment of potential adverse and beneficial effects against the determinants. The matrix will clearly identify the receptors affected and whether any specific vulnerable groups are likely to be affected for both construction and operation of the scheme.
- 5.30 The HIA report will draw directly from findings in the EIA and, where relevant, include cross-references to specific ES chapters so detailed information can be easily located.
- 5.31 'Embedded Mitigation' (i.e. designed into the scheme) will be considered when undertaking the assessment. Additional mitigation will also be recommended.

- 5.32 As part of the basis for HIA it is recognised that health and wellbeing can be affected by multiple determinants as indicated in **Figure 5.1**.

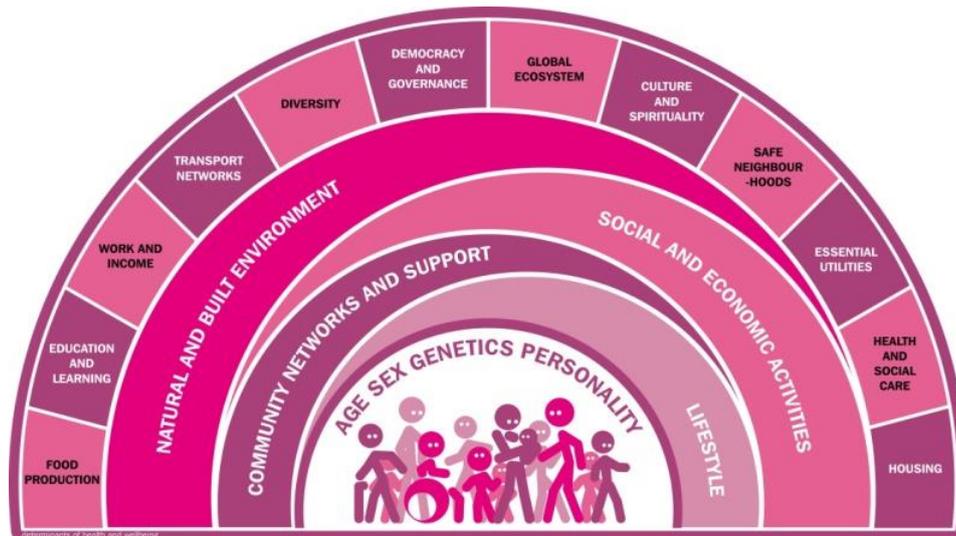


Figure 5.1 - The Determinants of Health and Wellbeing (Peter Brett Associates (Adapted from Dahlgren G and Whitehead (1991). Policies and strategies to promote social equity in health; Institute of Future Studies; Stockholm).

5.33 Sensitive receptors will be informed by those identified in the relevant topics within the ES and aligned to these, for example, noise and air quality. At this stage, the receptor groups identified for assessment are likely to broadly include the following and will be tailored to the health issue under consideration as described in the ES.

- Existing residents within the application site and within the area immediately surrounding the site, primarily those within the wards of Queen Eleanor and Buccleuch, Ise Lodge, and Barton;
- Existing residents in the wider area of Kettering where identified as applicable in other ES Chapters;
- Existing community service users, including local schools, healthcare facilities and public rights of way (PRoW) where appropriate to the particular health issue being considered (vehicular road users are considered from a connectivity perspective);
- New residents likely to live in the proposed development;
- New community service users likely to work or use facilities in the proposed development; and
- Construction workers during the demolition/construction of the proposed development.

5.34 Vulnerable groups that are likely to be affected will also be identified. These are likely to include at this stage:

- Older people (65 and over);
- Children (aged 0-17);
- Those with a high level of deprivation, low income or unemployment;
- Groups with pre-existing health conditions; and
- New parents or pregnant women.

Potential Significant Effects

5.35 The assessment will be undertaken on the health determinants relevant to the proposals and will be based on the London Healthy Urban Development Unit’s (HUDU) HIA checklist themes as shown in **Table 5.1**. This will be tailored to the local context and the proposed development based on the baseline.

5.36 It is anticipated that where there may be potential for likely significant effects associated with the characteristics of the scheme on the health determinants outlined in the HUDU themes they will be assessed through the EIA as noted in **Table 5.1**. It is therefore not proposed that human health will be considered as a separate chapter within the EIA. The HIA report will draw upon and cross reference these assessments as noted.

Table 5.1 - Consideration of health determinants from the HUDU Checklist in the EIA.

Theme	Planning Issue	Cross Reference to Other Technical Assessment
Healthy Housing	<ul style="list-style-type: none"> ▪ Housing design ▪ Accessible housing ▪ Healthy living ▪ Housing mix and affordability 	<p>No likely significant effects on human health anticipated</p> <p>Ongoing design considerations for housing standards will be considered both within the HIA and through the Design and Access Statement.</p>
Active Travel	<ul style="list-style-type: none"> ▪ Promote walking and cycling ▪ Safety ▪ Connectivity ▪ Minimising car use 	<ul style="list-style-type: none"> ▪ Transport; ▪ Noise and Vibration; and ▪ Air Quality.

Theme	Planning Issue	Cross Reference to Other Technical Assessment
Healthy Environment	<ul style="list-style-type: none"> ▪ Construction ▪ Air quality ▪ Noise ▪ Contaminated land ▪ Open space ▪ Play space ▪ Biodiversity ▪ Local food growing ▪ Flood risk ▪ Overheating 	<ul style="list-style-type: none"> ▪ Air Quality; ▪ Noise and Vibration; ▪ Ground Conditions; ▪ Ecology ▪ Landscape and Visual; and ▪ Flood Risk.
Vibrant Neighbourhoods	<ul style="list-style-type: none"> ▪ Healthcare services ▪ Education ▪ Access to social infrastructure ▪ Local employment and healthy workplaces ▪ Access to local food shops ▪ Public buildings and spaces 	<ul style="list-style-type: none"> ▪ Socio-economics; and ▪ Transport.

5.37 It should be noted that whilst the approach to HIA will consider provision of any health care services proposed as part of the development, it is not a Health Needs Assessment and does not attempt to quantify health care contributions. However, the Socio-Economic ES Chapter will be cross-referenced as necessary in the HIA report. Socio-economic considerations include the effects of the proposed development on healthcare provision.

Likely mitigation measures

5.38 Where necessary, additional mitigation or enhancement recommendations will be identified. These will aim to minimise potential negative health impacts and maximise potential positive health impacts, referencing where possible the most affected vulnerable group(s).

6.0 TRANSPORT & ACCESS

- 6.1 The assessment of transport and access will be undertaken by Peter Brett Associates LLP, now part of Stantec.
- 6.2 This chapter of the ES will identify and describe the nature and significance of the effects likely to arise in relation to transport and access to the site and Proposed Development.
- 6.3 The transport and access ES chapter will refer to the detailed Transport Assessment (TA), which will be a separate document to the Environmental Statement , and would form an Appendix to the ES.

Methodology – Data Sources

- 6.4 Travel information will be obtained from a variety of sources, including:
- traffic count survey data – including ATCs, turning movement, ANPR and journey time survey data;
 - the local highway authority’s Northamptonshire Strategic Transport Model (NSTM), used to evaluate the 2019 Baseline peak hour movements;
 - to maintain consistency of approach, the NSTM will also be used to evaluate the 2031 Do Minimum peak hour movements, and the 2031 Do Something Future Year peak hour movements by vehicles generated by the Development on the external highway network in the future year (2031 has been assumed to reflect the Core Strategy/Local Plan timeline/Plan-periods);
 - spreadsheet-based person trip analysis will provide further detailed analysis of Development trips by mode for both peak hour and daily movements; and
 - readily available national and local data – including *inter alia* National Travel Survey, TRICS, Census 2011 data, Webtris, and other freely available information.
- 6.5 A TA will be prepared, which will consider the likely effects of every mode of travel on the existing transport network as a result of the development. Reflecting recent requirements, the TA will contain the following aspects:
- Introduction;
 - Background and Development Proposals;
 - Existing Conditions (including a review of road safety);
 - Summary of Policy Review;
 - Development Access and Movement Strategy:
 - Base Person Trip Assessment;

- Access and Movement Strategy;
 - Pedestrian, Cycle and Equestrian Access Strategy;
 - Public Transport Strategy;
 - Site Layout, Vehicular Access and Parking provision;
 - Travel Demand Management Strategy;
 - Future Mode Share Assessment;
 - Construction Access Strategy;
 - Details of the NSTM;
 - Traffic and Junction Impact Analysis;
 - Mitigation Strategy;
 - Phasing; and
 - Conclusions.
- 6.6 In addition, a separate Framework Travel Plan (FTP) document will be prepared and submitted in support of the application. This will include details of the measures proposed within the individual occupier Travel Plans designed to mitigate any transportation effects of the development.
- 6.7 For the transport and access chapter of the ES, the methodology to be used and the determination of the significance criteria are in accordance with the standard guidance contained within:
- Guidelines for the Environmental Assessment of Road Traffic¹ published by The Institute of Environmental Assessment in 1993 (now the Institute of Environmental Management and Assessment (IEMA));
 - Volume 11 of the DMRB – Environmental Assessment; and
 - Relevant sections of the Department for Transport’s “Guidance on Transport Assessment” published in March 2007 (fundamentally superseded, but reference will be made).

LPA / Statutory Consultee discussions

- 6.8 Initial discussions have commenced with the Joint Planning and Highway Authorities - namely KBC, NCC and HE - and the first Transport Workshop Meeting was held on April 4th 2019.
- 6.9 A Scoping Study for the TA is being produced formally to agree the content of the assessment.

¹ Guidelines for the Environmental Assessment of Road Traffic make reference to the Manual of Environment Appraisal (MEA) published by the (then) Department of Transport in 1983. This has been superseded and reference has therefore been made to the relevant sections of the abovementioned Design Manual for Roads and Bridges (Highways Agency et al) – specifically Volume 11 entitled “Environmental Assessment”.

- 6.10 Any comments from the Joint Planning and Highway Authorities will be given due consideration as part of the TA works.

Legislation / Policy

National Planning Policy

- 6.11 The presumption in favour of sustainable development is a central theme running through the NPPF and transport planning policies are a key element of delivering sustainable development as well as contributing to wider sustainability and health objectives.
- 6.12 The NPPF states that there is to be a "presumption in favour of sustainable development" when making plans and decisions.
- 6.13 Paragraph 102 of NPPF 'Promoting Sustainable Transport' further states:

"Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:

- *the potential impacts of development on transport networks can be addressed;*
- *opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;*
- *opportunities to promote walking, cycling and public transport use are identified and pursued;*
- *the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and*
- *patterns of movement, streets, parking and other transport considerations are integral to the design of schemes and contribute to making high quality places."*

- 6.14 The NPPF states in paragraph 10 that "*So that sustainable development is pursued in a positive way, at the heart of the Framework is a **presumption in favour of sustainable development***" when making plans and decisions.
- 6.15 The Proposed Development is located within around 3.5km of the town centre and key facilities/services including public transport hubs (bus/rail stations), employment, retail, education and leisure facilities. Therefore, local planning authorities should consider car and cycle parking standards accordingly. In

particular, reflecting national policy when setting the car parking levels, the Developer and Proposed Development will take account of:

- the accessibility of the development;
- the type, mix and use of the development;
- the availability of and opportunities for public transport;
- local car ownership levels; and
- an overall need to reduce the use of high emissions vehicles.

Local Planning Policy

6.16 The key local planning policy for consideration within the Transport and Access assessment is contained in the adopted North Northamptonshire Joint Core Strategy 2011 – 2031, the relevant policies of which are as follows:

- Policy 10 – Provision of Infrastructure;
- Policy 15 – Well-connected Towns, Villages and Neighbourhoods;
- Policy 16 – Connecting the Network of Settlements; and
- Policy 17 – North Northamptonshire’s Strategic Connections.

Assessment of Baseline

6.17 The Baseline Assessment of the ES will review the existing transport context surrounding the site.

6.18 This assessment will be informed by a combination of

- traffic count survey data – including ATCs, turning movement, ANPR and journey time survey data; and
- the local highway authority’s Northamptonshire Strategic Transport Model (NSTM) will be used to evaluate the 2019 Baseline peak hour movements.
- the same NSTM will be used to evaluate the 2031 Do Minimum peak hour movements.

The overall approach

6.19 The aim of the assessment will be to identify, as far as reasonably possible, the nature of the transport changes within the area of the proposed development, to assess significance and to make appropriate recommendations. The assessment will include consideration of traffic impacts during construction as well as impacts during the operation of the proposed development.

- 6.20 The study area of the transport-related elements of the ES will be determined in accordance with the recommendation of the "Guidelines for Environmental Assessment of Road Traffic" that "a 30% change in traffic flows (or heavy vehicles) represents a reasonable threshold for including a highway link within the assessment". Other specifically sensitive areas, assumed to be within the urban area of Kettering, will be considered where traffic flows (or HVs) have increased by 10%, or more.
- 6.21 Typical daily and peak hour peak construction movements will be assessed with reference to a realistic programme of development and infrastructure construction activities, and the likely trip generation associated with these movements. These additional construction movements would be assessed with reference to the 2019 Baseline movements. The Post Development Completion effects will also be assessed with reference to the local highway authority's Northamptonshire Strategic Transport Model (NSTM), using the 2031 Do Something peak hour movements.

Potential Significant Effects

- 6.22 The sensitive receptors will be determined with reference to the criteria set out within the "Guidelines for Environmental Assessment of Road Traffic" document, and will be identified within the course of the assessment.
- 6.23 For the purposes of the ES chapter, the IEA guidelines recommend that the environmental effects listed in Table 2.1 of the guidance be considered important when considering traffic from an individual development. These effects include:
- Noise;
 - Vibration;
 - Visual Impact;
 - Severance;
 - Driver Delay;
 - Pedestrian Delay;
 - Pedestrian Amenity;
 - Accidents and Safety;
 - Hazardous Loads;
 - Air Pollution;
 - Dust and Dirt;
 - Ecological Impact; and
 - Heritage and Conservation.

- 6.24 Of these effects, several are considered in chapters elsewhere within the ES due to the specialist skills required; namely noise, vibration, visual impact, air pollution, ecological effects and heritage and conservation.

Potential Cumulative Effects

- 6.25 Whilst it is acknowledged that appropriate existing and approved development need to be assessed within the future year option tests, the development included for within the NSTM 2031 option test will reflect the requirements of the Joint Authorities – KBC, NCC and HE. As such, the future year assessments would evaluate the movements generated by all pertinent development identified within the North Northamptonshire Joint Core Strategy 2011-2031, and remain consistent with the conclusions of the TA.

6.26 Commentary will be provided about effects of the Proposed Development arising cumulatively from existing or approved development. The developments for consideration will be confirmed by the Council as part of this EIA and NSTM Scoping process. This would ensure that the EIA appropriately evaluates all significant effects arising from the cumulative impacts of the scheme in conjunction with other potential developments.

Likely Mitigation Measures

- 6.27 The mitigation measures necessary to ensure that the potential transport effects of the Proposed Development remain within acceptable parameters will be determined with respect to the assessment of the predicted operation of the transport network - including travel demand management measures, as well as potential improvements to the pedestrian and cycle network, public transport services and facilities, as well as highway junctions and links.
- 6.28 The ES chapter will reflect the findings of the TA, whilst assigning levels of significance to the perceived effects.
- 6.29 The chapter will set out the requisite mitigation measures and the residual effects once these are incorporated into the proposals.

7.0 AIR QUALITY

- 7.1 This section of the Scoping Report has been prepared by Peter Brett Associates, now part of Stantec. A chapter will be prepared setting out the findings of the air quality assessment. The assessment will consider the impact of the Proposed Development on the site and surrounding area, during both the construction and operational phases.
- 7.2 Existing local air quality, the likely future air quality in the absence of any further new development, and the likely future air quality if the development goes ahead will all be defined. The assessment of construction impacts will focus on the anticipated duration of works. The assessment of operational impacts will focus on existing impacts as a result of the consented development and a worst-case assessment.

Methodology – Data Sources

- 7.3 Existing local air quality will be defined within the study area, drawing upon monitoring carried out by the local authority with the information provided within the Council's Air Quality Review and Assessment reports.
- 7.4 Background concentrations for the site will be defined using the national pollution maps published by Defra. These cover the whole country on a 1x1 km grid (Defra, 2018).
- 7.5 Existing nitrogen and acid deposition rates for habitats within the study area will be determined from the Air Pollution Information System website (APIS, 2018).

LPA/ Statutory Consultee discussions

- 7.6 The Environmental Protection Officer at KBC will be consulted concerning detailed aspects of the proposed methodology and to obtain up to date local air quality monitoring data.

Legislation/ Policy

- 7.7 The Air Quality Strategy (2007) establishes the policy framework for ambient air quality management and assessment in the UK (DETR, 2007). The primary objective is to ensure that everyone can enjoy a level of ambient air quality which poses no significant risk to health or quality of life. The Strategy sets out the National Air Quality Objectives (NAQOs) and Government policy on achieving these objectives.

- 7.8 The relevant NAQOs for LAQM are prescribed in the Air Quality (England) Regulations 2000 (Statutory Instrument, 2000) and the Air Quality (Amendment) (England) Regulations 2002 (Statutory Instrument, 2002).
- 7.9 Where an objective is unlikely to be met, the local authority must designate an Air Quality Management Area (AQMA) and draw up an Air Quality Action Plan (AQAP) setting out the measures it intends to introduce in pursuit of the objectives within its AQMA.
- 7.10 The Local Air Quality Management Technical Guidance 2016 (LAQM. TG (16); Defra, 2016), issued by the Department for Environment, Food and Rural Affairs (Defra) for local authorities provides advice as to where the NAQOs apply.
- 7.11 The Air Quality Standards (Amendment) Regulations 2016 amended the Standard Regulations 2010, which implemented the European Union's Directive on ambient air quality and cleaner air for Europe (2008/50/EC), and includes limit values for NO₂ (Statutory Instrument, 2016). These limit values are numerically the same as the NAQO values but differ in terms of compliance dates, locations where they apply and the legal responsibility for ensuring that they are complied with.

National Policy

- 7.12 The revised National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how they are expected to be applied (Ministry of Housing, Communities & Local Government, 2019). In relation to achieving sustainable development, Paragraph 8 states that:

"Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

c) 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."

So that sustainable development is pursued in a positive way, at the heart of the Framework is a presumption in favour of sustainable development. Paragraph 11 states that plans and decisions should apply a presumption in favour of sustainable development, which for decision-taking means:

"... d) where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:

...

ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole."

7.13 Paragraph 180 on ground conditions and pollution 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."

7.14 Paragraph 181 states 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."

Planning Practice Guidance

7.15 Planning Practice Guidance (PPG) (Planning Practice Guidance, 2014) was first published in March 2014 to support the National Planning Policy Framework. Paragraph 001, Reference 32-007-20140306 (revision date 06.03.2014) of the PPG provides a summary as to why air quality is a consideration for planning:

"... Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit... The local air quality management (LAQM) regime

requires every district and unitary authority to regularly review and assess air quality in their area. These reviews identify whether national objectives have been, or will be, achieved at relevant locations, by an applicable date... If national objectives are not met, or at risk of not being met, the local authority concerned must declare an air quality management area and prepare an air quality action plan... Air quality can also affect biodiversity and may therefore impact on our international obligations under the Habitats Directive... Odour and dust can also be a planning concern, for example, because of the effect on local amenity."

Local Policy

7.16 The North Northamptonshire Joint Core Strategy 2011 – 2031, adopted in 2016, is the strategic Part 1 Local Plan for Corby, East Northamptonshire, Kettering and Wellingborough. It sets out the overall strategic plan for North Northamptonshire, to be developed in more detail through the Part 2 Local Plans prepared by the District and Borough Councils (North Northamptonshire Joint Planning Unit, 2016).

7.17 Policy 4 'Biodiversity and Geodiversity' and Policy 8 'North Northamptonshire Place Shaping Principles' relate to air quality and state:

"Policy 4: A net gain in biodiversity will be sought and features of geological interest will be protected and enhanced through:

a) Protecting existing biodiversity and geodiversity assets by:

iii. Protecting the natural environment from adverse effects from noise, air and light pollution"

Policy 8: "Development should:

e) Ensure quality of life and safer and healthier communities by:

ii. Preventing both new and existing development from contributing to or being adversely affected by unacceptable levels of soil, air, light, water or noise pollution or land instability"

Assessment of Baseline

7.18 Kettering Borough Council (KBC) has not declared any Air Quality Management Areas (AQMAs) in the borough. However, exceedances of the annual average nitrogen dioxide (NO₂) objective have been identified on London Road in 2017 and

the local authority will wish to understand the impact of the development on local air quality.

The overall approach

Construction

- 7.19 The potential impacts of dust during construction will be assessed with reference to the Institute of Air Quality Management's (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014), which is accepted as industry standard guidance on this subject. Air quality will be assessed at a range of worst-case receptors. For construction and demolition dust effects, the study area will be within 350 metres of the site. Consideration will also be given to the potential location of future dwellings and other sensitive uses proposed within the development site. For construction traffic activities the study area will be defined by the transport data where changes in traffic are significant, taking into account the thresholds defined by the IAQM guidance (IAQM, 2014).

Post Completion

- 7.20 The assessment of operational road traffic impacts will be undertaken using the ADMS Roads detailed dispersion model. The model will be used to predict concentrations within the development site to assess the suitability of the site for the full extent of the residential development as proposed, and also at off-site receptors to assess the impacts of additional traffic associated with the development. Model outputs will be verified against local air quality monitoring data. This modelling will make use of mapped background concentration data provided by Defra and of traffic flow projections.
- 7.21 Air quality will be assessed in relation to the national air quality objectives, established by the Government to protect human health. Air quality impacts arising from road traffic will be assessed with reference to guidance issued by the IAQM and Environment Protection UK (EPUK) in their document: Land-use Planning & Development Control: Planning for Air Quality (IAQM, 2017).
- 7.22 The impact of development traffic on the local sensitive ecological receptors such as Southfield Farm Marsh and Twywell Gullet Sites of Special Scientific Interest (SSSI) adjacent to the A14 will also need to be determined if the increase in development traffic is significant on roads within 200 metres of the habitat.

Potential Significant Effects

- 7.23 The principal air pollutants of concern with respect to the development will be:
- nitrogen dioxide (NO₂)

- fine airborne particles (PM₁₀ and PM_{2.5})
- dust

7.24 The main local sources of these pollutants are likely to be road vehicles (nitrogen dioxide, PM₁₀ and PM_{2.5}); and construction activities (dust and PM₁₀). Professional experience indicates that any likely impacts associated with other air pollutants will be negligible.

Potential Cumulative Effects

Construction Phase

7.25 The potential cumulative construction effects will be assessed taking into account developments in the vicinity of the Site should construction occur at the same time.

Post Completion

7.26 The cumulative effects of the existing and proposed development and the identified committed developments will be assessed. The future year modelling will consider the roads traffic emissions of the development site together with other committed developments in the area.

Likely mitigation measures

7.27 Practical and reasonable measures which can be implemented to mitigate any detrimental impacts associated with construction and operation of the proposed development will be considered and highlighted within the Air Quality chapter. Appropriate mitigation measures for inclusion within the Construction Environmental Management Plan (CEMP) will be set out, based on mitigation recommended within the IAQM guidance.

8.0 NOISE AND VIBRATION

- 8.1 This section of the Scoping Report has been produced by Peter Brett Associates, now part of Stantec, (PBA) and sets out the technical details of the noise and vibration assessment to be reported in the Noise and Vibration Chapter of the ES.

Methodology – Data Sources

Acoustic Sound Survey

- 8.2 An environmental sound survey will be undertaken in order to establish the existing baseline noise environment around the Proposed Development.
- 8.3 The data will also be used to provide noise limits for building services plant associated with non-residential uses and define background sound levels.
- 8.4 Unattended environmental sound measurements will be undertaken at locations within the site boundary for the period of 1-week. The proposed measurement positions will be selected in order to establish the noise levels emanating from the existing dominant noise sources at the site, which are due to vehicular movements on A14, Barton Road and Warkton Lane.

Acoustic Model

- 8.5 An acoustic model of the site and surrounding area will be prepared using industry standard software SoundPLAN version 8.1. The acoustic model will be used to evaluate the noise climate across the site. The sound survey measurements will be used to verify the acoustic model.
- 8.6 The acoustic model will also be used to assess the worst-case operational noise climate in 2031.

LPA/ Statutory Consultee discussions

- 8.7 We intend to undertake specific consultation with the Environmental Health Officer of Kettering Borough Council.

Legislation/ Policy

- 8.8 In accordance with the NPPF, NPSE and PPG guidance for noise, lowest observable (LOAEL) and significant observable adverse effect levels (SOAEL) will be proposed for each noise and vibration source under assessment in this ES Chapter.
- 8.9 In respect of the EIA Regulations, the beneficial and adverse effect levels of noise and vibration effects have been related to the significance levels. Based on the descriptions of the adverse effect levels in the PPG for noise, recommended actions for each significance level have been suggested. The noise and vibration significance criteria are presented in

8.10

8.11 *Table* below.

Table 8.1 - Noise and Vibration Significance Criteria

Significance Level	Noise and Vibration Adverse Effect Level	Impact and Action (to be applied to potential effects)
Substantial		Noise causes extensive and regular changes in behaviour and could lead to psychological stress or physiological effects. This level is unacceptable and should be prevented.
Major	SOAEL	Noise causes a material change in behaviour and/or attitude. This level should be avoided.
Moderate		Noise can be heard and causes small changes in behaviour or attitude. Noise should be mitigated and reduced to a minimum.
Minor	LOAEL	Noise can be heard but does not cause a change in behaviour or attitude. No specific mitigation measures are required.
Not Significant/Neutral	NOEL	Noise has no effect. No specific measures required

8.12 A beneficial effect may be considered to occur where noise levels fall below the NOEL, where specified (i.e. for the operational road traffic noise assessment, where there is no change or a decrease in noise levels).

Assessment of Baseline

8.13 The proposed development site location is generally rural in nature and predominantly used for agriculture.

8.14 Noise sensitive premises that exist within and adjacent to the proposed development site boundary are as follows:

- i. Residential dwellings within the SUE development;
- ii. Hayfield Cross School (within site boundary).
- iii. Existing and proposed Residential dwellings

8.15 The main sources of noise which are likely to affect the site are vehicular movements on the A14, Barton Road and Warkton Lane.

The overall approach

Construction Noise

- 8.16 Guidance for assessment of noise impact from construction noise will be taken from British Standard 5228: 2009+A1:2004 Code of Practice for Noise and Vibration Control on Construction (BS 5228) and Open Sites.
- 8.17 Details of the types of construction methods and plant likely to be used during the construction phases have yet to be formulated. At this stage in the scheme's design it is not possible to state precisely where plant will operate and for how long during the working day.
- 8.18 However, it is likely that the main construction phases would include site levelling/clearance, ground excavation, concreting and building construction. The building construction phase, and the servicing and fitting out of new buildings, is normally not a significant source of noise or vibration for local receptors and therefore will not be considered in the assessment.
- 8.19 To minimise associated impacts on local residents, guidance contained within BS 5228 Parts 1 and 2 (2009) will be used. This guidance details information on noise reduction measures and promotes the 'best practicable means' (BPM) approach to the construction process.
- 8.20 Based on guidance provided in BS 5228 the lowest observed adverse effect level (LOAEL) and the significant observed adverse effect level (SOAEL) will be identified as below for the assessment.

Table 8.2 - Construction Noise Level Thresholds of Potential Significant Effect at Residential Uses (External Facade Levels)

Time Period	LOAEL $L_{Aeq, T}$ (dB)	SOAEL $L_{Aeq, T}$ (dB)
Daytime: 07:00 – 19:00 Weekdays 07:00 – 13:00 Saturday	70	75

- 8.21 For Access E and F a Construction Management Plan (CMP) was produced as part of the condition discharge of the previous outline planning consent. Noise measures detailed in the approved CMP will be referenced where appropriate in the ES.

Suitability of Site for Residential Development

Road Traffic Noise

- 8.22 Guidance to set out the desirable guideline values in habitable rooms, such as living rooms and bedrooms will be taken from British Standard 8233: 2014 – Guidance on sound insulation and noise reduction for buildings (BS 8233).
- 8.23 The assessment of the proposed residential use will be undertaken based on the acoustic modelling and baseline surveys undertaken. A review of both internal and external noise levels will be assessed against guidance levels provided in BS 8233. The assessment will be based on predicted noise levels calculated through acoustic modelling for a future design year 2031.
- 8.24 BS 8233 sets out desirable guideline values in habitable rooms, such as living rooms and bedrooms. This standard will be used to assess noise at the residential units based on the noise survey and modelling.
- 8.25 BS 8233 also provides advice in relation to design criteria for external noise. It states that:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable.

In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space."

Operational Impact on Existing Dwellings

- 8.26 Changes in road traffic flows associated with the development have the potential to adversely affect noise sensitive receptors adjacent to those roads. The assessment of road traffic noise implements the noise prediction procedures as detailed in the DfT and Welsh Office's *The Calculation of Road Traffic Noise (CRTN)*.
- 8.27 Noise levels will be predicted for both 'with' and 'without' development scenarios, to allow the determination of the changes in road traffic noise at existing receptors as a result of the proposed scheme. The significance of these changes will be based on guidance criteria proposed in DMRB.
- 8.28 Planning conditions 49 and 50 of the outline consent (KET/2015/0967) relating to noise impacts on existing dwellings in the vicinity of Access E and F are currently

being reviewed and assessed. Conclusions from these assessments and submissions will also be included as necessary within the ES.

Potential Insignificant Effects

- 8.25 As no sources of significant vibration are located in the vicinity of the site, operational ground borne vibration impacts have been scoped out of the assessment

Potential Significant Effects

Construction Noise

- 8.26 It is likely that the main construction phases which may affect existing or phased residential dwellings would include site levelling/clearance, ground excavation concreting and building construction.

Operational Impacts

- 8.27 Operational impacts and effects may affect existing noise sensitive receptors and the proposed dwellings when construction has been completed. Potential impacts have been identified below:
- i. The main source of noise to impact the proposed residential uses on site is likely to be due to vehicular movements on the A14, Barton Road and Warkton Lane.
 - ii. Increases in vehicular movements on the proposed access points (see existing planning permission KET/2015/0967 and relevant conditions) and local road network as a result of the proposed development may result in an increase in noise and vibration levels at the nearest noise sensitive receptors.

Potential Cumulative Effects

- 8.28 Liaison will be undertaken with the transport consultant undertaking the transport assessment to establish traffic flows associated with committed developments in the area. See also table in Chapter 1.0 of this Report. Based on the traffic data provided the acoustic model will be used to assess the potential impacts of the cumulative effect of the development and committed developments on nearby noise sensitive receptors.

Likely Mitigation Measures

- 8.29 Where appropriate, guidance will be provided regarding the setback distances and orientation of the proposed residential dwellings along with any other recommendations (e.g. sound insulation), in order to alleviate noise impacts on noise sensitive dwellings.

9.0 LANDSCAPE AND VISUAL IMPACT

- 9.1 This chapter of the ES will identify and describe the nature and significance of the effects likely to arise on the existing landscape character from the Proposed Development and the visual amenity of people who view the Site and Proposed Development.
- 9.2 Lockhart Garratt are instructed by Hanwood Park LLP to undertake a Landscape and Visual Impact Assessment (LVIA) as part of the Environmental Statement (ES) submitted in support of the proposed development at Hanwood Park.
- 9.3 This part of the Report sets out the proposed approach to the assessment of the likely significant effects of the proposed development, in relation to the baseline landscape character and the visual environment of the Site and its setting.

Methodology – Data Sources

- 9.4 The assessment of landscape and visual effects will be based upon Lockhart Garratt's established assessment methodology, derived from the Guidelines for Landscape and Visual Impact Assessment Third Edition (Landscape Institute and Institute of Environmental Management and Assessment, 2013) (GLVIA 3), which is the nationally accepted guidance for these assessments.
- 9.5 A copy of the Lockhart Garratt Assessment Methodology is included within **Appendix 5** for ease of reference.
- 9.6 The preparation of the Visual Assessment will be undertaken in accordance with the Landscape Institute's Technical Advice Note 01/11, which sets out the current best practice guidance in relation the collection, processing and presentation of photographic images for visual assessment.
- 9.7 For clarification Lockhart Garratt would seek to agree the assessment methodology with the Council as local planning authority prior to completion of the assessment where possible, including the location of photographic viewpoints.
- 9.8 In addition to the aforementioned Methodologies and best practice guidance, consideration will be given to the wealth of information provided in support of the previous (extant) permission on site, in order to make best use of the information prepared to date and to ensure that the ES LVIA chapter is supported by a robust and comprehensive evidence base.

LPA/ Statutory Consultee discussions

9.9 As part of the ES LVIA process consultation with the following organisations and statutory bodies will be undertaken:

- North Northamptonshire Joint Planning and Delivery Unit
- Kettering Borough Council (KBC)
- Local Parish Councils and Relevant Neighbourhood Planning Groups

Legislation/ Policy

9.10 A review of relevant legislation and key national and local planning policies will be undertaken and will form part of the Landscape and Visual Impact Assessment (LVIA). This will include the policy and guidance documents listed below:

- National Planning Policy Framework (NPPF 2019)
- Planning Practice Guidance (PPG)
- North Northamptonshire Joint Core Strategy (Part 1- 2016)
- KBC 1995 Local Plan Saved Policies, Maps and Guidance (1995)
- KBC - Site Specific Part 2 Local Plan (Emerging Policy)
- KBC - Green Infrastructure Delivery Plan (2018)
- Kettering Urban Extension Strategic Design Guidance

9.11 Whilst not exhaustive, this list outlines the primary planning policy context for the scheme. Further consideration of other relevant Supplementary Planning Policy Guidance and emerging policy will also be provided, where relevant.

Assessment of Baseline

Overview

- 9.12 As stated above, there is a wealth of information provided in support of the previous (extant) permission on the Site. Whilst much of this information will remain relevant to some extent, changes to the existing landscape and visual environment should be noted, and the baseline upon which the previous LVIA was prepared remains fundamentally altered and it is therefore no longer reliable. It is also notable that the previous LVIA was prepared prior to the production of the latest assessment guidance (Third Edition, 2013).
- 9.13 Indeed, changes within the landscape such as the construction of a new primary school, residential dwellings, and highways and drainage infrastructure within the Site, and the new commercial development within the vicinity of Junction 10 to the south, significantly alter the character of the immediate site context and as such it is necessary to undertake a thorough updated baseline assessment.

Study Area

- 9.14 In addition to the previous assessment data the existing baseline will be reviewed and reassessed in accordance with current best practice guidance, building on the work undertaken to date and ensuring that the assessment is based on up to date and robust baseline data.
- 9.15 An updated desk study assessment will be undertaken which will define the revised study area and identify potential constraints, opportunities and features of note/merit. The desk study process will involve a review of:
- Ordnance Survey mapping, including historic maps;
 - Google Earth aerial imagery;
 - Multi-Agency Geographic Information for the Countryside (MAGIC) online mapping data;
 - Historic England Register of Listed Buildings, Register of Historic Parks and Gardens, and Scheduled Monument citations;
 - Natural England Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) citations where applicable;
 - Natural England National Character Area profiles, regional/county and district level character assessments as appropriate;
 - Published Design Guidance and relevant policy documents as applicable;
 - and
 - Northamptonshire County Council Definitive Rights of Way Map.

- 9.16 Given the scale and extent of the Proposed Development, a maximum study area of 5km radius from the Site boundary is proposed. It is considered that this forms a logical theoretical zone of influence within which the impact of the development should be assessed. It is likely however, that through further site assessment, the study area will be continually refined, to ensure that the assessment is both comprehensive and focused.
- 9.17 In addition to reviewing the aforementioned documents and resources, a Zone of Theoretical Visibility (ZTV) analysis will be undertaken to help understand and define the likely visual envelope for assessment. The ZTV analysis will use bare earth topographical information and 3D digital terrain modelling software as the basis for defining the visual envelope, based on the maximum study area of 5km as outlined above.
- 9.18 It should be noted that the ZTV analysis will not account for the presence of intervening features such as built form and established vegetation structure within the 5km study area. As such, whilst it will provide a good understanding of the likely visual envelope, the ZTV cannot be relied upon to define a definitive visual envelope.
- 9.19 With this in mind, the findings of the ZTV analysis will be tested through the site/field assessment process, to help further define the visual envelope, and to understand the likely visibility of future development within the Site.
- 9.20 Having undertaken a thorough and comprehensive baseline landscape and visual assessment (as outlined above) the primary baseline data will be collected and presented in accordance with the Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA 3).
- 9.21 A comparison of the findings of the baseline assessment will be made in relation to the previous assessment to highlight key changes within the landscape and visual environment and to define a definitive baseline upon which the assessment of effects will be made.

The overall approach

- 9.22 The assessment approach is outlined in detail within the Lockhart Garratt Ltd Assessment Methodology included within **Appendix 5**.
- 9.23 The LVIA chapter will consider the landscape and visual effects arising as a result of the proposed development at:
- Construction Phase
 - Operation (Year 1)
 - Operation with Mitigation (Year 15)

- 9.24 Throughout these stages, consideration will be given to the influence and impact of the ongoing and consented development within the immediate study area, alongside the likely phasing of the proposed development within the Site.
- 9.25 Consideration will also be given to the phased implementation of the proposed Green Infrastructure enhancements including the effect of advance planting implemented and elements of the previously approved (pursuant to outline planning permission KET/2008/0274 and carried forward on subsequent s73 permissions including KET/2015/0967) Green Infrastructure and Open Space Strategies which were already in place prior to commencement of the development at all stages of the assessment.

Assessing Landscape Impact

- 9.26 Landscape features and receptors identified as part of the baseline assessment process will be assessed in relation to their susceptibility to change and their perceived value, in order to define their overall sensitivity.
- 9.27 An evidence based, professional judgement will then be made as to the likely magnitude of change these receptors will experience and a judgement in relation to the overall significance of effect will be made in accordance with Lockhart Garratt Ltd Assessment Methodology.

Assessment of Visual Impact

- 9.28 The sensitivity of visual receptors will be considered in accordance with the nature of the receptor, with views from busy public highways judged as being of lower sensitivity than views from Public Rights of Way for example.
- 9.29 An evidence based professional judgement will then made in relation to the likely magnitude of the change experienced by these receptors and a judgement in relation to the overall significance of effect will be made in accordance with the Lockhart Garratt Ltd Assessment Methodology.
- 9.30 Consideration will also be given to the impact of the Proposed Development upon residential receptors and their amenity where appropriate.
- 9.31 A lighting impact assessment will also be undertaken as part of the EIA process considering the impact of the proposed development upon night time views. This will be appended within Chapter 9 and cross-referenced as part of the assessment of visual effects.

Potential Significant Effects

- 9.32 As the Landscape and Visual Impact Assessment (LVIA) process is still ongoing, the potential significant landscape and visual effects are difficult to determine, at this stage. It is likely, however, that whilst the receiving baseline will have changed as a result of recent development within the area, the overall findings of the previous ES LVIA Chapter will remain largely unchanged, with the proposals seeking to promote a level and scale of development that is in keeping with what was previously granted permission in 2010 and subsequently, including as recently as November 2018 under KET/2015/0967.
- 9.33 For the purposes of the impact assessment, beneficial or adverse effects of substantial, major and major/moderate effects are considered to be significant and to be of key importance in decision-making. Moderate adverse effects should also be collectively taken into account when considering the overall effects of the development in decision-making.
- 9.34 It is important to consider that change does not necessarily result in an adverse effect or harm to a particular landscape or visual environment.
- 9.35 The landscape assessor, in determining the significance of effect, will apply a defined assessment methodology, in combination with sound professional judgement upon which the identification of significant effects should be based.

Significance Thresholds

Table 9.1 - The table below defines the significance thresholds that will be applied when determining the impact of the development in landscape and visual terms.

Significance	Threshold Definition
Substantial	A very high magnitude of change that materially affects a landscape or view of national / international importance that has little or no ability to accommodate change.
Major	A high magnitude of change that materially affects a landscape or view that has limited ability to accommodate change.
Moderate	A medium magnitude of change that materially affects a landscape or view that may have the ability to accommodate change. Positive effects will typically occur in a lower quality landscape.
Minor	A low magnitude of change that materially affects a landscape that has the ability to accommodate change. Positive effects will typically occur in a lower quality landscape or view.
Negligible	A negligible magnitude of change that has little effect on a landscape that has the ability to accommodate change.
None	It is also possible for a magnitude of change to occur that results in an effect of neutral significance due to the change being compatible with local character or not visible.

Potential Cumulative Effects

- 9.36 As the Landscape and Visual Impact Assessment process is still ongoing, the potential cumulative effects of the Proposed Development are as yet undefined. However, a list of reasonably foreseeable schemes likely to be considered as part of the cumulative effects within the ES chapter are listed in section 1, paragraph 1.8.
- 9.37 These schemes will be considered as part of establishing the wider impacts and understanding how the possible effects can be reduced by provisions within the site, if necessary and where possible.

Likely mitigation measures

- 9.38 The previous permissions were accompanied by a robust Green Infrastructure Strategy and Open Space Strategy that set out the key planning and design aspirations for the proposed green infrastructure on the Site.
- 9.39 The fundamental principles of the Green Infrastructure and Open Space strategies for the site will remain unchanged and they will be updated to account for changes

within the receiving landscape, best practice guidance, relevant supplementary planning guidance and changes to the development layout where relevant.

- 9.40 Full details of the proposed Green Infrastructure and Open Space Strategies are included within the aforementioned documents supplied in support of the previously approved discharge of condition applications.

10.0 ECOLOGY AND BIODIVERSITY

- 10.1 This chapter of the ES will present an assessment of the potential effects of the Proposed Development upon ecological receptors, which will be identified through desk-based research, site surveys and consultation with key stakeholders. The approach proposed in this Scoping Report has been informed by the findings of the desk-based and initial site survey work and published best practice guidance. The ecological and nature conservation assessment will be undertaken by Lockhart Garratt.

Methodology – Data Sources

- Northamptonshire Biodiversity Records Centre (NBRC)
- Northamptonshire Bat Group
- Magic Map Application

LPA/ Statutory Consultee discussions

- 10.2 Consultation with the following organisations and online resources will be undertaken:
- Natural England
 - Northamptonshire Wildlife Trust
 - Northamptonshire County Council
 - Kettering Borough Council
- 10.3 Consultation may also be undertaken in line with the project developments if required from the following additional organisations:
- Environment Agency
 - Local Conservation Groups
 - Forestry Commission
 - Woodland Trust
 - Nature Improvement Officer

Legislation/ Policy

- 10.4 A review of relevant legislation and key national and local planning policies will be undertaken and will form part of the ecological impact assessment. This will include the legislation listed below, the NPPF, Planning Practice Guidance and policies relating to nature conservation within local planning policy (including the adopted North Northamptonshire Joint Core Strategy).

National Planning Policy and Legislation

- The Conservation of Habitats and Species Regulations 2010 (as amended) (The Habitat Regulations);
- Wildlife and Countryside Act 1981 (as amended) (WCA);
- Natural Environment and Rural Communities Act 2006 (NERC);
- Hedgerow Regulations 1997;
- Section 11: NPPF, Conserving and enhancing the natural environment; and
- Planning Practice Guidance.

Local Planning Policy

- North Northamptonshire Joint Core Strategy
 - Policy 4 - Biodiversity and Geodiversity
 - Policy 19 - The Delivery of Green Infrastructure
 - Site is a Committed Sustainable Urban Extension – Kettering East (NNJCS)
- Site Specific Part 2 Local Plan (Emerging Policy)
Policy ENV01 - Local Green Infrastructure Corridors
- Biodiversity Supplementary Planning Document (SPD) for Northamptonshire
- Kettering 1995 Local Plan Saved Policies, Maps and Guidance
 - Policy K6 – Kettering: Environmental Impact
- Supplement to NNJCS 2011-2031
 - Biodiversity Supplementary Planning Document (SPD) - Biodiversity

The Overall Approach

- 10.5 A data search covering data within 2km of the Site has been carried out and has revealed a range of notable species records for the surrounding area including bats, water vole, great crested newts, grass snake and bluebell.
- 10.6 Primary baseline data will be collected in accordance with standard best practice methodologies published by Natural England, Chartered Institute of Ecology and Environmental Management (CIEEM) and other recognised bodies, as appropriate.

10.7 As part of the chapter an impact assessment of the Important Ecological Features (IEFs) will be undertaken in line with the Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018) and will cover the following:

- Evaluation of identified important features; faunal species, habitats and vegetation (as appropriate) of an international, national and regional basis;
- Description and evaluation of the magnitude and significance of the potential effects of the Proposed Development on statutory and non-statutory sites designated for nature conservation for both the Construction and Post-completion stages;
- Description and evaluation of the magnitude and significance of the potential effects of the Proposed Development on species, habitats and vegetation, in accordance with current guidelines for both the Construction and Post-completion stages;
- Detailed species-specific assessment;
- Mitigation and enhancement measures to address the identified effects and identification of any residual effects following mitigation;
- Cumulative assessment; and
- A description and evaluation of residual effects of the Proposed Development.

Identification of Important Ecological Features (IEFs)

10.8 The Guidelines require identification of IEFs, formally known as Ecological Receptors that could be significantly affected, either positively or negatively by a Proposed Development.

10.9 The regulations governing EIA only necessitate investigation of likely significant effects. According to the Guidelines, significance relates to the weighting attached when decisions are made. For the purpose of ecological assessment, a 'significant effect' is one that either supports, or undermines biological conservation objectives (e.g. national, or local policy objectives or legislative obligations) for the IEFs identified at the outset as requiring assessment.

10.10 IEFs include habitats, designated sites and species of principal importance for conservation of biodiversity (under the Natural Environment and Rural Communities Act, 2006), as well as legally protected species.

Evaluation of Important Ecological Features (IEFs)

10.11 Ecological features will be evaluated in terms of their nature conservation value using the criteria set out in the Guidelines. Valuation of IEFs ultimately involves professional judgement based on available guidance, information and expert advice.

10.12 The Guidelines state that the importance of an ecological feature should be valued as a defined geographical context. Each IEF will be valued using the following frame of reference;

- International and European;
- National;
- Regional;
- County; and
- Local/site

Assessment of Baseline

10.13 The ecological survey work in relation to this Proposed Development and future planning application is currently ongoing. A review of the survey work to be undertaken over the 2019 survey season is given below with interim findings detailed where possible.

10.14 At this stage the following proposed schedule of survey works have or are to be undertaken to identify potential ecological features that could be classified as Important Ecological Features (IEFs):

Table 10.1 – Proposed schedule of works

Survey	Timing	Notes/Likelihood
Desk Study	April 2019	Review of biological information from Northamptonshire Biological Records Centre and Northamptonshire Bat Group within 2km of the site boundary. MAGIC search for protected sites within 5km of site boundary.
Extended Phase 1 Habitat Survey	April – August 2019	Assessment completed. Detailed mapping of site habitats, photographic record, detailed target notes and ground based assessment of trees for bat roosting potential.
Hedgerow Assessment	July 2019	Assessment ongoing; work to update work completed by FPCR in 2008.
Amphibian / GCN Survey	June 2019	Assessment completed. Appropriate surveys completed with evidence of GCN recorded in four of the ponds surveyed; two next to the site, one 700m east and one 400m north of the site boundary.

Bat Survey	June – September 2019	Bat activity surveys involving walked transects and remote detectors deployed across the site. Previous survey work on the site has identified the presence of commoner species roosting in buildings and trees with commuting and foraging activity seen along the hedgerows, the River Ise, brook and ditches and in association with mature treelines and scattered trees.
Breeding Bird Survey	May –June 2019, April 2020	Walked Transects completed in May and July 2019. Further assessment required in April 2020.
Wintering Bird Survey	November 2019– February 2020	Not yet instructed. Walked transects of the site yet to be undertaken.
Reptile Survey	September 2019	Ongoing. A minimum of seven survey visits will be undertaken to check suitable refugia laid weeks prior to surveying.
Otter and Water Vole Survey	April – September 2019	Assessment ongoing. Habitat suitability/Scoping Survey. Species to be scoped in/out based on this survey and desk study information.
Crayfish Mitigation / Method Statement	November 2019	Awaiting Instruction. As agreed with Heather Webb (Principal Project Officer at Northamptonshire County Council). Works that will affect the areas of the river Ise will be supported and completed under an appropriate method statement.

Brown Hare Survey	May – October 2019	Awaiting Instruction. Incidental sightings during the suite of other ecological surveys will be recorded with areas of suitable habitat and confirmed activity detailed.
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10.15 If following assessment any of the above are considered IEFs they will be scoped into the assessment for detailed consideration within the ES.

10.16 The potential impacts of the development upon them will be discussed and the potential impacts will be determined through understanding how each IEF responds to the various effects associated with the Proposed Development.

Potential Significant Effects

10.17 As the ecological survey work is still ongoing, the potential significant ecological effects of the Proposed Development are difficult to determine, at this stage. A list of likely IEFs that will be assessed as part of the ES are provided below:

- Statutory designated sites
- Non-statutory designated sites
- Habitats (Including hedgerows, woodland, semi-improved grassland, running water and standing water)
- Badgers
- Bats
- Breeding/wintering birds
- Great crested newts
- Crayfish / Freshwater Invertebrates – under method statement
- Otter
- Reptiles
- Water vole

Potential Cumulative Effects

10.18 As the ecological survey work is still ongoing, the potential cumulative effects of the Proposed Development are difficult to determine, at this stage. A list of reasonably foreseeable schemes likely to be considered as part of the cumulative effects within the ES chapter are listed in Section 1, para 1.8 of this report.

- 10.19 These schemes will be considered as part of establishing the wider impacts and understanding how the possible effects can be reduced by provisions within the site where possible.

Likely mitigation measures

- 10.20 As the ecological survey work is still ongoing, the mitigation measures required for the Proposed Development are difficult to determine, at this stage. General mitigation measures likely to be implemented are given below and include;

- Protected species licences
- Habitat creation and/or enhancement
- Habitat manipulation
- Species specific safeguards

- 10.21 Recommendations will be made to mitigate any significant detrimental impacts associated with the construction and operation of the Proposed Development on any identified IEF. Any other mitigation that is not related to an IEF but is nonetheless considered necessary would also be set out. Once the appropriate mitigation measures have been proposed, the impacts remaining after they have been taken into account will be identified. Once the appropriate mitigation measures have been proposed, the impacts remaining once that have been taken into account will be identified.

Arboricultural Assessment

- 10.22 Previous arboricultural work completed at the site was undertaken in 2008 by FPCR and Lockhart Garratt. In 2013, Lockhart Garratt completed further tree constraint assessments for the areas identified as the Surface Water Attenuation Pond, Access Junction F and Access Junction E.
- 10.23 These works were undertaken to identify the potential tree constraints in relation to the proposed associated road junctions and on-site developments. Works undertaken include details of the trees and sections of hedgerows likely to be lost as part of the proposed works and areas for possible retention where the current Strategic Master Plan allows.

Table 10.2 – Arboricultural work undertaken

Survey	Completed	Notes
Tree Assessment of Trees to be Removed	2008	Undertaken by FPCR
Tree Implications with Masterplan Hedgerow Implications with Masterplan	2008	Undertaken by Lockhart Garratt. Trees and hedgerows identified that are to be either retained or lost by the proposed works and sections of hedgerow and scattered trees that are identified for potential retention.
Tree Constraints Plans -Attenuation Pond -Junction E -Junction F	2013	Undertaken by Lockhart Garratt. Hedgerows, single and groups of trees identified with appropriate root protection areas and tree condition.

- 10.24 The potential impacts that are likely to be encountered as part of the Proposed Development are potential tree and hedgerow loss, the facilitation of necessary tree pruning, the protection of any retained trees through the construction phase and any special engineering solutions.
- 10.25 Any infringement into Root Protection Areas (RPAs) of retained trees would be identified along with reference to appropriate mitigation, included but not limited to protective fencing, working within RPAs and details of special engineering solutions such as 'no dig' surfaces. Consideration will also be given to the impact of any tree loss on the locality and any proposed mitigation measures to offset any loss to the community.
- 10.26 Potential mitigation may include the retention of significant trees, redesigning of proposed plot layouts where the masterplan allows, tree planting and habitat creation.

11.0 HISTORIC ENVIRONMENT

11.1 The Historic Environment Assessment and this chapter of the ES will evaluate the known and potential archaeological and historic resource within the Site and its surroundings. This will be placed in the local, regional and national context, and assessed against national criteria. The Archaeology and Heritage assessment will be undertaken by RPS.

Methodology – Data Sources

11.2 An assessment of the historic environment within and around the site will be undertaken. This report will be appended to Chapter 11 Historic Environment of the ES, which will summarise the Assessment. The aim of the assessment is to identify, as far as is reasonably possible, the nature of the archaeological and cultural heritage resource within the site and its surroundings, to assess their significance and to make appropriate recommendations for the future treatment of any heritage assets or their settings which may be affected.

11.3 Consultation with the following organisations and documents will be undertaken as a minimum:

- Local Studies and Archives, and other relevant repositories;
- NPPF and Local Planning Policies;
- Heritage setting guidance issued by Historic England;
- Historic Ordnance Survey mapping;
- Historic aerial photography; and
- Various relevant online resources and catalogues.

11.4 All heritage assets identified will be categorised in terms of their sensitivity in accordance with guidelines set out in the Design Manual for Roads and Bridges, Volume 11, Section 3, Part 2 (2007) on “Cultural Heritage”.

LPA/ Statutory Consultee discussions

11.5 Consultation will be undertaken with relevant statutory and non-statutory consultees, regarding the outline planning application and the scope of the Heritage Environment Assessment, potential measures to avoid adverse impacts, opportunities to create beneficial effects and to identify measures to mitigate those impacts which are unavoidable. Relevant consultees include Historic England, Northamptonshire County Council Archaeological Officer and other local authority officers identified during the Scoping Report and Request exercise.

Legislation/ Policy National Planning Policy

11.6 Section 16 of the NPPF, entitled 'Conserving and enhancing the historic environment' provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets. Overall, the objectives of 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 value that heritage makes to our knowledge and understanding of the past.

11.7 In considering any planning application for development, the local 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.

Local Planning Policy

11.8 The key local planning policy for consideration within the archaeology and heritage assessment are as follows.

North Northamptonshire Joint Core Strategy 2011-2031

- Policy 2 – Historic Environment.

Assessment of Baseline

11.9 In 2007/8 the Archaeology and Heritage Assessments undertaken to support the previously-approved outline planning application and EIA included an examination of data held on the National Monuments Record (NMR) (replaced by the National Heritage List for England (NHLfE)) and Northamptonshire Historic Environment Record. No Scheduled Ancient Monuments, World Heritage Sites, Registered Parks & Gardens, Listed buildings or Historic Battlefields were located within the application site boundary, which is the same as that included as part of this Scoping Report.

11.10 The following designated heritage assets were identified as receptors in the 2007/8 ES:

- Boughton House – a Grade I Listed building
- Boughton House Park and Garden – a Registered Park and Garden

- Warkton Conservation Area
- Weekley Conservation Area

11.11 The 2007/8 ES identified the following non-designated heritage assets within the study site including:

- Prehistoric funerary sites
- Iron Age settlement sites
- Scatters of Saxon/Early Medieval and Iron Age pottery

11.12 Since this time a programme of archaeological evaluation trenching has been carried out on Phase 1 part of the site (OAE 2012) and a geo-physical survey over the whole site. The Phase 1 evaluation identified eight distinct areas of activity, most of which dated to the Later Iron Age and Earlier Roman periods. During 2013 archaeological areas within R7 and R8 were mitigated via a programme of excavation and recording. The excavation revealed Middle Iron Age activity, including a large boundary ditch crossing the entire 400m length of the excavation area. Adjacent to this was a rectangular structure, which may be a rare example of a Middle Iron Age shrine (OAE 2013). In addition, during 2018 archaeological excavations were carried out in advance of the construction of the Surface Water Attenuation Pond and associated infrastructure within Phase 1. These revealed extensive Roman remains and part of an Iron Age settlement, including a large area dedicated to crop processing (OAE 2018).

11.13 A review of existing baseline knowledge will be undertaken as part of the update to the technical reports and ES Chapter.

The Overall Approach

11.14 The ES Chapter will review the potential effects identified in accordance with current policy and guidance, baseline conditions and assessment methods.

11.15 The assessment will identify and evaluate the nature and likelihood of the impacts of the Proposed Development, in both the short and long term, on archaeological and cultural heritage features against clearly defined criteria. Significance will be assigned to impacts relative to the sensitivity of the resource and the magnitude of impact in accordance with best practice.

11.16 Archaeological resources are susceptible to a range of impacts during development. These relate to works associated with site preparation as well as construction related activities, including:

- Demolition and site clearance activities that disturb archaeological remains;

- Excavation that extends into archaeological sequences, for example deep foundations or basements resulting in the removal of the resource;
 - Piling activities resulting in disturbance and fragmentation of the archaeological resource;
 - Dewatering activities resulting in desiccation of waterlogged remains and deposits.
- 11.17 The implications, if any, of these actions will be discussed and significance criteria allocated to any identified impact.
- 11.18 In terms of the effects on cultural heritage, the effects of the development can be direct, such as loss or damage to heritage features, or indirect, including the effect on the setting of a designated heritage asset (i.e. Listed Building, Scheduled Monument or Registered Park and Garden). This component of the assessment will be in accordance with Historic England guidelines for setting assessments. In addition, this assessment will be considered alongside the landscape and visual assessment, the approach to which is set out in Section 9 of this report. Any impacts will be assessed, and significance criteria applied.
- 11.19 Once impacts have been identified, the means by which they can be avoided through design will be explored as a priority. Where these are possible, designed-in mitigation measures will be clearly identified and incorporated into the parameters plans.

Potential Significant Effects

- 11.20 If significant impacts cannot be avoided through design, then alternative strategies would be proposed and secured through planning conditions. The residual impacts following the implementation of these measures will then be defined and significance criteria applied.

Potential Cumulative Effects

- 11.21 The potential cumulative effects on archaeology and built heritage assets resulting from the development of the site and nearby schemes will be considered as part of the ES (see also Section 1 of the Report).

Likely Mitigation Measures

11.22 Where significant effects are identified, the ES will propose suitable mitigation measures.

12.0 AGRICULTURAL AND SOIL RESOURCES

12.1 This chapter of the ES will identify and describe the nature and significance of the effects likely to arise in relation to soil resources and agricultural land resources (best and most versatile land). This chapter will be provided by Land Research Associates.

Methodology – Data Sources

12.2 These issues will be addressed through a combination of a desk study and soil survey. The desk study uses the following data sources:

- British Geological Survey (BGS) mapping (at 1:50,000 scale)
- National Soil Mapping (at 1:250,000 scale)
- Natural England available Agricultural Land Quality mapping
- Meteorological Office climatological data

12.3 This information is then used to inform a soils and Agricultural Land Classification (ALC) survey, carried out to Natural England TIN049 guidelines, carrying out auger observations at a density of 1 observation every hectare. Soil resources within the site will be identified. The soil data is also used to draw maps showing land quality, identifying areas of best and most versatile (BMV) land.

LPA/ Statutory Consultee discussions

12.4 Natural England are the statutory consultants for soil resources and agricultural land. They require consultation on projects which may involve the loss of greater than 20 ha of BMV land. The methodology has been planned in accordance with their standard response and will be revised as required.

Legislation/ Policy

12.5 The importance in assessing the effects of development on soil resources and agricultural land is recognised in the National Planning Policy Framework (NPPF, 2019). The relevant advice is provided below:

- a) ...protecting and enhancing soils (in a manner commensurate with their... identified quality in the development plan)*
- b)...recognising the economic and other benefits of the best and most versatile agricultural land*
(Chapter 15, Paragraph 170).

'Plans should:...allocate land with the least environmental...value, where consistent with other policies in this Framework...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.' (Chapter 15, Paragraph 171 and footnote 53).

Assessment of Baseline

12.6 The site lies within a larger survey area undertaken by LRA in 2005. It has been found to contain a large portion of best and most versatile land (high sensitivity receptor) formed of fine loamy soil resources (medium sensitivity receptor). Some of this land has since been developed and the magnitude of the further loss of these receptors will be assessed in the ES Chapter and mitigation advice provided where possible.

The overall approach used to identify and assess effects

12.7 The Site will be assessed to determine land grade areas and soil resources affected by the Proposed Development. They will be assessed to the following criteria:

Table 12.1 - Magnitude of Impacts

Receptor	High	Medium	Low	Negligible
Soil Resource	Loss or irreversible damage to all topsoil resources. Sealing ¹ of more than 75% of the soils within the site.	Loss or irreversible damage to at least 50% of topsoil resources. Sealing of 50 – 75% of the soils.	Beneficial re-use of all or nearly all good quality topsoil resources ² . Sealing of less than 50% of the soils within the site.	Only minor disturbance of soils within the site, minimal surface sealing.
Agricultural Land	Irreversible loss of more than 80 ha of best and most versatile land.	Irreversible loss of 20 – 80 ha of best and most versatile land.	Irreversible loss of 5 – 20 ha of best and most versatile land.	Irreversible loss of less than 5 ha of best and most versatile land.

Table 12.2 - Sensitivity of Receptors

	High	Medium	Low
Soil Resources	Permeable loamy soils providing a broad range of ecosystem services and/or supporting valuable habitats.	A mixture of soils, none of them supporting valuable habitats.	Slowly permeable damaged or contaminated soils providing a limited range of ecosystem services.
Agricultural Land	Grades 1 and 2	Subgrade 3a	Subgrades 3b, 4 and 5

Table 12.3 - Significance of Effects

MAGNITUDE	SENSITIVITY			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

Potential Significant Effects

12.8 Effects will be assessed during construction and post construction periods. Potential effects include soil compaction, loss of soil resource and loss of best and most versatile agricultural land. There is the potential for all topsoil resources to be lost during construction and for significant subsoil compaction. Loss of BMV land is likely to be inevitable with a development of this size.

Potential Cumulative Effects

12.9 The effects on soils and agriculture are not cumulative (in the way that for example, the effects of multiple developments on traffic, faunal habitats or air quality are cumulative). 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.

Likely Mitigation Measures

12.10 Likely mitigation to protect soil resources for reuse in landscaping includes the creation and adherence to a Soil Management Plan. This will protect the entire soil resource from damage and mitigate the potential effects to a negligible impact. There is no mitigation possible for the loss of BMV agricultural land; this will have

to be balanced against other sustainability factors of the Site and the Proposed Development.

13.0 HYDROLOGY, FLOOD RISK & DRAINAGE

- 13.1 This chapter of the ES will identify and describe the nature and significance of the effects likely to arise from the Proposed Development in relation to hydrology, drainage and flooding potential during both the construction and operational phases. The chapter will set out the existing/baseline conditions, summarise the potential direct and indirect impacts of the proposed development, the mitigation measures required to prevent, reduce or offset the impacts and the residual impacts.
- 13.2 The ES chapter will be supported by a Flood Risk Assessment (FRA). The FRA will consider whether the proposed development is likely to be affected by current or future flooding from any source and will categorise the site in accordance with the Flood Zones set out in the National Planning Policy Framework and associated Planning Practice Guidance. The FRA will also consider whether the development will increase flood risk elsewhere and the nature of mitigation measures required to deal with development impacts. This assessment will be undertaken by Peter Brett Associates LLP, now part of Stantec.

Methodology – Data Sources

- 13.3 Existing studies/documents, including evidence base studies undertaken in support of the preparation of the North Northamptonshire Joint Core Strategy (adopted 2016) will be reviewed to identify the best available data to be taken forward to inform the EIA/FRA. In addition, the following sources of information will be used to assist with characterising the baseline water environment:
- <https://flood-map-for-planning.service.gov.uk/>;
 - <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>;
 - <https://environment.data.gov.uk/catchment-planning>;
 - <http://www.natureonthemap.naturalengland.org.uk/MagicMap.aspx>.
- 13.4 A walkover survey will be undertaken to facilitate an understanding of the baseline water environment and the general landform of the site and surrounding area and to define the scope/specifications of technical assessments/surveys.
- 13.5 The nature of flood risk associated with the tributary watercourses will be assessed by undertaking hydraulic modelling analysis. This will enable the site to be categorised in accordance with the Flood Zones set out in the NPPF. A hydraulic model was previously developed (2013) in support of the Stage 2 FRA (February 2013) prepared in support of an application to discharge Condition 65 of planning permissions KET/2007/0694 and KET/2008/0274. Subject to consultation with the EA and LLFA, it is currently envisaged that this model will be revised and updated to reflect current guidance and methods and subsequently used to inform the FRA that supports the ES chapter.

- 13.6 A surface water drainage strategy was previously devised to control, convey, store and dispose of surface water run-off arising from the proposed development during operation. Design principles and parameters and a conceptual layout are presented in the Stage 1 FRA (August 2008) and further detail provided as part of the aforementioned Stage 2 FRA (approved by the EA and KBC in March 2013) prepared in support of the extant planning permission. Various elements of the surface water drainage infrastructure – including construction of an attenuation pond located centrally in the Development - have been constructed as part of the extant planning permission. The approved, site-wide strategy and associated design principles and parameters will therefore be taken forward as part of the FRA prepared in support of the outline planning application to be submitted during the early part of 2020.
- 13.7 The FRA will include an assessment of the potential impacts of climate change upon flood levels and surface water run-off for the design life of the proposed development, in accordance with EA guidance published in February 2016 (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>). Other, wider climate change impacts are addressed in Chapter 16.

LPA/Statutory Consultee Discussions

- 13.8 Consultation with the EA, KBC and NCC, as the Lead Local Flood Authority, will be undertaken to identify and collate data in respect of the baseline water environment, define the scope of investigation/technical work required to inform the FRA and ES chapter, agree assessment methodologies and the design principles to be applied to ensure compliance with the relevant policy, legislation and guidance in respect of flood risk and surface water drainage/management.

Legislation/ Policy

- 13.9 The FRA and ES chapter will be prepared in accordance with the following:
- National Planning Policy Framework
 - Planning Practice Guidance
 - Water Environment (Water Framework Directive) (England and Wales) Regulations 2017
 - North Northamptonshire Joint Core Strategy 2011-2031 (Adopted July 2016)
 - The emerging Site Specific Kettering Part 2 Local Plan

Assessment of Baseline

- 13.10 The principal watercourse in the area is the River Ise (Main River), which flows to the south through the eastern area of Kettering town, approximately 1km to the west of the proposed development. The Alledge Brook (also Main River) flows to the south, a short distance beyond the eastern development boundary, before turning to flow to the east as it approaches the A14.
- 13.11 A tributary of the Brook flows through the central and eastern areas of the proposed development and confluences with the Alledge Brook just beyond the south-eastern site boundary.
- 13.12 The Environment Agency (EA) publishes floodplain maps on the internet (<https://flood-map-for-planning.service.gov.uk>). These maps show the possible extent of river flooding associated with a 1 in 100 year event (1% probability of occurrence), ignoring the presence of flood defences. Also shown is the possible extent of flooding arising from a 1 in 1,000 year event (0.1% probability).
- 13.13 The flood map indicates that localised areas along the Alledge Brook, outside of the site boundary, lie within the floodplain. The map also indicates that a narrow corridor of land either side of the southern reach of the Alledge Brook tributary lies within Flood Zone 3 (High Probability – land having a 1 in 100 or greater annual probability of river flooding). However, the flood map coverage does not extend to include all reaches of watercourses within the site boundary.
- 13.14 As outlined above, a hydraulic model of the watercourses within the site was developed in 2013. This analysis confirmed that floodplain extents were generally confined to a narrow corridor either side of the watercourses flowing through the site. As noted above, this model will be revised and updated to reflect current guidance and methods and subsequently used to characterise the baseline flood risk regime, and will include appropriate reference to the benefit of an attenuation basin recently constructed as part of the agreed early-phase surface water mitigation for the Development.
- 13.15 The EA 'Flood Risk from Surface Water Map' (<https://flood-warning-information.service.gov.uk/long-term-flood-risk>) shows areas that may be susceptible to surface water flooding following an extreme rainfall event. The map highlights a number of corridors within and adjacent to the site at high, medium and low risk of surface water flooding. These areas generally coincide with watercourses/ditches/drains and topographical 'low' points across the terrain (i.e. areas where surface water would naturally accumulate following rainfall).
- 13.16 The site falls within the area administered by the Anglian River Basin Management Plan (RBMP). The relevant Management Catchment is the 'Nene' and the site lies within the catchment of the Alledge Brook Water Framework Directive (WFD) designated water body, which lies within the 'Nene Middle' Operational Catchment.

- 13.17 The Alledge Brook is not designated as a 'heavily modified' water body, such that the environmental objective for the water body is to achieve Good Ecological Status. The overall water body classification is currently 'Moderate' (Cycle 2, 2016), with 'Moderate' ecological status and 'Good' chemical status. The reasons for not achieving 'Good' ecological status include diffuse pollution associated with agriculture and rural land management.
- 13.18 The overall water body WFD objective is to achieve 'Good' status by 2027.
- 13.19 The development proposals are unlikely to have an adverse effect upon the achievement of environmental objectives established under the WFD. The ES will therefore be supported by a relatively 'high level' WFD compliance statement, as opposed to a 'full' WFD compliance assessment.

The overall approach

- 13.20 The significance of effects will be assessed by considering the sensitivity of receptors (i.e. their importance and ability to tolerate and recover from change) and the likely magnitude of the impact (i.e. its spatial extent and duration). By combining sensitivity and magnitude, the significance of the effect is established.
- 13.21 Table 13.1 outlines the criteria that will be used to determine receptor sensitivity.

Table 13.1 - Sensitivity/Value of Receptor

Sensitivity/Value of Receptor	Description	Example
High	<p>Attribute with a high quality and rarity, local scale and limited potential for substitution.</p> <p>Attribute with a medium quality and rarity, regional or national scale and limited potential for substitution.</p> <p>Attribute highly sensitive to change.</p>	<p>Examples include:</p> <p>Receiving watercourse classified as High or Good Ecological status/potential under WFD</p> <p>Site protected under EU or UK wildlife legislation (Special Area of Conservation (SAC), Special Protection Area (SPA), Site of Special Scientific Interest (SSSI)).</p> <p>Species protected under EU or UK wildlife legislation</p> <p>Site located within a Groundwater Source Protection Zone (SPZ) inner or outer protection zone (Zone 1), NPPF Flood Risk Vulnerability Classification "Essential Infrastructure" or "Highly Vulnerable"</p> <p>EA current groundwater quantitative and chemical qualities defined as Good</p> <p>Human receptors (construction workers and future residents)</p>
Medium	Attribute with a medium quality and rarity, local	Examples include:

Sensitivity/Value of Receptor	Description	Example
	scale and limited potential for substitution. Attribute reasonably tolerant of change.	Floodplain providing a moderate volume of storage Receiving watercourse classified as Good or Moderate Ecological status/potential under WFD NPPF Flood Risk Vulnerability Classification "More Vulnerable"
Low	Attribute with a low quality and rarity, local scale and limited potential for substitution. Attribute tolerant of modest change.	Examples include: EA current river ecological quality defined as Poor / Bad and chemical quality defined as Fail Floodplain with limited existing development. Receiving watercourse classified as Poor Ecological status/potential under WFD NPPF Flood Risk Vulnerability Classification "Less Vulnerable"
Negligible	Attribute of very limited quality and tolerant of substantial change.	Examples include: Floodplain essentially rural in nature, characterised by agricultural land use NPPF Flood Risk Vulnerability Classification "Water Compatible"

13.22 The magnitude of the change arising as a result of the proposed development will be assessed using the criteria set out in Table 13.2.

Table 13.2 - Magnitude of Impact

Magnitude of Impact	Description	Example
Large	Results in a loss of attribute and/or quality and integrity of the attribute. Following development, the baseline situation is fundamentally changed.	Examples include: Change in ecological and/or chemical qualities of the surface water. Loss of flood storage/increased flood risk. Large change in: <ul style="list-style-type: none"> ▪ water quality of receiving watercourse; ▪ NPPF Flood Risk Vulnerability Classification; ▪ surface water flood risk; ▪ fluvial flood risk;

Magnitude of Impact	Description	Example
		<ul style="list-style-type: none"> ▪ water supply volume; and ▪ foul drainage volume.
Moderate	<p>Results in impact on integrity of attribute, or loss of part of attribute. Following development, the baseline situation is noticeably changed.</p>	<p>Examples include:</p> <p>Contribution of a significant proportion of the effluent in the receiving river, but insufficient to change its qualities.</p> <p>Moderate change in:</p> <ul style="list-style-type: none"> ▪ water quality of receiving watercourse; ▪ NPPF Flood Risk Vulnerability Classification; ▪ surface water flood risk; ▪ fluvial flood risk; ▪ water supply volume; and ▪ foul drainage volume.
Small	<p>Results in some measurable change in attribute's quality or vulnerability. Following development, the baseline situation is largely unchanged with barely discernible differences.</p>	<p>Examples include:</p> <p>Measurable changes in attribute, but of limited extent/duration.</p> <p>Small change in:</p> <ul style="list-style-type: none"> ▪ water quality of receiving watercourse; ▪ NPPF Flood Risk Vulnerability Classification; ▪ surface water flood risk; ▪ fluvial flood risk; ▪ water supply volume; and ▪ foul drainage volume.
Negligible	<p>The impacts are unlikely to be detectable or outside the norms of natural variation.</p>	

13.23 The significance of an effect will be assessed based upon the sensitivity of the receptor and the magnitude of the change using the matrix presented at Table 13.3.

Table 13.3 - Determining Significance of Effect

		Sensitivity of Receptor			
		High	Medium	Low	Negligible
Magnitude of Impact	Large	Substantial	Major	Moderate	Minor
	Moderate	Major	Moderate	Minor	Negligible
	Small	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

13.24 In the absence of 'industry standard' significance criteria for the consideration of hydrology, drainage and flood risk impacts, a qualitative approach, based upon available knowledge, experience and professional judgement, will be employed. The significance criteria that will be used for the purposes of the ES chapter are set out in Table 13.4.

Table 13.4 - Examples of how significance of effect is determined for Hydrology, Drainage and Flood Risk

Significance Level	Significance Level Criteria	Typical Examples
Substantial Beneficial	Substantial improvements at catchment scale associated with sites and features of national or regional importance	Fundamental changes to the regional hydrological regime. Fundamental reduction in volume and/or peak discharge of surface water run-off from the Site. Fundamental improvement in surface water quality. Fundamental changes to flow conveyance and floodplain storage.
Major Beneficial	Major improvements at catchment scale	Fundamental changes to the regional hydrological regime. Fundamental reduction in volume and/or peak discharge of surface water run-off from the Site. Fundamental improvement in surface water quality. Fundamental changes to flow conveyance and floodplain storage.

Significance Level	Significance Level Criteria	Typical Examples
Moderate Beneficial	Improvements at local scale	Moderate changes to the local hydrological regime. Moderate reduction in volume and/or peak discharge of surface water run-off from the Site. Moderate improvement in surface water quality. Moderate changes to flow conveyance and floodplain storage.
Minor Beneficial	Limited improvements at local scale	Some noticeable changes to the local hydrological regime. Some noticeable reduction in volume and/or peak discharge of surface water run-off from the Site. Some noticeable improvement in surface water quality. Some noticeable changes to flow conveyance and floodplain storage.
Negligible	No appreciable impact	No noticeable changes to the local hydrological regime. No noticeable change in volume and/or peak discharge of surface water run-off from the Site. No noticeable changes in surface water quality. No noticeable changes to flow conveyance and floodplain storage.
Minor Adverse	Limited detrimental effects at local scale	Some noticeable changes to the local hydrological regime. Some noticeable increase in volume and/or peak discharge of surface water run-off from the Site. Some noticeable deterioration in surface water quality. Some noticeable changes to flow conveyance and floodplain storage.
Moderate Adverse	Detrimental effects at local scale	Moderate changes to the local hydrological regime. Moderate increase in volume and/or peak discharge of surface water run-off from the Site. Moderate deterioration in surface water quality. Moderate changes to flow conveyance and floodplain storage
Major Adverse	Important detrimental effects at catchment scale which may become key factors in the	Fundamental changes to the regional hydrological regime. Pollution of potable sources of water abstraction. Fundamental increase in volume and/or peak discharge of surface water run-off from the Site.

Significance Level	Significance Level Criteria	Typical Examples
	decision-making process	Fundamental deterioration in surface water quality. Fundamental changes to flow conveyance and floodplain storage.
Substantial Adverse	Substantial detrimental effects at catchment scale associated with sites and features of national or regional importance	Fundamental changes to the regional hydrological regime. Pollution of potable sources of water abstraction. Fundamental increase in volume and/or peak discharge of surface water run-off from the Site. Fundamental deterioration in surface water quality. Fundamental changes to flow conveyance and floodplain storage.

Potential Significant Effects

- 13.25 Construction activities will include the clearance of vegetation, topsoil stripping, establishment of compound areas, excavation and site levelling/re-profiling to create development platforms, preparation of site roads and construction of foundations. Compaction of the ground caused by construction plant and an increase in the extent of impermeable surfaces associated with access roads and compound areas have the potential to impact upon the surface water drainage regime and increase surface water run-off from the site.
- 13.26 Construction activities also have the potential to give rise to the contamination of surface water resulting from spilled hydrocarbons/petrochemicals from construction plant and the mobilisation of silts and contaminants during earthworks operations, potentially leading to increased silt loading in watercourses.
- 13.27 The proposed development will give rise to an increase in the impermeable area within the catchment of the Alledge Brook, thereby increasing surface water run-off during the operational phase. This has the potential to increase flood risk to existing development/infrastructure/third party assets and land downstream of the site.
- 13.28 During the operational phase, there is the potential for the contamination of surface water resulting from the flushing of silts and hydrocarbons from areas of hardstanding.

Potential Cumulative Effects

- 13.29 In accordance with national planning policy, other development schemes within the catchment of the Alledge Brook will be expected to incorporate measures to ensure that development does not increase flood risk elsewhere. Similarly, these other

development schemes will be required to include measures to provide pollution control such that water quality is not adversely affected.

- 13.30 On account of policy requirements, it is envisaged that the proposed development will be categorised as 'nil detriment' in terms of off-site/downstream hydrology, drainage and flood risk related impacts. On this basis, it is highly unlikely that there will be any cumulative effects within the catchment of the Alledge Brook.

Likely mitigation measures

- 13.31 The development proposals will include measures to prevent, reduce and offset significant adverse effects upon hydrology, drainage and flood risk. Being 'built-in' to the proposals from the outset, the assessment of the significance of effects will include consideration of these 'embedded' mitigation measures. This includes adoption of a sequential approach, whereby no build development is proposed within Flood Zones 2 or 3, and the inclusion of a surface water drainage strategy which includes the benefit of an attenuation basin with restricted discharge rates recently constructed centrally within the Development as part of the agreed early-phase surface water mitigation.
- 13.32 Embedded mitigation for the construction phase will consist of a Code of Construction Practice/Construction Environmental Management Plan. Construction phase mitigation measures would be secured through implementation of the measures set out in this document, which could include (but is not limited to) guidance with regards to protecting habitats and species, site set-up and security, off-site and on-site traffic movements, material handling, storage and disposal of waste (including contamination), air quality, noise and vibration, and water resources and flood risk management.
- 13.33 In terms of operational phase mitigation measures, the FRA will set out details of a surface water management strategy. This will be centred upon SuDS measures, which also serve a treatment function, thereby assisting with the management of water quality.

14.0 GROUND CONDITIONS

- 14.1 This chapter of the ES will identify and describe the nature and significance of the effects likely to arise in relation to ground conditions both during construction and the post-construction (or operational) phases. This assessment will be undertaken by Peter Brett Associates LLP, now part of Stantec.
- 14.2 The chapter will set out the existing/baseline conditions, summarise the potential direct and indirect impacts of the Proposed Development, the likely mitigation measures required to prevent, reduce or offset the potential impacts and the residual impacts.
- 14.3 The study area for the ground conditions chapter will incorporate the site area shown on the site location plan included as Appendix 1 plus a buffer of 250m beyond the redline boundary. It is considered that this is the only area that would be affected in terms of ground conditions based on potential sources of contamination and the sensitivity of environmental receptors.

Methodology - Data Sources

- 14.4 The assessment of impacts in respect of geodiversity (geology and geomorphology), land (or ground) stability and land contamination (collectively 'ground conditions') is undertaken in accordance with the methodologies outlined below.
- 14.5 The existing baseline conditions, against which the likely environmental effects of the proposed development are assessed, will be determined through both desk-based reviews of available information and information acquired from site visits and available previous surveys. The baseline condition involves a description of the environment as it is currently and how it is expected to change as a result of the Proposed Development, parts of which have already been commenced and/or completed. Specifically, for a residential led, mixed-use development the potential impact on the site geology with respect to the geological setting, land stability and land contamination is considered.
- 14.6 The following data sources have been consulted to inform the baseline review:
- The 'Geomorphology, Geology, Geotechnical, and Contamination' ES chapter for the site, prepared by Waterman Ltd in July 2007, and submitted as part of the original planning application (KET/2007/0694 & KET/2008/0274).
 - British Geological Survey (BGS) mapping available at 1:50,000 and 1:10,000 scale for the Kettering district.

- Information held on the Peter Brett Associates LLP managed National Natural and Artificial Cavities Database.
- Ground investigations previously carried out on the site as part of ongoing development, including:
 - Site Investigation Report - East Kettering Development - Access E. Ref JN0586-1, 5th June 2014. ST Consult.
 - Site Investigation Report - East Kettering Development - DC2 & R20. Ref JN0586-2, 5th June 2014. ST Consult.
 - Site Investigation Report - East Kettering Development - Access F & Parcels E3, R24 & R25. Ref JN0586-3, 5th June 2014. ST Consult.
 - Site Investigation Report - East Kettering Development - Attenuation Pond. Ref JN0586-4, 5th June 2014. ST Consult.
 - East Kettering Sustainable Urban Extension - Pond 367 Geotechnical Assessment Report Project ref. 25134/3505. August 2015. Peter Brett Associates.

14.7 An updated Land stability and Phase 1 Contaminated Land desk study will be prepared to form the baseline study for the ES chapter and will form a technical appendix. The scope of work will include:

- Acquisition and review of commercially obtained environmental database information from the Landmark Information Group (through the Envirocheck® modular report product);
- A direct enquiry for environmental information to the Environmental Protection Department of Kettering Borough Council; and
- An updated site reconnaissance walkover by a geo-environmental engineer to facilitate direct inspection of the site and the surrounding area for evidence of potentially contaminative past or present land use activities.

LPA / Statutory Consultee Discussions

14.8 Outline planning permission for the Hanwood Park development (previously known as the East Kettering SUE Development) was obtained in March 2010 (KET/2007/0694 & KET/2008/0274). The outline application was supported by an EIA with consideration of ground conditions given in Chapter 10 of the accompanying ES.

14.9 Whilst no recent formal consultations have taken place to-date regarding potential land contamination considerations affecting the site, this would be undertaken as part of the baseline studies and take the form of an enquiry to Kettering Borough Council for environmental information on the site.

Legislation/ Policy

14.10 The Land stability and Phase 1 Contaminated Land desk study and ES chapter will be prepared in accordance with:

- National Planning Policy Framework
- Planning Practice Guidance on the GOV.UK portal for the natural environment, land stability and land contamination
- North Northamptonshire Joint Core Strategy 2011-2031 (Adopted July 2016)
- The emerging Site Specific Kettering Part 2 Local Plan.

14.11 A risk-based approach will be followed for land stability considerations. Following the approach outlined in the updated Kettering Borough Council Contaminated Land Strategy (February 2019) a risk-based approach will also be followed for land contamination considerations.

Assessment of Baseline

14.12 The site predominantly comprises agricultural land crossed by farm tracks with small wooded areas and areas/ parcels of part completed development comprising residential properties, a primary school and associated infrastructure including roads and a surface water attenuation pond.

Geology/ Geodiversity

14.13 The site is shown on British Geological Survey mapping as being underlain by the following strata:

- Superficial Strata
 - Alluvium.
 - Oadby Member (Glacial Till).
- Bedrock Strata (Jurassic aged)
 - Blisworth Limestone Formation.
 - Rutland Formation (including the Stamford and the Wellingborough Limestone Members).
 - Northampton Sand Formation.
 - Whitby Mudstone Formation.

14.14 The Whitby Mudstone outcrops in the lowest lying parts of the site with the overlying strata outcropping successively up slope with the Blisworth Limestone capping the

highest parts of the site. Alluvium is present locally in narrow tracts along the valley floors and the Oadby Member is present only locally on the western side of the site.

14.15 In terms of the hydrogeology of the site, the geological formations present on the site are designated as:

- Principal Aquifer - Blisworth Limestone Formation.
- Secondary A Aquifer - Alluvium, Northampton Sand Formation, Stamford Member, Wellingborough Limestone Member.
- Secondary B Aquifer - Rutland Formation.
- Unproductive Strata - Whitby Mudstone.

14.16 The 2007 ES chapter (for 'ground conditions') did not identify any geological Sites of Special Scientific Interest (SSSI) on or in proximity to the site. Review of the MAGIC website (which provides authoritative geographic information about the natural environment from across the UK government and is managed by Natural England) on 15 August 2019 identifies no geological sites within the red-line site boundary. The closest geological SSSI is approximately 450m to east (of the south-east corner of the site) and is the Cranford St John SSSI (notified in 1986 and comprising a quarry face exhibiting a section of middle Jurassic strata).

14.17 The Alledge Brook (designated as Main River) flows to the south a short distance beyond the eastern development boundary. As part of completed development works on the site, a large surface water attenuation pond has been constructed in the south-east part of the site with outflow from this into a tributary watercourse of the brook.

Land Contamination

14.18 Three current or former farmyards are present within the site at grid references 490556E, 277312N; 490416E, 278034N and 490396E, 276903N and two small infilled former ironstone quarries are present at 490589E, 276710N and 490752E, 277695N). Historically the study site was agricultural land.

14.19 In terms of sites of potential environmental or geological sensitivity, there are no Ramsar Sites, non-geological Sites of Special Scientific Interest, Special Protection Areas, Special Areas of Conservation or National or Local Nature Reserves on or within 500m of the site.

14.20 The 2007 desk study identified no recorded landfill within the site, but '*numerous*' within a 1km radius. The updated baseline study will confirm this through the acquired environmental database report and from direct enquiry to Kettering Borough Council.

14.21 Potential environmental receptors include;

- Human Health
 - Construction/ maintenance workers
 - Future site users; and
 - Neighbouring sites during construction
- Controlled Waters
 - Underlying superficial and bedrock aquifers; and
 - The Alledge Brook and its tributaries
- Ecological Systems
 - In any protected locations such as Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Candidate SACs, RAMSAR sites
- Property in the form of buildings, including heritage assets

Land stability

- 14.22 The previous desk study of the site prepared in 2007 included information sourced from Corus' Property Department regarding the historical Cranford Mines (to the east). These records indicate that whilst underground mining for ironstone in the Northampton Sand Formation occurred in the area it did not extend beneath the site.
- 14.23 The PBA managed artificial (non-coal mining) database has no records of any artificial cavities within the site but identifies a possible old mining area 65m to the east.
- 14.24 The PBA maintained Natural Cavities data base has records of gulls & fissure occurrence in one location, in the south-east corner of the site associated with cambering.
- 14.25 From study of the geology and ground conditions it is considered that the Site is potentially at risk from the following ground instability hazards:
- Gulls and fissures due to valley cambering.
 - Relic shear surfaces - Weakened ground associated with relic shear surfaces is a recognised geotechnical risk on sloping ground associated with the clays of the Whitby Mudstone Formation in Northamptonshire.
Clay Shrinkage and Swelling - Clay soils have been confirmed on site by the ground investigation work associated with all the geological formations present and particularly the Whitby Mudstone Formation.

The Overall Approach to identify & assess affects

- 14.26 The following elements have been **scoped out** of the EIA:

- The effect on statutory or non-statutory sites of geological importance as no sites have been identified in the study area or surrounding area; and
- Impacts on potential mineral resources

14.27 The following elements have been **scoped in** to the EIA:

- Impacts associated with the potential for encountering potentially contaminated ground during the construction phase; and
- Impacts associated with the potential for land or ground instability during the construction and post-construction phase

14.28 The significance of effects will be assessed by considering the sensitivity of receptors (i.e. their importance and ability to tolerate and recover from change) and the likely magnitude of the impact (i.e. its spatial extent and duration). By combining sensitivity and magnitude, the significance of the effect is established.

14.29 Table 14.1 outlines the criteria that will be used to determine receptor sensitivity.

Table 14.1 - Sensitivity/ Value of Receptor

Sensitivity/ Potential Value of Receptor		Examples
High	Human Health	Construction workers; General public access; Occupiers of residential property; Other sensitive developments including Schools and Hospitals.
	Ecology	Special Protection Area, Special Area of Conservation or Ramsar (protected wetland) site or ecological SSSI.
	Surface Water	Water Framework Directive Water Quality High to Good.
	Groundwater	Principal aquifer providing regionally important potable water supply. SPZ1 – Inner Source Protection Zone. Private water supplies for potable use (boreholes, wells or springs).
	Buildings, heritage assets and property	World Heritage site and Scheduled Ancient Monuments.
	Ground Instability	Slope stability or subsidence problems almost certainly present or have occurred in the past. Major constraint on land use.
Medium	Human Health	Workers/ visitors to commercial premises.
	Ecology	National Nature Reserve (NNR).
	Surface Water	Water Framework Directive Water Quality Good to Moderate
	Groundwater	Principal Aquifer supplying locally important water supply. SPZ2 – Outer Protection Zone.

Sensitivity/ Potential Value of Receptor		Examples
		Private water supplies for non-potable use (boreholes, wells or springs).
	Buildings, heritage assets and property	Conservation area.
	Ground Instability	Slope stability or subsidence problems are possibly present or anticipated.
Low	Human Health	Workers/ visitors to industrial premises.
	Ecology	County wildlife site.
	Surface Water	Water Framework Directive Water Quality Moderate to Poor.
	Groundwater	Secondary Aquifer. SPZ3 – Source Protection Zone total catchment.
	Buildings, heritage assets and property	Local value/ historical character. Agricultural land in arable production or pasture land.
	Ground Instability	Slope stability or subsidence problems are not likely to occur but consideration to potential problems should be considered.
Negligible	Human Health	Unoccupied/ limited access.
	Human Health	Unoccupied/ limited access.
	Ecology	Local habitat resource/ no local designation.
	Surface Water	Water Framework Directive Water Quality Poor to Bad.
	Groundwater	Unproductive non-aquifer.
	Buildings, heritage assets and property	Replaceable buildings.
	Ground Instability	Slope stability or subsidence problems are not thought to occur but consideration to potential problems of adjacent areas should be considered.

14.30 The magnitude of the change, either positive or adverse, arising because of the proposed development will be assessed using the criteria set out in Table 14.2.

Table 14.2 - Magnitude of Impact

Magnitude of Impact	Description of Consequence
High	Land Contamination: Soil contamination is considered to pose a very high risk to potential receptors with numerous pollutant linkages certain to be present. Site certain to be or is currently deemed as Part 2A contaminated land and/or considered unsuitable for proposed end use. Ground Instability: Slope stability problems almost certainly present or have occurred in the past. Significant constraint on land use. Ground conditions

Magnitude of Description of Consequence Impact	
	due to the presence of clay soils and/ or adverse foundation conditions require special foundation schemes to be adopted for all building structures.
Medium	Land Contamination: Soil contamination is considered to pose a moderate risk to potential receptors with one or more pollutant linkages present. General remedial works required to make site suitable for proposed end use. Ground Instability: Moderate risk of slope stability problems being present or anticipated. Land use should consider specifically the suitability of the site. Mitigation measures likely to be required to make site suitable for development. Ground conditions due to the presence of clay soils and/ or adverse foundation conditions require special or engineer designed foundation schemes to be adopted locally for low-rise housing and in general for more heavily loaded structures.
Low	Land Contamination: Soil contamination is considered to pose a very low risk to potential receptors with one or more pollutant linkages possibly present. Very localised and small scale remedial works may be required on small areas of the site to make site suitable for proposed end use. Ground Instability: Slope stability problems are not likely to occur but potential problems of adjacent areas impacting on the site should be considered. Ground conditions are suitable for the general adoption of conventional foundation schemes for low rise development but may require engineer designed foundation schemes for more heavily loaded structures.
Negligible	Land Contamination: Soil contamination is not present or if slightly elevated levels are recorded no remedial works likely to be required to make site suitable for proposed end use. Ground Instability: Slope stability problems are not thought to occur on or within influencing distance of the site. Ground conditions are suitable for the general adoption of conventional high-level foundation schemes for the entire development.

14.31 The significance of an effect will be assessed based upon the sensitivity of the receptor and the magnitude of the change using the matrix presented at Table 14.3.

Table 14.3 - Determining Significance of Effect

Magnitude of Impact	Sensitivity of Receptor			
	High	Medium	Low	Negligible
High	Substantial	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

- 14.32 In the absence of 'industry standard' significance criteria for the consideration of ground conditions impacts, a qualitative approach, based upon available knowledge, experience and professional judgement, will be employed. The significance criteria that will be used for the purposes of the ES chapter are set out in Table 14.4.
- 14.33 Following the determination of impact significance, the overall effect significance is reported as either 'Significant' or 'Not Significant'. Where impact significance is assessed as negligible or minor, the overall effect is Not Significant. Where the impact significance is assessed as moderate, major or severe, the overall effect is Significant.

Table 14.4 - Example Guidelines for the Assessment of Significance for 'Ground Conditions'

Significance Level	Description of Consequence
Negligible	Land Contamination: No appreciable environmental risk to water resources, aquatic flora and fauna and humans. Any very low negative effects are reversible. Ground Instability: No effects on ground instability.
Minor Adverse	Land Contamination: Temporary and minor environmental risk to surface water resources, aquatic fauna, flora or air quality. No appreciable risk to humans (construction workers or end users). Ground Instability: Minor (non-structural) damage to building fabric (brickwork / building finishes). Some continued maintenance required to all hardstanding areas. Development will cause localised and very minor slope instability.
Moderate Adverse	Land Contamination: Local environmental hazard to water resources, aquatic fauna and flora, and/ or humans (construction workers and/ or end users) requiring monitoring and local remedial work. Ground Instability: Non-structural damage to buildings but repair requiring services of builder. Weather-tightness of buildings impaired. Loss of functionality of floor slabs. Local damage to service pipes. Some loss of serviceability of roads/ footways requiring repair/ local replacement. Development will cause localised slope instability.

Potential Significant Effects

- 14.34 Details of the Construction phase of the project are not known at this stage, but it has been assumed that the following will occur in accordance with normal development of residential and commercial property and construction / installation of associated infrastructure:

- Where locally required, demolition of existing buildings and structures;
- Site clearance and preparation;
- Groundworks;
- Earthworks;

- Construction of residential and other buildings;
- Installation of underground services, including water supply, sewerage, gas supply, electric and telecommunication services;
- Construction of key highway infrastructure and other estate roads; and
- Landscaping works to areas of public open space.

14.35 Details of any regrading earthworks that may be required to create development parcels are not known at this stage. The development will require the excavation of the near surface topsoil and subsoils and possibly the reuse of excavated subsoils to create development platforms and the construction of roads, utilities and foundations. This will disturb and cover the near surface geology over those parts of the Site where physical development is proposed.

14.36 It has again been assumed that the following activities will occur during the operational phase of the development:

- Occupation of residential dwellings.
- Use of public areas and open spaces.
- Maintenance of public highway and drainage facilities.
- Landscape maintenance of areas of public open space.
- Extensions and minor building works to buildings.

Potential Cumulative Effects

14.37 The 2007 ES Chapter that considered 'ground conditions' (encompassing geomorphology, geology, geotechnical and contamination) identified *"..no cumulative likely significant effects with regard to geotechnical and contamination issues in the context of the existing geomorphology and geology in the short or long term resultant from the Project.."*

14.38 The potential cumulative effects of the Project will be reviewed in the context of current proposals for development of other nearby sites that are either under construction or currently within the planning process (see Section 1 of this Report).

Likely Mitigation Measures

14.39 There are a series of embedded mitigation measures that will be incorporated into the development with respect to 'ground conditions' as part of the planning and design process. These include planning controls, statutory building regulation controls and best practice engineering design in accordance with current British Standards and, for residential development, bespoke industry technical standards produced by the National House Building Council (NHBC).

- 14.40 As part of the planning process, Building Regulations and for residential development warranty purposes, additional future intrusive ground investigation works will be undertaken. Phase 2 intrusive site investigation to inform a Tier 2 risk assessment will be undertaken as part of the planning and development process to determine whether there are any unacceptable risks to people, property of the environment associated with the natural geology or past land use history of the site. The investigation will seek to confirm the geological and conceptual site model prepared as part of the Phase 1 desk study works and include (as required) targeted investigation, sampling and monitoring as required of any potential sources of contamination identified. Geotechnical site investigations will also be undertaken as part of the development process to inform foundation and infrastructure design.
- 14.41 Further likely mitigation measures to be applied to the development to prevent, avoid or reduce significant effects to ground conditions related environmental receptors include:
- Implementation of a Construction Environmental Management Plan (CEMP).
 - Earthworks to be completed in accordance with a CL:AIRE compliant Materials Management Plan (MMP).
 - Soil management operations to be generally in accordance with relevant guidance and best practice guidance documents.
 - Construction works to be completed in accordance with relevant guidance and best practise guidance documents to limit environmental impact during construction.
- 14.42 The EIA for Ground Conditions will be presented as a chapter within the ES, with the baseline (Land instability and Phase 1 Contaminated land desk study report) study included as a technical appendix.

15.0 WASTE

- 15.1 The following insignificant effects have been identified and therefore waste will not be considered further within the EIA or reported in the ES. A factual evidence base has been provided below to support this. This section of the Report has been prepared by Peter Brett Associates LLP, now part of Stantec.
- 15.2 In addition, a waste strategy will be submitted with the outline planning application setting out primary mitigation for the management of waste during the construction and operational phases. As part of this exercise, consultation will also be undertaken with the waste collection department at Kettering Borough Council (KBC).

Methodology - Data Sources

- 15.3 PBA, now part of Stantec, will produce a Waste Strategy to accompany the planning application. Information on how waste will be managed, stored, and collected from the site will be provided within the Waste Strategy submitted as part of the planning application.
- 15.4 Northamptonshire Minerals and Waste Local Plan will be used to inform the waste strategy of waste management, capacity, and facilities in the region.

LPA/Statutory Consultation Discussions

- 15.5 Consultation will be carried out with the relevant team at the Council, in order to determine if all relevant policy and guidance in relation to waste have been considered. Liaison will also be carried out to confirm collection frequency as well as to agree the methodology.

Legislation/ Policy

National Policy

The European Revised Waste Framework Directive (2008/98/EC)

- 15.6 This sets the framework for UK Waste Policy. The Waste Hierarchy (**Figure 1**) runs throughout this policy and ranks waste management options according to what is best for the environment.

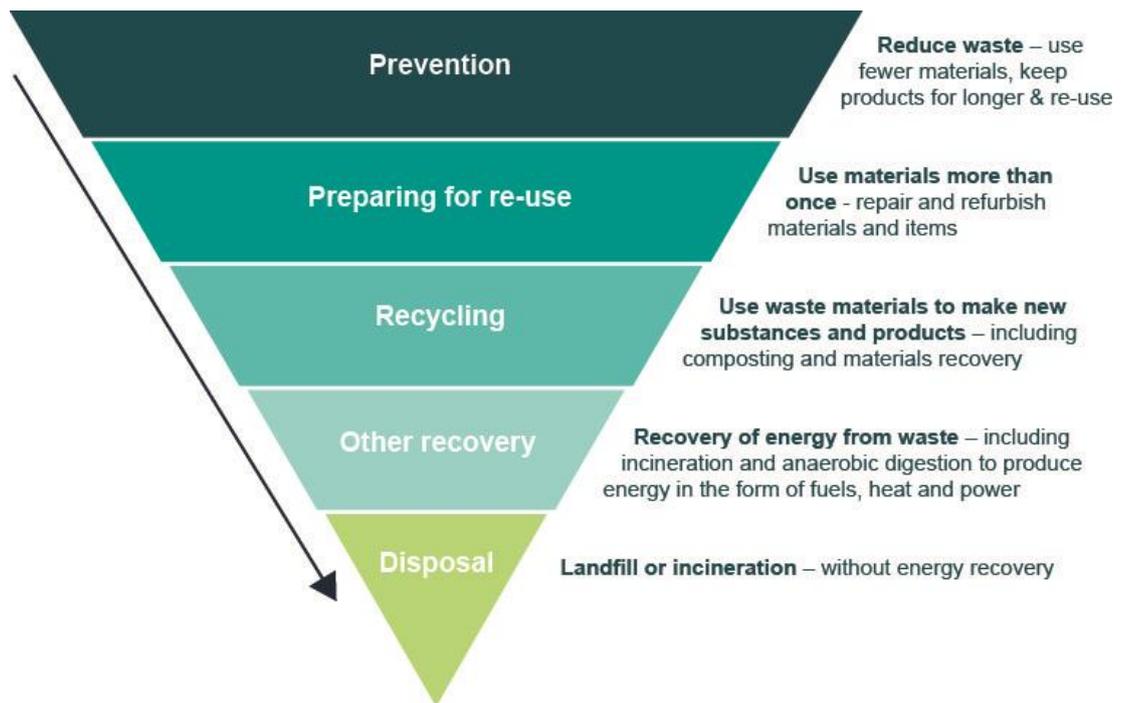


Figure 15.1 - Waste Hierarchy, Defra 2013.

The Waste (England and Wales) (Amendment) Regulations 2014

15.7 These Regulations place a duty on waste producers and all handlers of waste to manage waste in accordance with a hierarchy of options where this achieves the best overall environmental outcome. Therefore, as a producer, the operator/residents of this development must endeavour to reduce, sort and separate waste – for example, by separating the recyclable from the non-recyclable waste - before placing out the residual waste for disposal (or potentially energy recovery).

15.8 These Regulations also aim to improve the quality and quantity of material being collected for recycling. They do this by placing a duty on waste collectors, to enable recyclable material (particularly glass, paper, plastics and metal), to be collected separately, where it is necessary to support the recovery of high-quality recyclables, and where this is technically, environmentally or economically practicable (TEEP). Although this duty is specifically on the collectors of waste, it is important for any new development to consider the logistical impacts of separating out these materials.

Our Waste, Our Resources: A Strategy for England (2018)

- 15.9 This Strategy assists the Government's commitment set out in the 25 Year Environment Plan, to leave the environment in a better condition for the next generation. This Strategy reaffirms the UK's commitment to the waste hierarchy and introduces the circular economy concept in relation to waste. The circular economy model encourages the recycling of resources through recovering and regenerating products and materials to keep resources in use for longer.
- 15.10 This Strategy highlights the Government's ambitious plans in relation to food waste. Households produce approximately 7 million tonnes of food waste is produced annually, of which 5 million tonnes is categorised as edible. '*Reducing greenhouse gas emissions from landfill by ensuring that every householder and appropriate businesses have a weekly separate food waste collection*'.

Local Policy

Adopted North Northamptonshire Joint Core Strategy – Part 1 Local Plan

- 15.11 The Core Strategy was adopted on 14th July 2016. The vision for the Strategy is for North Northamptonshire to set an example for construction-based innovation and low carbon growth. The area is recognised for its safe, healthy, affordable, and attractive location. In order to secure infrastructure and services and meet daily needs, development requires necessary connections to the wider environment, such as in terms of waste. The following policies are in relation to waste:
- Policy 10 - Provision of Infrastructure states that development should seek measures to limit the need for additional/expanded waste infrastructure.

- 15.12 The development plan for North Northamptonshire also includes The Minerals and Waste Local Plan, which is used as a basis for the assessment of waste and explored further in this scoping chapter. It is recognised in the Core Strategy that the Local Plan requires maximising the use of recycled aggregates.

The Part 2 Local Plan for Kettering

- 15.13 Part 2 of the Local Plan includes site specific proposals, for areas within the borough of Kettering. The document is currently in draft for consultation stage, which is to be adopted in September 2020. The Plan will cover the period 2011-2031 and take into account the NPPF and PPG advice.

Assessment of Baseline

- 15.14 A desk-based review of the Site and its surroundings has been undertaken to determine the baseline conditions in relation to waste.
- 15.15 The site lies within the administrative boundary of KBC and Northamptonshire County Council (NCC). KBC is the waste collection authority, responsible for the household waste in their respective areas and NCC is the disposal authority responsible for the safe disposal of household waste collected by the district and borough councils.
- 15.16 Operational waste collection in Kettering consists of an alternate weekly waste and recycling collection service. Residents are provided with four waste containers: a 140L (1-2 bedroom) or 190L (3+ bedroom) black bin for residual domestic waste, a 240L blue bin for recycling (paper and card, foil, glass bottles and jars, metal cans and aerosols, cartons, plastic bottles and containers), a 55L red box for paper only, and a 240L grey/green bin for garden waste.
- 15.17 KBC provides a commercial waste and recycling service. This includes the provision of 240L, 660L, and 1100L containers for the specific commercial needs. An 80L sack or label collection is also offered.

Potential Significant Effects

Impact to human health and ecological receptors as a result of waste generated from construction activities.

- 15.18 The construction waste stream is temporary in its nature and will be managed on site and disposed of at nearby licenced waste disposal facilities. As a result, relevant human health and ecological receptors are not affected by the construction waste directly. In addition, all waste management facilities associated with commercial waste streams such as construction will have already been subjected to environmental planning requirements and environmental permitting. These are therefore already controlled by regulatory procedures.
- 15.19 During construction, cut and fill requirements have been assessed and it is likely that excess material will be used on site during site levelling and preparation. There is also no known contamination identified on the site. There will therefore be no requirements to remove large quantities of inert or hazardous waste off site.
- 15.20 Additionally, infrastructure and construction have commenced and will be completed over a number of years, with end build estimated for 2031. Therefore, disposal of any residual construction waste will be low over the build out period.
- 15.21 There may be indirect effects associated with waste management concerning traffic, noise, and air quality issues which will be considered in other technical sections of this scoping report.

Impact to human health and ecological receptors as a result of waste generation from operational activities

- 15.22 The proposed development primarily consists of residential land uses, which are unlikely to produce hazardous materials during operation. The operational waste streams will be managed on-site and disposed of at nearby waste disposal facilities where appropriate materials will be reused or recycled in accordance with the waste hierarchy (Northamptonshire Minerals and Waste Local Plan, 2017).
- 15.23 As a result, relevant human health and ecological receptors are not affected by the operational waste directly but may be affected through the transportation of such materials considered in other technical sections of the EIA Scoping Report.
- 15.24 The Northamptonshire Minerals and Waste Local Plan identifies an indicative capacity gap for several types of waste, such as non-inert landfill and inert recycling. A spatial strategy for waste management will be developed for Northamptonshire. A number of waste management facilities are proposed to provide treatment of waste in the county.

Potential Cumulative Effects

- 15.25 Cumulative effects are scoped out as this is considered within The Northamptonshire Minerals and Waste Local Plan, which provides evidence for the waste strategy we have proposed. Local planning considerations such as the natural environment, have been addressed as part of The Plan. An environmental assessment of The Plan has also been conducted.

Likely mitigation measures

- 15.26 Primary mitigation for the management of waste during construction and operation will be included within the waste strategy. Waste management principles will be set out and are guided by the waste hierarchy (**Figure 15.1**). This can be secured by condition on any permission for the Proposed Development as on the previous permissions (e.g. KET/2008/0274 and KET/2015/0967), which included a waste audit and waste management facilities strategy approved in 2013.

16.0 CLIMATE CHANGE

16.1 This chapter of the ES will identify and describe the nature and significance of the effects likely to arise in relation to climate change. In accordance with the EIA Regulations and the Institute of Environmental Assessment (IEMA) guidance documents (IEMA 2015 and IEMA 2017), a climate change assessment should consider the likely significant environmental effects in relation to the impact of the Proposed Development on climate change and the impact of climate change on the development. This chapter and assessment will be prepared by Peter Brett Associates LLP, now part of Stantec.

Methodology – data sources

16.2 The assessment approach that will be utilised in the climate change ES chapter has been developed to fulfil the requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017. The assessment method has also drawn upon guidance from IEMA.

16.3 In accordance with this guidance, the assessment will consider likely significant environmental effects in relation to the impact of the development on climate change and the impact of climate change on the development from a qualitative perspective.

Impact of the Proposed Development on Climate Change

16.4 An initial high-level review of the potential impact of the proposed development on climate change has been undertaken to develop the methodology for this assessment. The assessment will adopt emission boundaries (i.e. scope of the emissions) that align with the World Business Council for Sustainable Development (WBCSD) / World Resources Institute (WRI) Greenhouse Gas Protocol (WBCSD and WRI, 2019) and British Standards Institution (BSI) PAS 2050 (BSI, 2011) methodology and consider both the construction and operation stages of the proposed development.

16.5 The GHG Protocol categorises direct and indirect emissions into three broad scopes:

- **Scope 1:** all direct GHG emissions;
- **Scope 2:** indirect GHG emissions from consumption of purchased electricity, heat or steam; and
- **Scope 3:** other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not

owned or controlled by the reporting entity, electricity-related activities not covered in Scope 2, outsourced activities, waste disposal, etc.

- 16.6 IEMA guidance on the assessment of the impact on climate change emphasises the need for proportionality in the context of national, sector and local GHG emissions. The guidance recognises that qualitative assessments are acceptable, particularly where mitigation measures are agreed early on in the design stage. These will be outlined within the ES. Emissions associated with the proposed development will be minimal against the national, sector and local emissions inventories, and therefore a qualitative approach is appropriate for this assessment.

Impact of Climate Change on the Proposed Development

- 16.7 The climate baseline conditions for the site have been informed by UK Climate Projections 2018 (UKCP18) produced by the UK Met Office (Met Office, 2018). UKCP18 builds upon the previous projections to provide information on how the climate of the UK may change over the rest of this century. This information will be considered to identify the likely changes to climate to describe the future, emerging baseline and to qualitatively assess the likely significant effects of climate change on the proposed development.
- 16.8 UKCP18 uses Representative Concentration Pathways (RCPs) to develop projections and consider factors such as economic activity, population growth and land use change, which will result in a different range of global mean temperature increases until 2100. The four RCPs are set out in Table 16.1 below.

Table 16.1 - Increase in global mean surface temperature averaged over 2081-2100 compared to the pre-industrial period for the RCPs.

RCP	Change in Temperature (°C) by 2081-2100
2.6	1.6 (0.9-2.3)
4.5	2.4 (1.7-3.2)
6.0	2.8 (2.0-3.7)
8.5	4.3 (3.2-5.4)

- 16.9 RCP6.0 is a medium scenario where emissions stabilize due to the application of mitigation for reducing GHG emissions. This is considered the most appropriate scenario for assessing the impact of climate change on the proposed development. The assessment will therefore utilise the probabilistic projections and scenario RCP6.0 for the 25 km grid cell within which the site is located (487500, 287500). A review of the following data from this data set will be undertaken:

- Average Summer Precipitation (% change);

- Average Winter Precipitation (% change);
- Average Annual Precipitation (% change);
- Maximum Average Summer Temperature;
- Minimum Average Winter Temperature; and
- Annual Mean Temperature.

16.10 The climate projections described above will be considered alongside the design information available and embedded mitigation to identify the vulnerability and resilience of the proposed development to climate change.

LPA/ Statutory Consultee discussions

16.11 The Senior Development Officer at KBC provided initial advice regarding the scope of the ES via email on the 7th December 2018. His comments regarding climate change within the ES included the consideration of:

- Impact of the development on the climate e.g. emissions (particularly greenhouse gases), weather impacts; and
- Adaptation strategy for heat, drought, cold, snow and heavy rains/flash flooding.

Legislation /Policy

Town and Country Planning (Environmental Impact Assessment) Regulations

16.12 Schedule 4 to the 2017 EIA Regulations requires an ES to include:

'4. A description of the factors specified in regulation 4(2) likely to be significantly affected by the development...climate (for example greenhouse gas emissions, impacts relevant to adaptation)

5. A description of the likely significant effects of the development on the environment resulting from:

(f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;'

Climate Change Act

16.13 The Climate Change Act 2008 established the context for Government action, incorporating a requirement to undertake climate change assessments and develop a National Adaptation Programme (NAP) to address the opportunities and risks from climate change.

16.14 In July 2019, an amendment to change the target of net UK carbon emissions for the year 2050 from 80% to 100% lower than the 1990 baseline was made.

National Planning Policy Framework

- 16.15 In terms of planning, addressing climate change is one of the core land use planning principles which the National Planning Policy Framework (NPPF, 2019) expects plan-making and decision-taking to underpin. It recognises that planning plays a key role in minimising vulnerability, providing resilience and managing the risks associated with climate change.
- 16.16 Paragraph 150 states that new development should be planned for in ways that:
- "a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and*
- b) can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards."*

North Northamptonshire Joint Core Strategy 2011-2031

- 16.17 The Joint Core Strategy is the strategic Part 1 Local Plan for Kettering. Adapting to future climate change is a key theme throughout the Plan. Policies to help achieve this outcome are:
- Policy 1 – Presumption in favour of Sustainable Development
 - Policy 4 – Biodiversity and Geodiversity
 - Policy 5 – Water Environment, Resources & Flood Risk Management
 - Policy 8 – North Northamptonshire Place Shaping Principles
 - Policy 9 – Sustainable Buildings
 - Policy 19 – The Delivery of Green Infrastructure
 - Policy 20 – The Nene and Ise Valleys
 - Policy 21 – Rockingham Forest
 - Policy 25 – Rural Economic Development and Diversification
 - Policy 26 – Renewable and Low Carbon Energy

Site Specific Part 2 Local Plan - Draft Plan

- 16.18 The draft Site Specific Part 2 Local Plan was published for consultation in June 2018. When adopted the SSP2 will form part of the Development Plan for KBC. The Plan

supports the vision of adaptability to future climate change as set out in the Joint Core Strategy. Policies to help achieve this outcome are:

- Policies ENV01 and ENV03 - which identify Borough Green Infrastructure corridors and Local Green Space; and
- Policy TCE6 - which seeks to protect and enhance local services and facilities.

Guidance

16.19 The Institute of Environmental Management and Assessment (IEMA) has published two documents:

- 'EIA Guide to Climate Change Resilience and Adaptation' (IEMA, 2015) which provides a framework for the effective consideration of climate change resilience and adaptation in the EIA process. This guidance states that the scoping of a project, taking into account climate change, should focus on general considerations rather than detailed, quantitative analysis; and
- 'EIA Guidance on assessing greenhouse gas emission and significance.' (IEMA, 2017) places the significance of GHG emissions within the context of national and sector emissions, as well as sets out proportionality of undertaking climate change assessments when considering that context.

Assessment of Baseline

Current Baseline Data

16.20 The main findings from the UKCP18 Science Overview Report (Lowe et al, 2019) are as follows:

- Observations for the UK show that the most recent decade (2008-2017) has been on average 0.3 °C warmer than the 1981-2010 average and 0.8 °C warmer than 1961-1990. All of the top ten warmest years have occurred since 1990; and
- In the past few decades there has been an increase in annual average rainfall over the UK. However, natural variations are also seen in the longer observational record.

16.21 Historic climate averages during the period 1981-2010 for the Midlands, obtained from the Met Office website (Met Office, 2019), indicates the following:

- Average annual maximum daily temperature was 13.4°C;
- Warmest month on average was July (mean maximum daily temperatures of 21.1°C);

- Coldest month on average was February (mean minimum daily temperature of 0.8°C);
- Average total annual rainfall was 798.3 mm;
- Wettest month on average was October (82 mm of rainfall on average for the month); and
- Driest month on average was February (54 mm of rainfall on average for the month).

Future Baseline Data

16.22 Figures 16.1-16.6 in Appendix 7 show the projections for average summer, winter and annual precipitation, maximum average summer temperature, minimum average winter temperature and annual mean temperature using probabilistic projections and scenario RCP6.0.

16.23 The figures suggest that the following central estimates (50th percentile) can be expected in 2099:

- Warmer, drier summers with an increase of 5.4 °C to the maximum temperature and decrease of 35% precipitation;
- Milder, wetter winters with an increase of 3.1 °C to the minimum temperature and 19% precipitation; and
- An increase in annual average temperature of 3.5 °C and decrease in annual average precipitation of 4%.

The overall approach

16.24 Likely significant effects will be identified through the approach set out in the methodology section above. There is no nationally adopted method for assessing and determining significance of climate change impacts within EIA. The assessment approach will therefore draw upon guidance from IEMA (IEMA, 2015 and IEMA, 2017). This includes the consideration of whether the effect is temporary or permanent and in the context of national, sector and local scales.

16.25 Effects that are described as 'minor' or 'negligible' are determined to be 'Not Significant', and effects that are described as 'moderate', 'major' or 'substantial' are determined to be 'Significant'. Table 16.1 sets out the significance criteria that will be used in this assessment.

Table 16.2 - Significance Criteria

	Level of Effect	Criteria
Significant	Substantial	These effects are assigned this level of significance as they represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites and features of national or regional importance. A change at a district scale site or feature may also enter this category.
	Major	These effects are likely to be important considerations at a local or district scale and may become key factors in the decision-making process.
	Moderate	These effects, while important at a local scale, are not anticipated to be key decision-making issues.
Not significant	Minor	These effects may be raised as local issues but are unlikely to be of importance in the decision-making process.
	Negligible or No Effect	Either no effect or effect which is beneath the level of perception, within normal bounds of variation or within the margin of forecasting error. Such effects should not be considered by the decision-maker.

Potential Significant Effects

Impact of the Proposed Development on Climate Change

16.26 Potential activities associated with the proposed development likely to impact climate change, based on their potential to emit GHG emissions, are outlined in Table 16.3 below.

Table 16.3 - GHG Emission Sources

Stage of Development	GHG Protocol / PAS 2050 Scope	Example Activity
Construction	Scope 1	Enabling activities, land clearance and construction processes such as emissions resulting from the combustion of fuels in the applicant's owned/controlled vehicles, plants or equipment used for construction of the proposed development.
	Scope 2	Emissions associated with electricity needed for plant and welfare facilities.
Operation	Scope 1	Emissions associated with directly burning fossil fuels on site, such as heating in proposed buildings and transport.
	Scope 2	Emissions associated with purchased electricity from the national grid during operation of the proposed development.

16.27 On this basis, the information above will be scoped into the qualitative GHG assessment.

16.28 Indirect Scope 3 emissions associated with, for example, waste disposal and the production of purchased materials or fuels, have been scoped out of this assessment

as it is not considered proportionate to the proposed development within the context of the EIA.

Impact of Climate Change on the Proposed Development

- 16.29 The proposed development may be vulnerable to future climate conditions. Potential significant effects relate to high temperatures and heat waves, extreme precipitation events, water shortage in drought conditions and other extreme weather events which could result in adversely affects during the construction and/or operation of the proposed development.
- 16.30 There is also the potential for climate change, in particular changes to seasonal patterns, to exacerbate the effects on environmental receptors to an extent that a new or previously identified effect becomes significant. These are referred to as in-combination climate change impacts.

Potential Cumulative Effects

- 16.31 Other existing and approved developments in the surrounding area, as set out in section 1, Paragraph 1.8, will be reviewed in order to consider cumulative effects.

Likely Mitigation Measures

- 16.32 During the master planning stage of the project (see Strategic Master Plan), the designers and project team have considered, and will continue to do so, design features which could and would contribute to providing appropriate resilience to climate change. This includes the incorporation of sustainable urban drainage systems (SuDS), drought tolerant green infrastructure, public open space and well-connected services and facilities to reduce reliance on cars.

17.0 CONCLUSION

- 17.1 A concise concluding chapter of the ES will summarise the main effects of the Proposed Development, identify any significant effects transcending the assessed topics and determine the overall balance between adverse and beneficial effects.

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19.0 GLOSSARY

ANPR	Automatic Number-Plate Recognition - a technology that uses optical character recognition on images to read vehicle registration plates, used to understand vehicle movement.
ATC	Automatic Traffic Counter – a loop-counter based traffic data collection system.
DMRB	Design Manual for Roads and Bridges - Highways England’s design guidance.
FTP	Framework Travel Plan - the overarching document that sets out a framework of travel plan measures for a series of occupiers, such as at symmetry park. It is one of a range of measures designed to reduce car use, setting out a series of transport interventions to encourage sustainable travel options typically for an organisation or occupier.
HE	Highways England (formerly operating as the Highways Agency) – the Strategic Highway Authority.
HV	Heavy Vehicles – all motorised vehicles in excess of 3.5t.
IEMA	Institute of Environmental Management and Assessment.
KBC	Kettering Borough Council – the Local Planning Authority.
Mitigate	to reduce the severity – in terms of this assessment, the measures implemented to reduce the impact of the additional development traffic.
NCC	Northamptonshire County Council – the Local Highway Authority.
NPPF	National Planning Policy Framework.
NSTM	Northamptonshire Strategic Transport Model – NCC’s local area transport model.
TA	Transport Assessment - a comprehensive review of transport issues relating to a Proposed Development, submitted in support of a planning application.
TEMPRO	Trip End Model Presentation PROgram - Highways England’s traffic growth forecast database.
Travel Demand	transport interventions to encourage sustainable travel options and to Management help people reduce their need to travel especially by car.
TRICS	Trip Rate Information Computer System – a database of trip rates for developments used in the United Kingdom for transport planning purposes, specifically to quantify the trip generation of new developments.

APPENDIX 1: SITE LOCATION PLAN

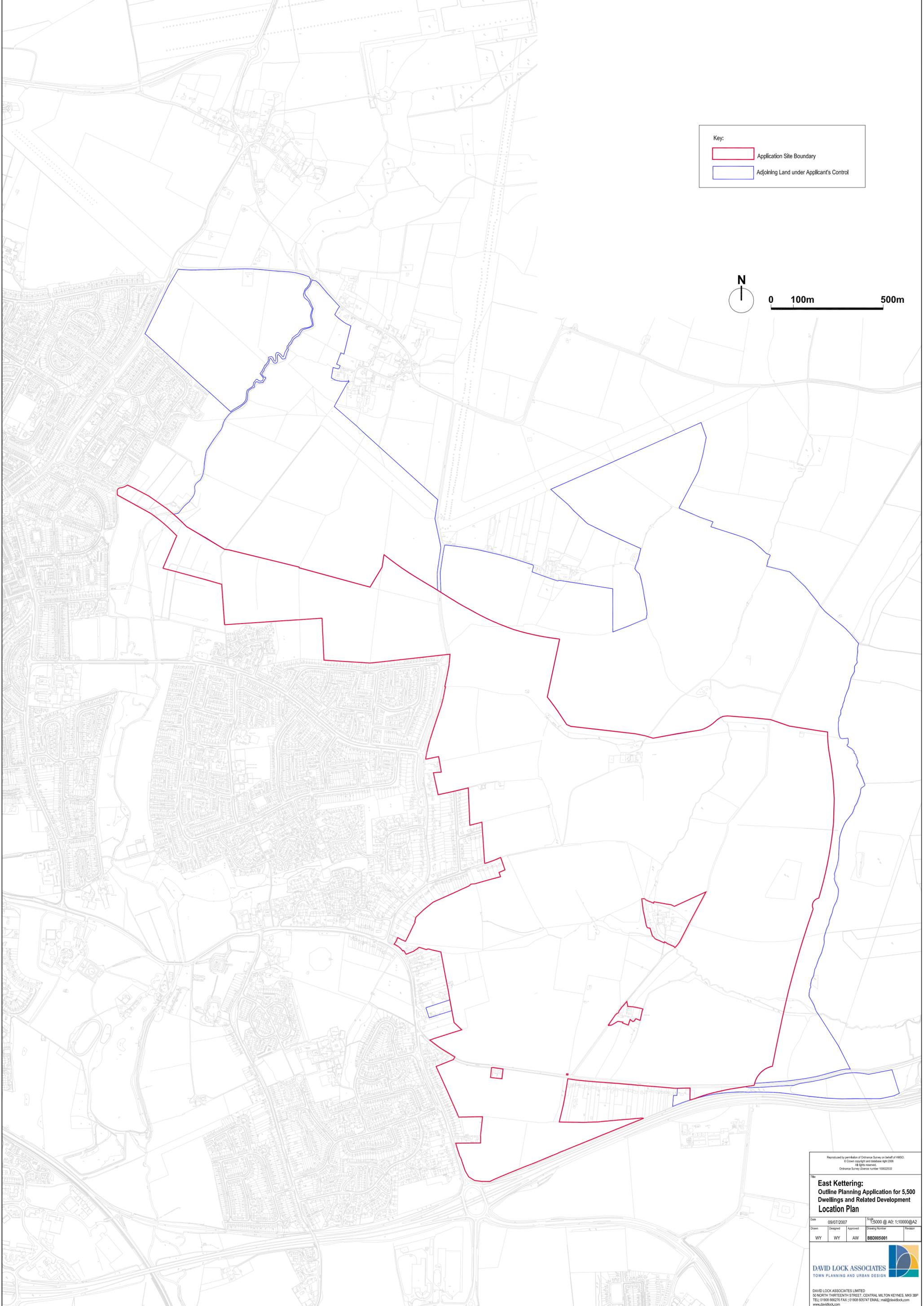
Key:

- Application Site Boundary
- Adjoining Land under Applicant's Control

N



0 100m 500m

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**East Kettering:
Outline Planning Application for 5,500
Dwellings and Related Development
Location Plan**

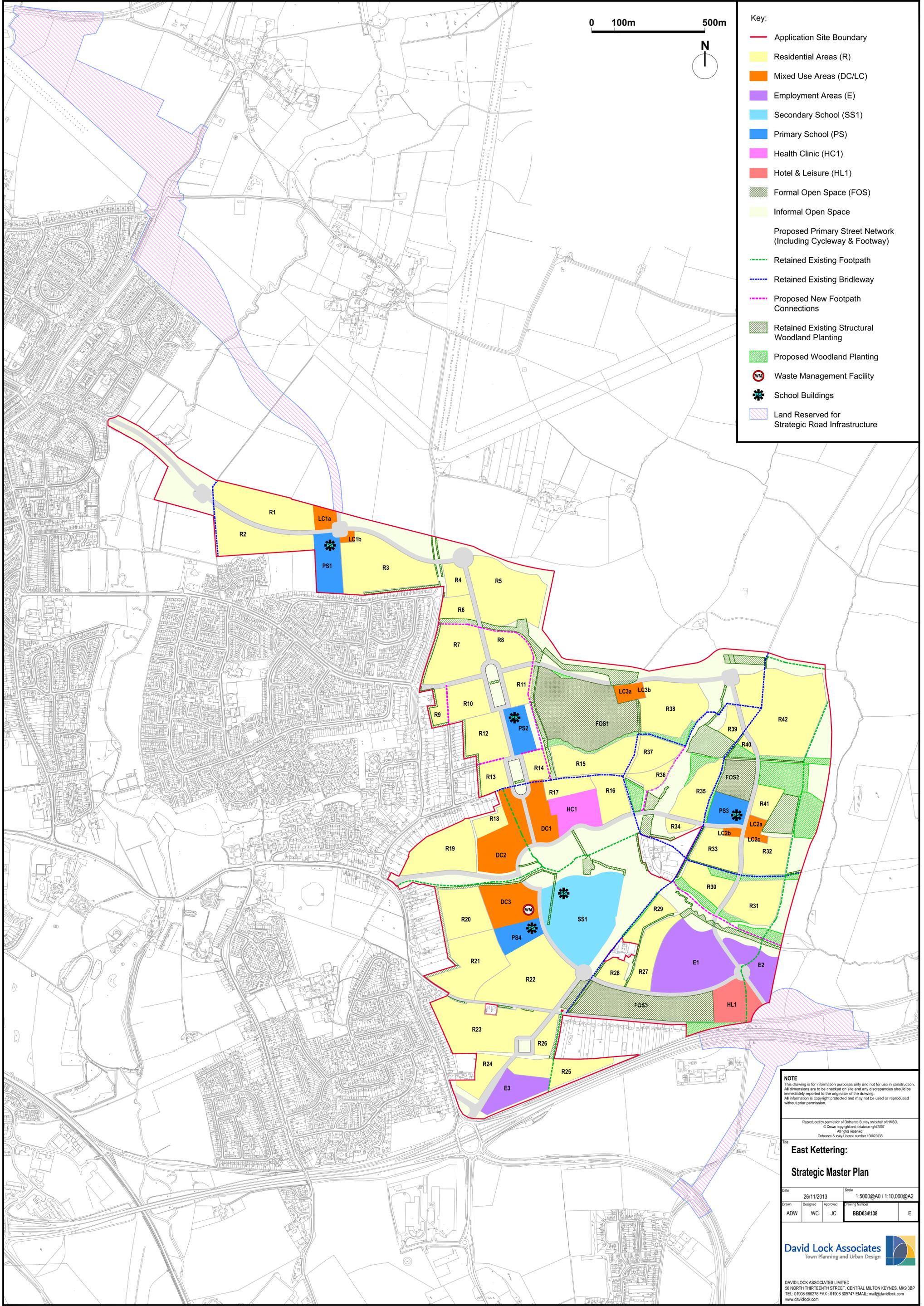
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APPENDIX 2: STRATEGIC MASTERPLAN



- Key:**
- Application Site Boundary
 - Residential Areas (R)
 - Mixed Use Areas (DC/LC)
 - Employment Areas (E)
 - Secondary School (SS1)
 - Primary School (PS)
 - Health Clinic (HC1)
 - Hotel & Leisure (HL1)
 - Formal Open Space (FOS)
 - Informal Open Space
 - Proposed Primary Street Network (Including Cycleway & Footway)
 - Retained Existing Footpath
 - Retained Existing Bridleway
 - Proposed New Footpath Connections
 - Retained Existing Structural Woodland Planting
 - Proposed Woodland Planting
 - WM Waste Management Facility
 - ✿ School Buildings
 - Land Reserved for Strategic Road Infrastructure

NOTE
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APPENDIX 3: LAND USE SCHEDULE

Land Use Schedule

East Kettering:

Outline Planning Application for 5,500 dwellings and Related Development

Summary Land Use Budget

	Size (ha)	Dwellings (units)	Non-residential Floorspace (sqm)
Residential Areas	145.0	5,170	
District Centre	11.4	265	28,000
Local Centres	3.1	65	3,100
Employment Areas	14.0		42,400
Secondary School	11.0		13,500
Primary Schools	9.0		12,000
Health Clinic	3.0		12,000
Hotel and Leisure	3.1		8,300
Formal Open Space	21.3		
Informal Open Space	85.9		
Primary Infrastructure	21.7		
Total	328.5	5,500	119,300

Detailed Land Use Budget

-- Residential Areas

Parcel	Size (ha.)	Use	Quantum (dw.)	Net Density (dw./ha)	Phase
R1	5.9	Residential	177	30	2
R2	5.2	Residential	156	30	2
R3	7.8	Residential	230	30	2
R4	1.3	Residential	52	40	2
R5	7.7	Residential	308	40	2
R6	1.4	Residential	56	40	2
R7	5.5	Residential	220	40	1
R8	2.8	Residential	112	40	1
R9	1.0	Residential	29	29	1
R10	2.8	Residential	129	46	1
R11	1.8	Residential	90	50	1
R12	3.4	Residential	156	46	1
R13	1.6	Residential	74	46	1
R14	1.3	Residential	65	50	1
R15	4.6	Residential	184	40	2
R16	2.7	Residential	86	32	2
R17	1.8	Residential	58	32	1
R18	1.2	Residential	49	41	1
R19	4.7	Residential	193	36	1
R20	4.1	Residential	168	41	1
R21	6.1	Residential	250	41	1
R22	8.8	Residential	361	41	1
R23	8.4	Residential	269	32	1
R24	2.1	Residential	75	36	1
R25	3.5	Residential	117	33	1
R26	1.1	Residential	39	35	1
R27	2.9	Residential	102	35	2
R28	1.2	Residential	36	30	2
R29	1.7	Residential	51	30	2
R30	2.4	Residential	72	30	2
R31	3.9	Residential	117	30	2
R32	3.1	Residential	121	39	2
R33	3.0	Residential	120	40	2
R34	0.6	Residential	15	25	2
R35	3.3	Residential	99	30	2
R36	1.2	Residential	29	24	2
R37	2.4	Residential	60	25	2
R38	5.9	Residential	177	30	2
R39	1.0	Residential	25	25	2
R40	0.3	Residential	11	35	2
R41	1.5	Residential	53	35	2
R42	12.0	Residential	379	32	2
Total	145.0		5,170	36.0	

Note 1: See Parameters Plan: D - Housing Density for parcel locations.

Note 2: 'Net' is as defined in Annex B of *PPS3: Housing* (2006).

-- District Centre

Parcel	Size (ha.)	Use	Floorspace (sqm)	Resi. Units (dw)	Height (m)	Phase
DC1	2.5	Mixed use	10,460	55	up to 15	1
DC2	5.0	Mixed use	21,755	114	up to 15	1
DC3	3.9	Mixed use	18,405	96	up to 15	1
Total	11.4		50,620	265		

Note: For building height, specified maxima are to ridge level, but exclude any point features.

Detailed Land Use Schedule in the District Centre

Use Class	Use		Resi. Units (dw)	Floorspace (sqm)
A1	Retail	Convenience		2,100
		Comparison		3,000
A1	Retail	Specialist		250
A2	Financial Etc			2,000
A3,4,5	Restaurants etc			800
B1	Business			11,550
D1	Non-resi/community			4,000
D1	Health centre			2,000
D1	Children's nursery			500
D2	Assembly and Leisure			1,800
C3	Residential		265	22,620
Total			265	50,620

Note 1: Specialist retail includes pharmacy, dry cleaners, laundrettes, postal services, etc.

Note 2: Size of health centre subject to PCT requirements. A separate facility from HC1 (health clinic).

-- Local Centres

Parcel	Size (ha.)	Use	Floorspace (sqm)	Resi. Units	Height (m)	Phase
LC1	1.0	Mixed use	3,200	30	up to 12	2
LC2	1.2	Mixed use	4,400	35	up to 12	2
LC3	0.9	Mixed use	1,000	0	up to 12	2
Total	3.1		8,600	65		

Note 1: For building height, specified maxima are to ridge level, but exclude any point features.

Note 2: For LC3, low plot ratio reflects proposal to re-use existing farm buildings as a community facility, within an extensive open setting.

Detailed Land Use Schedule in the Local Centres

Use Class	Use		Resi. Units (dw)	Floorspace (sq.m)
A1	Retail	Convenience		400
A3,4,5	Restaurant/Take away			700
D1	Non-resi/community			1,400
D2	Leisure			600
C3	Residential		65	5,500
Total			65	8,600

-- Employment Areas

Parcel	Size (ha.)	Use	Floorspace (sqm)	Height (m)	Phase
E1	8.2	Employment	24,660	up to 15	2
E2	2.8	Employment	8,420	up to 15	2
E3	3.0	Employment	9,320	up to 15	1
Total	14.0		42,400		

Note 1: All floorspace is in Use Class B1 (business), of which up to 50% would be B1a (office) use

Note 2: In addition, 11,550 sqm of B1a (office) use is proposed in the District Centre (see above).

Note 3: For building height, specified maxima are to ridge level, but exclude any point features.

-- Schools

Parcel	Size (ha.)	Use	Height (m)	Phase
SS1	11.0	Secondary School	up to 15	1
PS1	3.0	Primary School	up to 12	2
PS2	2.0	Primary School	up to 12	1
PS3	2.0	Primary School	up to 12	2
PS4	2.0	Primary School	up to 12	1
Total	20.0			

Note: For building height, specified maxima are to ridge level, but exclude any point features.

-- Health Clinic

Parcel	Size (ha.)	Use	Floorspace (sqm)	Height (m)	Phase
HC1	3.0	Health Clinic	12,000	up to 15	1

Note: For building height, specified maxima are to ridge level, but exclude any point features.

-- Hotel and Leisure

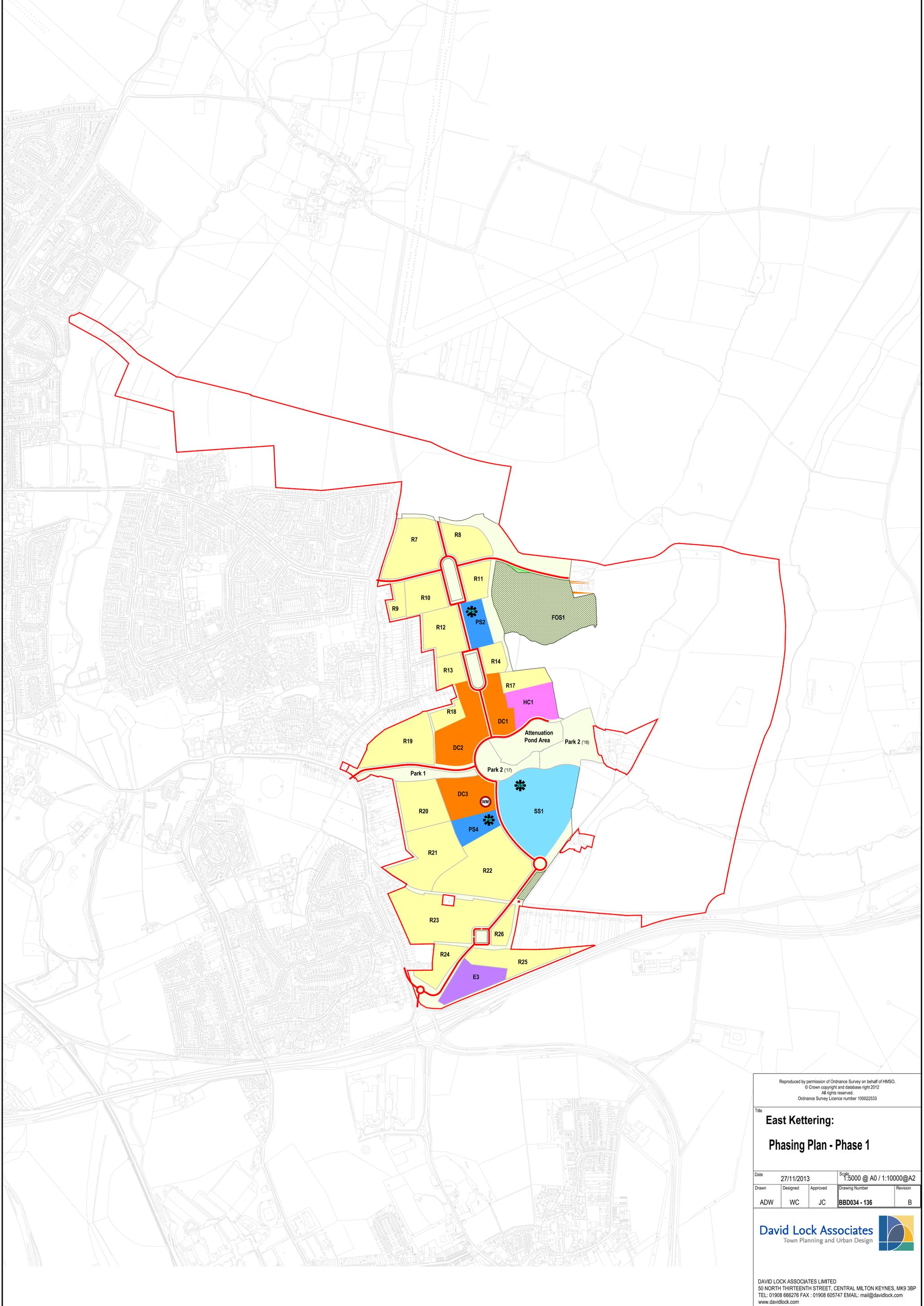
Parcel	Size (ha.)	Use	Floorspace (sqm)	Height (m)	Phase
HL1	3.1	Hotel (200 Beds)	8,300	up to 15	2

Note: For building height, specified maxima are to ridge level, but exclude any point features.

-- Formal Open Space

Parcel	Size (ha.)	Phase
FOS1	11.4	1
FOS2	2.3	2
FOS3	7.6	2
Total	21.3	

APPENDIX 4: PHASING PLANS



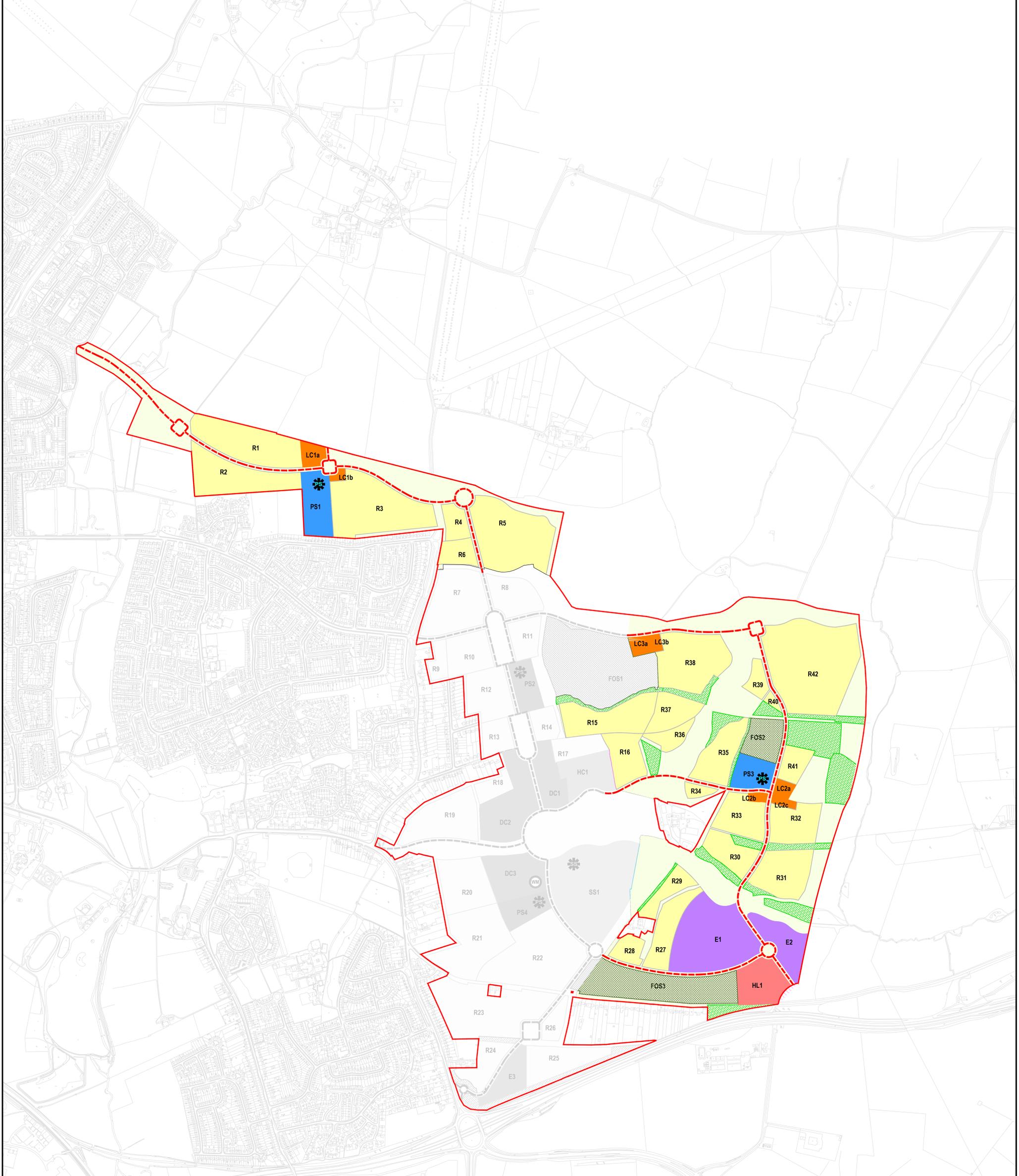
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APPENDIX 5: PRELIMINARY LANDSCAPE SCOPING FIGURE

Landscape & Visual Impact Assessment Methodology

Date: 2019



Arboriculture

Ecology

Forestry & Woodland Management

Landscape & Green Infrastructure

Minerals & Waste Restoration

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1. INTRODUCTION

- 1.1. This methodology is derived from the Guidelines for Landscape and Visual Impact Assessment Third Edition (2013) (GLVIA 3), jointly published by the Landscape Institute and the Institute of Environmental Management and Assessment. This publication gives guidance on carrying out a Landscape and Visual Impact Assessment (LVIA), either as a standalone appraisal or part of an Environmental Impact Assessment (EIA).
- 1.2. In the context of this methodology, the term “landscape” should be taken to include townscape and seascape considerations where relevant.

2. DEFINING THE STUDY AREA

- 2.1. Prior to any assessment being undertaken, it is important to consider the scope and extent of the study area. Typically the study area will be defined through the preparation and assessment of a Zone of Theoretical Visibility (ZTV) and/ or desk based study and site assessment. This process will allow the identification of a delimited visual envelope, one which is defined by the prevailing topography, vegetation and built form.
- 2.2. A landscape study may extend beyond a relatively confined visual envelope, where there is clear evidence that the site is part of, or intrinsically linked to a wider character area. The detail of such studies will be appropriate to the scale of the development, for instance where tall structures such as wind turbines may have an influence over a larger distance, the assessment will take this into account.

3. DESCRIPTION OF EFFECTS

- 3.1. The level of effect on both landscape and visual receptors should be identified in respect of the different components of the proposed development. In order to assess the significance of the effect upon a receiving environment, it is necessary to consider the effect magnitude, i.e. the degree of change, together with the sensitivity of the receptor.
- 3.2. This assessment will identify whether the effects are:
- Adverse, Beneficial or Neutral - Adverse effects would typically occur where there is loss of landscape elements, or the proposal detracts from the recognised landscape quality and character of an area or view. Neutral effects would include changes that neither add to nor detract from the quality and character of an area or view, but which nonetheless result in an identifiable change. Beneficial effects would typically occur where a development could positively contribute to the landscape character or view, for example through the replacement of incongruous elements with more appropriate uses.
 - Direct or Indirect – A direct effect will be one where a development will affect a view or the character of an area, either beneficially or adversely. An indirect effect will occur as a result of associated development i.e. a development may result in an increase of traffic on a particular route.
 - Short, Medium or Long Term – this relates to the expected duration and magnitude of a development. Within this assessment the potential effects are assessed during the Construction Phase, then at Years 1 and 15, of the Operational Phase.
 - Reversible or Irreversible – this is the assessment of whether the resulting effect of a development can be mitigated or not, and the effectiveness of the proposed mitigation at reducing the effect.

Significance of Effects (EIA only)

- 3.3. A final judgment is then made as to whether the identified effect is likely to be significant, as required by the Environmental Impact Assessment Regulations 2011. In summarising the effects consideration should be given to the key issues, and an identification of the scope for reducing any negative/adverse effects will be undertaken. Mitigation measures should be identified in order to reduce, where possible, the final judgement on the significance of any residual adverse effects in the long term.

4. METHODOLOGY FOR ASSESSING LANDSCAPE EFFECTS

Identifying and Assessing the Landscape Baseline

- 4.1. In order to accurately define the quality and character of the receiving landscaping it is important to identify and assess those landscape receptors and/or features that form part of the landscape and help to characterise it.
- 4.2. The identification of these features will be informed through:
 - Review of Ordnance Survey mapping, historical map data and aerial and other remote sensing imagery where appropriate;
 - Review of relevant published landscape character assessment at national, regional and local levels as appropriate;
 - Identification of landscape-based designations;
 - Identification and description of individual elements, features, aesthetic and perceptual aspects of the landscape which contribute to its character;
 - Assessment of the general condition of the receiving landscape;
 - Assessment of the relative value of the receiving landscape (see below);
 - Judgement of the susceptibility of the receiving landscape to a change of the type proposed (see below).
- 4.3. Where appropriate, and where the published character assessments do not reflect the specific characteristics of the receiving environment at a relevant scale, the LVIA will identify local landscape character areas for assessment. These character areas are determined through the site assessment, and will make reference to published landscape character assessments and the application of sound professional judgement based upon the evidence at hand.
- 4.4. Criteria for the selection of local landscape character areas within the likely study area include:
 - Proximity and influence on the site;
 - Physical connections with the site (for example public rights of way, roads, vegetation and vegetation belts); and
 - Visual connection with the site (particularly where the view is a key characteristic of the local area).

Assessing Landscape Sensitivity

- 4.5. The sensitivity of the landscape is determined by combining the value of the landscape with its susceptibility to change.
- 4.6. **Susceptibility** is defined as the inherent sensitivity of the landscape and its ability to accommodate a particular change, and can apply to specific landscape features, the character of the site as a whole, or the character of the surrounding landscape, and other Landscape Character Areas defined within the published assessments or similar.

Table 1: Landscape Susceptibility to Change

Susceptibility	Assessment Criteria
Very High	<ul style="list-style-type: none"> • No or few detracting features; • Townscapes may include a high proportion of historic assets; • Typical examples may be nationally designated e.g. World Heritage Sites, National Parks, Heritage Coasts, AONB's etc.
High	<p>Landscape resource where there is a high susceptibility to change.</p> <ul style="list-style-type: none"> • Landscapes would be considered of high value, have a high degree of intimacy, generally strong landscape structure, relatively intact and contain features worthy of protection; • Few detracting features; • Townscapes may include a high proportion of historic assets; • Typical examples may be of Regional or County importance e.g. within the setting of National Parks, AONB's, Conservation Areas etc.
Medium	<p>Landscape resource where there is a medium susceptibility to change.</p> <ul style="list-style-type: none"> • Landscapes would be considered of medium value, good landscape structure, with some detracting features or evidence of recent change. • Townscapes may include a proportion of historic assets or of cultural value locally. • Typical examples may be designated for their value at District level.
Low	<p>Landscape resource where there is a low susceptibility to change.</p> <ul style="list-style-type: none"> • Landscapes would be considered of low value, and contain evidence of previous landscape change; • Degraded landscape structure, characteristic patterns and combinations of landform and land cover are compromised by land use.
Negligible	<p>Landscape resource where there is little or no susceptibility to change.</p> <ul style="list-style-type: none"> • Typical landscapes are likely to be heavily degraded, of weak landscape structure, support intensive land uses, and require landscape restoration.

Landscape Value

- 4.7. The value of a landscape is derived from the value or importance given to the area by society, statutory bodies, local and national government, local communities and society at large. National designations include National Parks and Areas of Outstanding Natural Beauty. At a local level Local Authorities are likely to have local landscape designations in their Local Plans. However, GLVIA 3 notes that the fact that an area is not covered by such a designation does not mean that it is not valued and in this case reference should be made to published character assessments, local planning policies and guidance. GLVIA 3 also notes that there should not be an over-reliance on designations, favouring a process of assessment and the application of sound, evidence-based professional judgement.
- 4.8. The National Planning Policy Framework (NPPF) however, places greater weight on the importance of National level designations such as AONB's and National Parks. At a local level, any assessment of local value should be supported by a prescriptive, criteria based, NPPF compliant assessment (NPPF para 170). In the absence of such an assessment it is the role of the professional as part of the LVIA process to objectively assess the value of the receiving landscape in relation to box 5.1 of GLVIA 3.

Table 2: Landscape Value

Susceptibility	Typical Criteria	Typical Scale	Examples
Very High	Landscape is recognised as an area of great importance or quality and rarity. Demonstrates limited capacity to accommodate change.	International National	World Heritage Sites National Parks Areas of Outstanding Natural Beauty
High	Landscape is recognised as being of high quality or importance and rarity. Has some potential to accommodate change which is in keeping with the character of the area.	Regional Local	Often identified through Local Landscape Designations May be undesignated but value may be expressed through published assessments or cultural celebration, e.g. art or literature
Medium	Landscape is recognised as being of medium quality or importance or rarity. Demonstrates some potential to accommodate change through appropriate mitigation.	Regional Local	Typically undesignated but value may be expressed through published assessment

Low	Landscape is of low quality or importance or rarity. Typically degraded with detracting feature and in poor condition.	Local	Typically identified as having some redeeming features and demonstrating potential for restoration or improvement
Negligible	Landscape is of very low quality or importance or rarity. Typically degraded with many detracting features, and poorly managed.	Local	Typically an area identified for improvement through development and/or management of existing features

Table 3: Overall Landscape Sensitivity

Vs.		Identified Landscape Value				
		Very High Value	High Value	Medium Value	Low Value	Very Low Value
Identified Susceptibility	Very High Susceptibility	Very High	High	High / Medium	X	X
	High Susceptibility	High	High	Medium / High	Medium / Low	X
	Medium Susceptibility	High / Medium	Medium / High	Medium	Low / Medium	Low
	Low Susceptibility	X	Medium / Low	Low / Medium	Low	Low / Negligible
	Negligible Susceptibility	X	X	Low	Low / Negligible	Negligible
		Sensitivity				

Landscape Magnitude of Change

- 4.9. The magnitude of change relates to the degree in which proposed development alters the fabric of the receiving landscape. This change is characterised as high, medium, low, negligible or none.

Table 4: Magnitude to Change to Landscape Receptors

Magnitude	Definition
High	Change resulting in a high degree of deterioration or improvement, or introduction of prominent new elements that are considered to fundamentally change the character of a landscape.
Medium	Change resulting in a moderate degree of deterioration or improvement, or constitutes a perceptible change within a landscape.
Low	Change resulting in a low degree of deterioration or improvement to a landscape or view, or constitutes only a minor component within a landscape.
Negligible	Change resulting in a barely perceptible degree of deterioration or improvement to a landscape.

- 4.10. When assessing the magnitude of change consideration will be given to:

- **The size or scale of the development:** the extent of the change to existing landscape receptors is considered, with weight given to the proportion of the total extent of the site that this represents and the contribution that the receptor makes to the overall character of the landscape;
- **The extent of the development** – consideration is given to the geographical area within which the landscape effects may be perceived. This is assessed at:
 - Site level;
 - Immediate setting;
 - At the scale of the local landscape character area; and
 - On a larger scale affecting a number of local landscape areas or National Character Areas (if required).
- **The permanency of the development:** consideration is given to whether the proposals will result in a long term or short term effect; whether the development is reversible or changes the status of the site (for example to previously developed land); and whether for example restoration to baseline conditions is envisaged at the end of this term;
- **The change to the key characteristics of the receiving landscape:** taking into account:
 - Changes to the appearance of the site;
 - Changes to identified landscape features;
 - Changes to key or special qualities or characteristics of the landscape; and
 - Changes in the landscape setting of heritage assets and landscape-related designations.

- **The proposed mitigation:** consideration should be given to the extent to which the development effects can be mitigated, through positive design, the provision of replacement or enhanced landscape features, or limiting effects on the wider landscape.

Significance of Landscape Effect

- 4.11. The level of effect upon the receptor should be identified in respect of the different components of the proposed development. In order to assess the significance of the effect on the receiving environment, it is necessary to consider the magnitude, i.e. the degree of change, together with the sensitivity of each identified receptor.
- 4.12. This will identify whether the effects are:
- **Adverse or Beneficial** - beneficial effects would typically occur where a development could positively contribute to the landscape character. Neutral effects would include changes that neither add nor detract from the quality and character of an area or view. Adverse effects would typically occur where there is loss of characteristic landscape elements, or the proposal detracts from the landscape quality and character of an area or view;
 - **Direct or Indirect** – A direct effect is where a development will affect the character of an area either beneficially or adversely. An indirect effect would be associated with a development, i.e. an increase of traffic on a particular route.
 - **Short, Medium or Long Term** – this relates to the expected duration and magnitude of a development. Within this assessment the potential effects are assessed during the construction phase, then at years 1 and 10 following completion of the development.
 - **Reversible or Irreversible** – This is the judgement of whether the resulting effect of a development can be mitigated or not, and whether the result of the mitigation is beneficial.
- 4.13. The significance of landscape effect is determined by cross-referencing the sensitivity of the receptor with the magnitude of change expected as a result of the development. Table 5 below outlines how the assessment of significance is undertaken.

Table 5: Landscape Significance of Effect*

Vs.		Sensitivity of Landscape Receptor					
			Very High	High	Medium	Low	Negligible
Magnitude of Change	High		Substantial	Major	Major / Moderate	Moderate	Moderate / Minor
	Medium		Major	Major / Moderate	Moderate	Moderate / Minor	Minor
	Low		Major / Moderate	Moderate	Moderate / Minor	Minor	Negligible
	Negligible		Moderate	Moderate / Minor	Minor	Negligible	Negligible / None
		Significance of Landscape Effect					

* To be read in conjunction with Table 9 below.

5. METHODOLOGY FOR THE ASSESSMENT OF VISUAL EFFECTS

- 5.1. As set out within section 2 above, the visual baseline is identified through a process of desk study, Zone of Theoretical Visibility (ZTV), the extent of the visual envelope is then defined and tested through field assessment.
- 5.2. On the basis of the baseline assessment and field survey analysis, visual receptors are identified and classified as to their sensitivity to change. This will involve the identification of the visual receptors through:
- Identification of the area in which the development may be visible (the visual envelope;
 - Identification of publicly accessible, representative, viewpoints where views will be affected and the nature of those views;
 - Identification of any recognised viewpoints (i.e. known viewpoints from a key landmark or local feature);
 - Identification of those views which can be considered characteristic of the landscape character area;
 - Identification of the different groups of people who may experience views of the development.

Sensitivity of Visual Receptors

- 5.3. The sensitivity of a visual receptor should be established. This sensitivity will be dependent on the value attached to the view and the susceptibility of the visual receptor(s) to a change of the type proposed. This may be linked to the type of activity that the person is engaged in – for example someone walking in the countryside would be more sensitive to a change to the view than a person working in an office.

Table 6: Visual Sensitivity Thresholds

Visual Sensitivity	Threshold Definition
Very High	Viewers on public rights of way or accessible land whose prime focus is on the high quality of the surrounding landscape, and who are often very aware of its value. Examples include viewers within nationally designated landscapes such as National Parks or AONB's and users of National Trails.
High	Viewers on public rights of way whose prime focus is on the landscape around, or occupiers of residential properties with primary views affected by the development. Examples include viewers within regional/local landscape designations, users of Long Distance Routes or Sustrans cycle routes, or the setting of a listed building.
Medium	Viewers engaged in outdoor recreation with some appreciation of the landscape, occupiers of residential properties with oblique views affected by the development, and users of rural lanes and roads. Examples include viewers within moderate quality landscapes, local recreation grounds, and outdoor pursuits.
Low	Viewers engaged in outdoor sport or recreation whose prime focus is on their activity, or people passing through the area on main transport routes whose attention is focused away from an appreciation of the landscape.
Negligible	Viewers whose attention is focused on their work or activity and not susceptible to changes in the surrounding landscape.

Magnitude of Change of Visual Receptors

5.4. The following definitions are used to assess the magnitude of change to visual receptors. As with the assessment of the magnitude of change for landscape receptors, consideration is given to:

- **The size or scale of the development:** taking into account:
 - The mass and scale of the development visible and the change experienced from an identified location; and
 - The loss or addition of features within the view and the changes to the view's composition (including the proportion of the view occupied by the proposed development and the degree of contrast or integration of the proposed development within the context of the existing landscape elements) and the nature of the view in terms of duration and degree of visibility.
- **The extent of the development** – the extent of the development will vary between each identified viewpoint and will likely reflect the extent of the development visible in the view alongside the distance of the viewpoint from the proposed development.
- **The permanency of the development:** considering whether:

- The proposals will result in a long term or short term effect;
- The development is reversible or changes the status of the site (for example to previously developed land); and
- Restoration to baseline conditions is envisaged at the end of this term.
- **The proposed mitigation:** Judging the extent to which the landscape proposals will be able to mitigate the visual effects of the development by screening, or through design of the development (e.g. siting, use of visually recessive colours and materials and location of open space).

Table 7: Magnitude of Change to Visual Receptors

Magnitude	Definition
High	Change resulting in a high degree of deterioration or improvement, or introduction of prominent new elements that are considered to make a major alteration to a view.
Medium	Change resulting in a moderate degree of deterioration or improvement, or constitutes a perceptible change within a view.
Low	Change resulting in a low degree of deterioration or improvement to a landscape or view, or constitutes only a minor component within a landscape.
Negligible	Change resulting in a barely perceptible degree of deterioration or improvement to a view.
No Change	It is also possible for a view to experience no change due to it being totally compatible with the character of the visual environment or not visible due to intervening structures or vegetation.

Significance of Visual Effect

5.5. The significance of visual effect is determined by cross referencing the sensitivity of the receptor with the magnitude of change expected as a result of the development. Table 8 below outlines how the assessment of significance is undertaken.

Table 8: Visual Significance of Effect*

Vs.		Sensitivity of Visual Receptor				
		Very High	High	Medium	Low	Negligible
Magnitude of Change	High	Substantial	Major	Major / Moderate	Moderate	Moderate / Minor
	Medium	Major	Major / Moderate	Moderate	Moderate / Minor	Minor
	Low	Major / Moderate	Moderate	Moderate / Minor	Minor	Negligible
	Negligible	Moderate	Moderate / Minor	Minor	Negligible	Negligible / None
	No Change	None	None	None	None	None
	Significance of Landscape Effect					

* To be read in conjunction with Table 9 below.

6. UNDERSTANDING SIGNIFICANT EFFECTS

- 6.1. For the purposes of the impact assessment beneficial or adverse effects of substantial, major and major/moderate effects are considered to be significant and to be of key importance in decision making. Moderate adverse effects should also be taken into account when considering the overall effects of the development in decision making.
- 6.2. It is important to consider that change does not necessarily result in an adverse effect or harm to a particular landscape or visual environment.
- 6.3. The landscape assessor, in determining the significance of effect, will apply a defined assessment methodology, in combination with sound professional judgement upon which the identification of significant effects should be based.

Definition of Significance Thresholds

Table 9: Significance Thresholds

Significance	Threshold Definition
Substantial	A very high magnitude of change that materially affects a landscape or view of national / international importance that has little or no ability to accommodate change.
Major	A high magnitude of change that materially affects a landscape or view that has limited ability to accommodate change.
Moderate	A medium magnitude of change that materially affects a landscape or view that may have the ability to accommodate change. Positive effects will typically occur in a lower quality landscape.
Minor	A low magnitude of change that materially affects a landscape that has the ability to accommodate change. Positive effects will typically occur in a lower quality landscape or view.
Negligible	A negligible magnitude of change that has little effect on a landscape that has the ability to accommodate change.
None	It is also possible for a magnitude of change to occur that results in an effect of neutral significance due to the change being compatible with local character or not visible.

APPENDIX 6: LIGHTING

Introduction

1.1 Whilst not proposed to be a topic chapter within the ES, the lighting assessment will form an appendix to the Landscape and Visual Chapter (Chapter 9). It will identify the likely significant effects from obtrusive light due to external artificial lighting associated with the construction and operation of the Proposed Development.

Assessment of Baseline

Existing Lighting Conditions

1.2 Approximately 10m high, HPS streetlights are present along the A14 on the approach to Junction 10, however the rest of the road is unlit. Warkton Lane, which runs to the north of the Site and expands northwards, is also lit with approximately 10m high HPS streetlighting. Cranford Road which runs through the south of the Site, is illuminated by occasional streetlights, associated with junctions and the location of housing. There is the potential for residential, security lighting along Warkton Lane, Barton Road, and Cranford Road.

Environmental Zone

1.3 The Site is considered to be of low district brightness and is not subject to any designations and so would be classified as Environmental Zone E2 – Rural (Institute of Lighting Professionals, 2011), as defined below.

Table 1.1: Environmental Zone Classifications, ILP 2011

Environmental Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc.
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night- time activity

Sensitive Receptors

- 1.4 A desk-based review of the Site has been undertaken and shows that it is not subject to any landscape, heritage, or ecological designations.
- 1.5 There are clusters of listed buildings in the surrounding settlements of Cranford St Andrew and Cranford St John, approximately 1.2 km to the east, and Warkton (1 km), Grafton Underwood (2.5 km), and Weekley (2 km) to the north. In Barton Seagrave, to the west, is a scheduled monument comprising moats, fishponds, and shrunken medieval village remains.
- 1.6 Small watercourses run throughout the Site, with accompanying ponds and drainage ditches to the south of the Site. These are important habitats for bats.
- 1.7 The existing and proposed receptors to obtrusive light on and surrounding the Site include:
- Residents of nearby properties within the Site and close to the site boundary (s) who could be affected by light intrusion, glare and sky glow;
 - Existing residents within the Site;
 - Residents of distant properties;
 - Users of the local highway network in close proximity to the Site who may be affected by glare;
 - Proposed new residents within the Proposed Development;
 - Proposed new residents within committed development;
 - Light sensitive nocturnal protected species (e.g. bats) using existing habitat within the Site. This will be covered in Chapter 10 Ecology; and
 - Nearby heritage assets in close proximity to the Site. This will be covered in Chapter 11 Heritage.
- 1.8 The sensitive receptors will be decided upon when LVIA viewpoints and the Zone of Theoretical Visibility are prepared.

Methodology

- 1.9 The Lighting Assessment methodology will be undertaken with due regards to ILP Professional Lighting Guide 04: Guidance on Undertaking Environmental Lighting Impact Assessments.
- 1.10 The external baseline lighting conditions will be verified by a field survey of the Site and the surrounding study area. The survey would include night-time photography from the pre-determined viewpoints, that will be selected from the landscape and visual assessment viewpoints. These viewpoints will be agreed with KBC.

- 1.11 Due to the outline nature of the proposal, the lighting assessment will be qualitative. No lighting design information will be submitted to support the outline planning application. It is expected that a preliminary lighting design will be submitted to discharge a planning condition.

Potential Effects

Construction

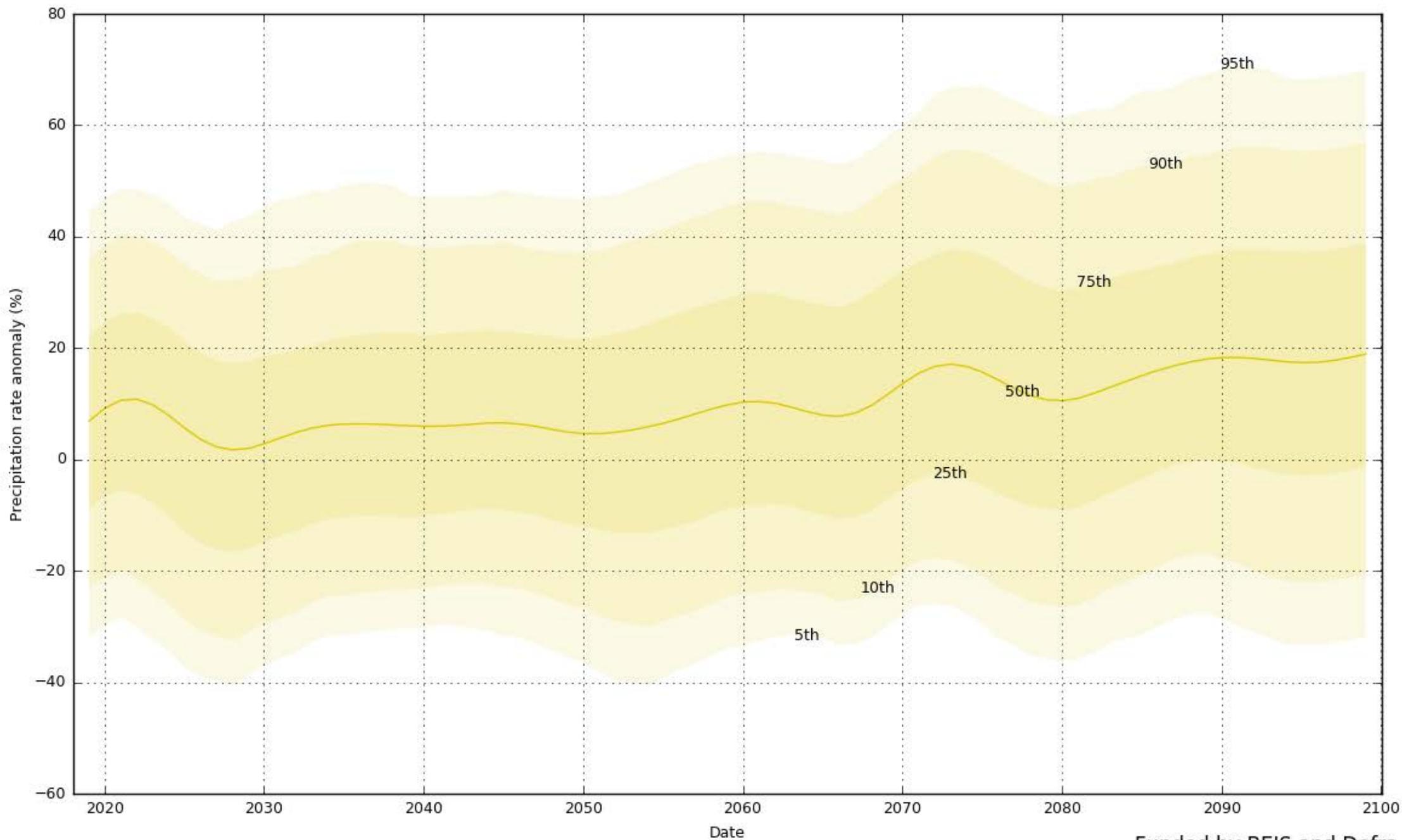
- 1.12 Construction lighting tends to lead to more obtrusive lighting than operational lighting because of its temporary nature, and the type of lighting equipment used. For ease of deployment and use, construction lighting tends to be mobile, and focus on providing the widest coverage of light from the fewest possible units in order to minimise time spent maintaining and installing the equipment. However, these effects can be minimised and controlled through appropriate design measures. While construction is predominantly a daytime activity, lighting is more likely to be required during the night-time in winter when the hours of daylight are shorter.

Operation

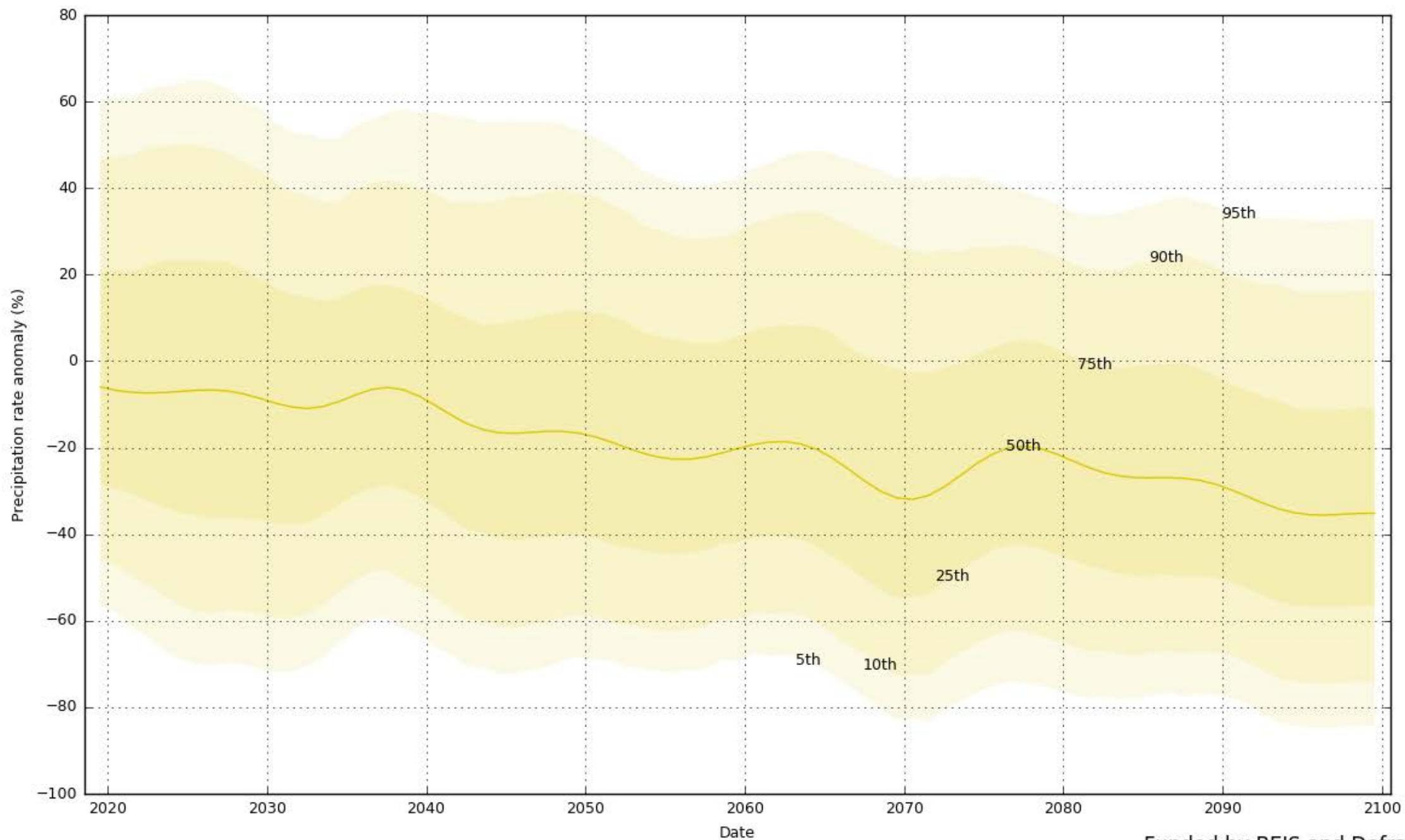
- 1.13 The operational lighting requirements for the Proposed Development will follow relevant British Standards, industry guidance and local authority requirements to meet the minimum required to safely and securely light the Proposed Development.
- 1.14 During operation of the Proposed Development, sensitive receptors within close proximity of the Site, as well as proposed on-site and off-site receptors (from committed development), could be subject to potential adverse effects resulting from light intrusion and glare of poorly designed or controlled luminaires. There is also potential for adverse effects from sky glow to sensitive receptors located further from the Site.
- 1.15 Potential adverse effects on sensitive receptors during operation of the completed scheme can be mitigated by primary mitigation measures such as location of land uses and landscaping to provide screening. It is anticipated that operational effects from light would be minimised through targeting the limitations for exterior lighting established in the Institution of Lighting Professionals Guidance Note 01 Guidance Notes for the Reduction of Obtrusive Light (2011). Secondary mitigation measures, such as the preparation of a preliminary lighting design, will also contribute to reducing the adverse effects felt by receptors. There is still the potential for adverse operational effects, therefore lighting will be considered through a lighting assessment that will be appended to the ES.

APPENDIX 7: CLIMATE CHANGE FIGURES

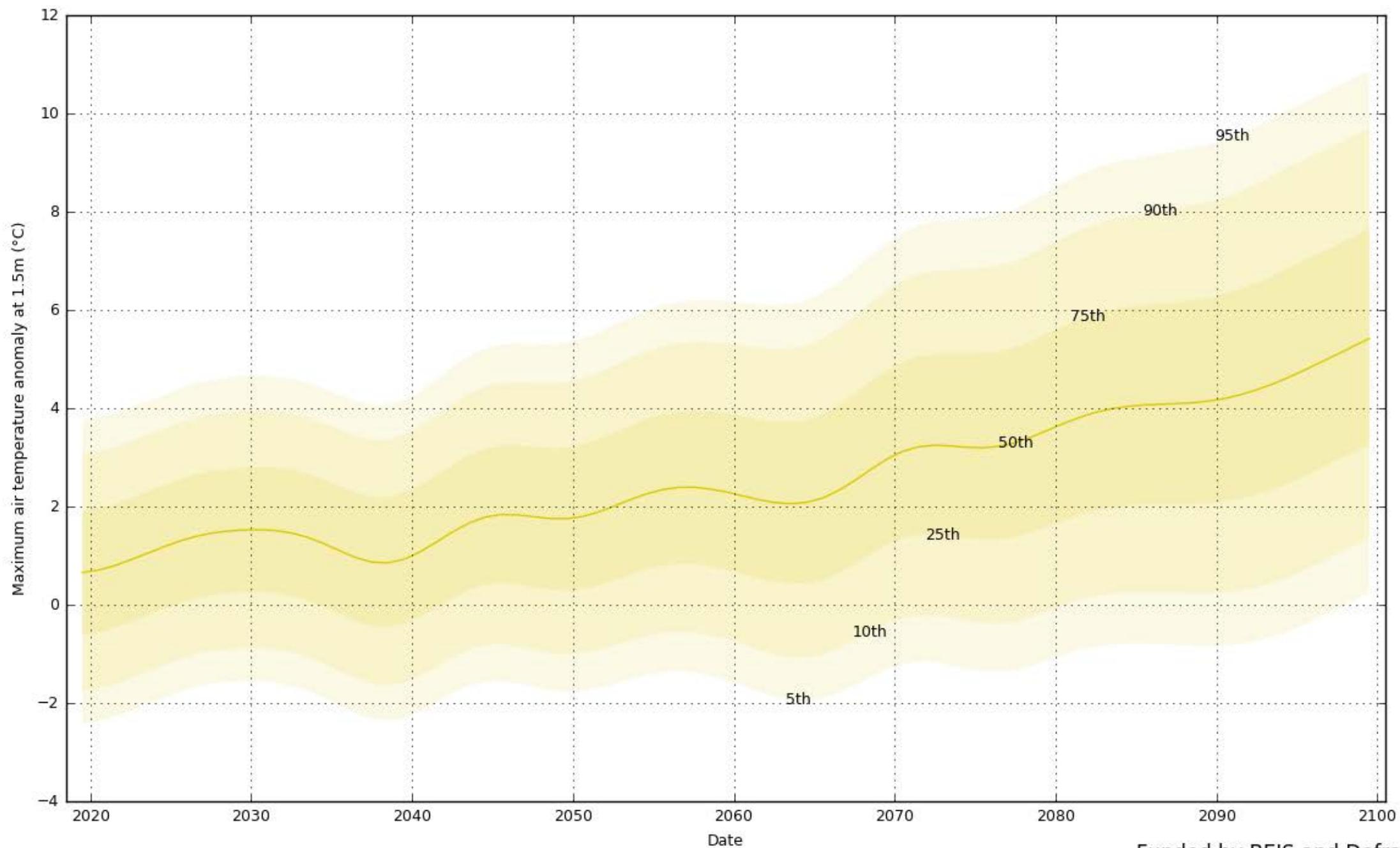
Seasonal average Precipitation rate anomaly (%) for December January February in 2019 to 2100 for grid square 487500, 287500, using baseline 1981-2000, and scenario RCP 6.0, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles



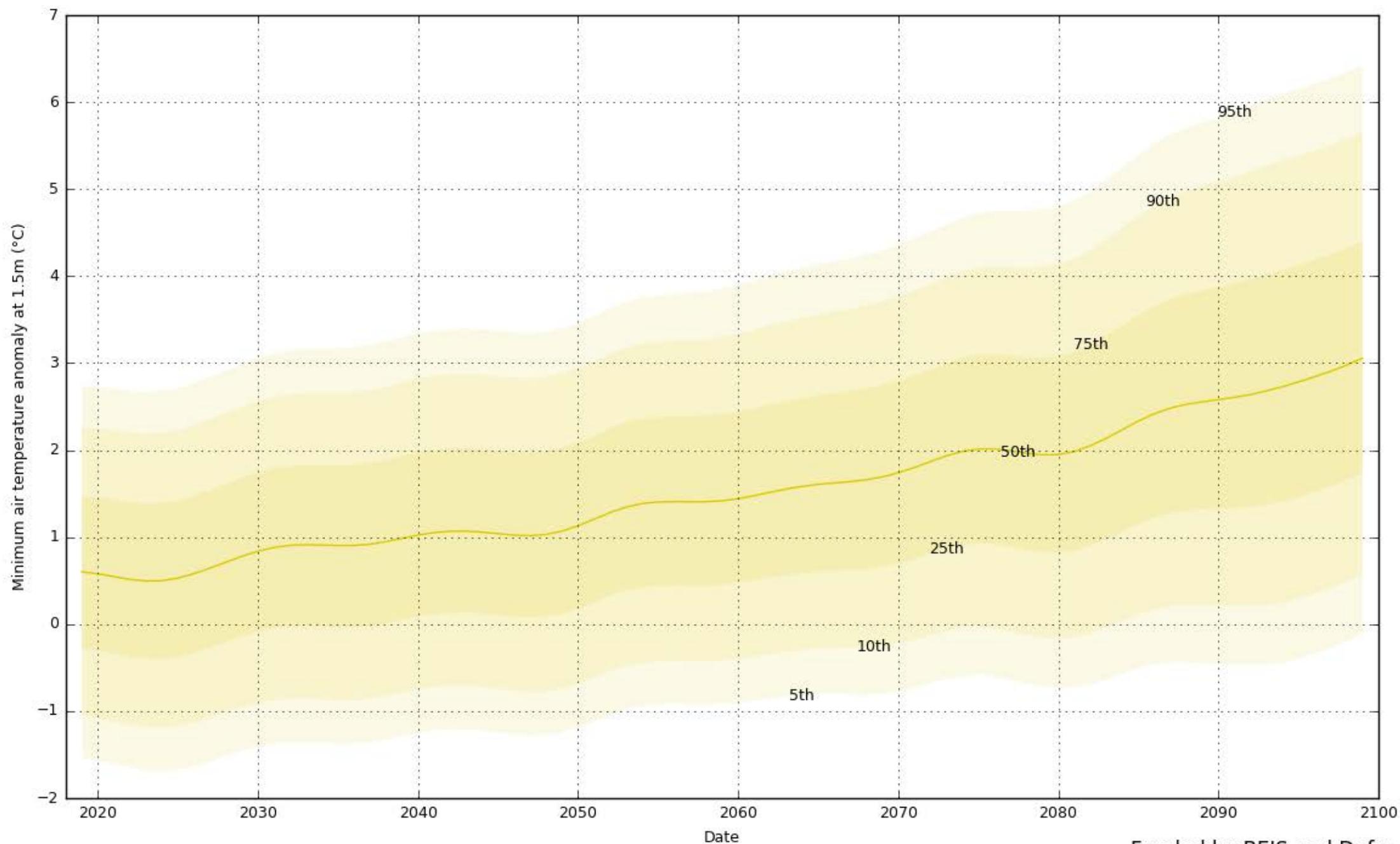
Seasonal average Precipitation rate anomaly (%) for June July August in 2019 to 2100 for grid square 487500, 287500, using baseline 1981-2000, and scenario RCP 6.0, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles

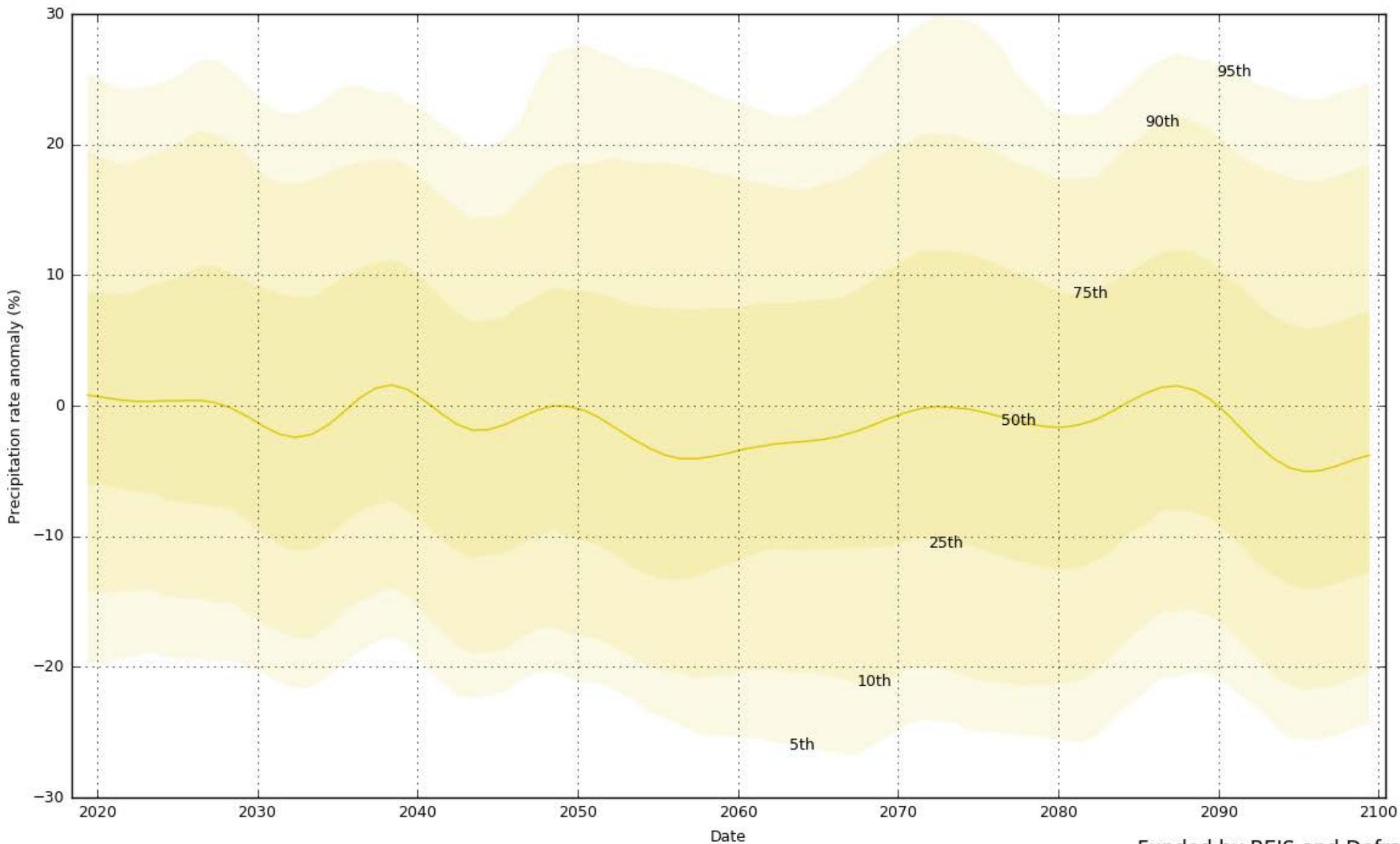


Seasonal average Maximum air temperature anomaly at 1.5m (°C) for June July August in 2019 to 2100 for grid square 487500, 287500, using baseline 1981-2000, and scenario RCP 6.0, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles



Seasonal average Minimum air temperature anomaly at 1.5m (°C) for December January February in 2019 to 2100 for grid square 487500, 287500, using baseline 1981-2000, and scenario RCP 6.0, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles





Annual average Mean air temperature anomaly at 1.5m (°C) for 2019 to 2100 for grid square 487500, 287500, using baseline 1981-2000, and scenario RCP 6.0, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles

