

10 GROUND CONDITIONS

10.1 INTRODUCTION

10.1.1 This Chapter of the Environmental Statement (ES) assesses the likely significant effects of the Proposed Development on the environment in respect of Ground Conditions and Contamination at the Application Site. A description of the Application Site and Proposed Development are provided in **Chapters 3 and 4**. Additional assessment on the water environment is provided in **Chapter 11: Water Resources**. **Figure 1.2** illustrates the location of the Site. The Proposed Development Indicative Concept Masterplan is provided in **Figure 4.4**, with the Parameters assessed within the ES illustrated in **Figures 4.1 – 4.3**.

10.1.2 The assessment considers the environmental site setting in relation to published information on geology, hydrology, hydrogeology and contaminated land issues. The likely effects of the Proposed Development on topography, ground stability, soil compaction and soil erosion, re-use of soils, waste soils, and contamination of the Application Site are considered. The assessment includes the identification of potential effects resulting from the Proposed Development, the requirements for mitigation, residual effects, and the significance of these effects.

10.2 ASSESSMENT APPROACH

10.2.1 The approach taken by the assessment follows the general principles outlined in the Institute of Environmental Management and Assessment (IEMA) guidelines for EIA¹. The method complies with the requirements of the Government's Good Practice Guide for EIA² (hereafter referred to as the 'Good Practice Guide').

10.2.2 The approach to the assessment comprises:

- Establishing the baseline conditions for the study area with respect to geology, soil and mineral resources, ground stability, hydrology, hydrogeology, contaminated land (including the potential for unexploded ordnance and ground gases) and historical uses;
- Identification of potential effects on identified resources and receptors from the construction and operation of the Proposed Development;
- Assessment of the significance of likely effects from the Proposed Development; and
- Identification of any residual effects.

Methodology

Physical Effects

10.2.3 An impact assessment of the potential physical effects of the Proposed Development on geology has been undertaken using a qualitative approach considering the effects on topography, soil compaction, soil erosion and ground stability from the construction works and operation of the Proposed Development.

10.2.4 This approach requires an understanding of the construction works required to complete the Proposed Development including, but not limited to, site clearance requirements, ground improvement proposals, earthworks including temporary

¹ Institute of Environmental Management and Assessment (2004), Guidelines for environmental impact assessment

² Department of Communities and Local Government (2006), Environmental Impact Assessment: A guide to Good practice and Procedures.

Ground Conditions

stockpiles, cut/fill balance and proposed landscaping, foundation design for structures and construction methods. Details relating to the proposed construction and operation of the Proposed Development, at this outline stage, are provided in **Chapter 4**.

- 10.2.5 The baseline information in relation to ground conditions of the study area has been reviewed and considered in the context of construction and operation of the Proposed Development and methods to determine if any effects are likely. These effects have then been assessed using the value of the receptors and magnitude of impact to consider the significance of the effect as discussed further below.

Effects on Soil and Geology as a Valuable Resource

- 10.2.6 The Application Site does not lie within a Mineral Safeguarding Area, however some mining and quarrying has taken place in the local area. Also mapping indicates the absence of superficial deposits within the Application Site.
- 10.2.7 Although it is known that the Application Site was a farm so likely to have some agricultural land value, the Application Site comprises Agricultural Land Classification Subgrade 3b, which is poorer quality land in the context of the policy advice in the National Planning Policy Framework (NPPF) and does not fall within the Best and Most Versatile (BMV) land classification.
- 10.2.8 In addition, reference to Policy GB1 (also including Policy JE2, H2 and HE3) of the Coventry Local Plan³ states the certain areas will be removed from the Green Belt to accommodate future development needs and are shown on the policies map (contained with the local plan document). Land at Keresley (residential) has been flagged for removal from the Green Belt to accommodate future development needs. Therefore, the Proposed Development is consistent with the local adopted plan and not classified as BMV land.
- 10.2.9 The effects on soil as a valuable resource has therefore been scoped out and not considered further. The effects of the Proposed Development on geology as a valuable resource is also scoped out of the assessment, as the Proposed Development is unlikely to impact any Local Geological Sites. This was proposed and agreed within the Scoping process.

Assessment of Significance: Value / Sensitivity of a Receptor and Magnitude of Impact - Physical Effects

- 10.2.10 The value / sensitivity of a receptor is considered when determining the consequence of an effect in the impact assessment. The value / sensitivity of each of the receptors has been determined using the classifications given in **Table 10.1**.

³ Coventry City Council, April 2017. Local Plan.

Table 10.1 Criteria for classifying the value and/or sensitivity of geological receptors in relation to physical effects

Value/ Sensitivity	Criteria	Examples
Very High	Attribute possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the Application Site/receptor. Attribute has a very low capacity to accommodate the proposed change.	Major topographic, ground stability, soil compaction or erosion hazards currently present at the Application Site.
High	Attribute possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the Application Site/receptor. Attribute has a low capacity to accommodate the proposed change.	Moderate topographic, ground stability, soil compaction or erosion hazards currently present at the Application Site.
Medium	Attribute only possesses characteristics which are locally significant. Attribute has tolerance to accommodate the proposed change.	Small topographic, ground stability, soil compaction or erosion hazards currently present at the Application Site.
Low	Attribute possesses no significant characteristics. Attribute has tolerance to accommodate the proposed change.	No topographic, ground stability, soil compaction or erosion hazards currently present at the Application Site.

10.2.11 Following determination of the value / sensitivity of the receptors, the magnitude of potential construction phase and operational phase impacts is determined based on the criteria defined in **Table 10.2**.

Table 10.2 Classification of magnitude of impacts for physical effects on geological receptors

Magnitude	Description
High	Total loss of major alterations to one of more of the key elements, features or characteristics of the baseline. The post-development situation will be fundamentally different.
Medium	Partial loss or alteration to one of more of the key elements or characteristics of the baseline. The post-development situation will be partially changed.
Low	Minor loss or alteration to one or more of the key elements, features or characteristics of the baseline. Post-development, the change will be discernible but the underlying situation will remain similar to the baseline.
Negligible	Very minor loss or alteration to one of more of the key elements, features or characteristics of the baseline, such that post-development, the change will be barely discernible, approximating to the "no change" situation.

10.2.12 The overall potential significance of the effect is then defined using the matrix presented below in **Table 10.3**, which describes the relationship between the value / sensitivity of the receptor as defined in Error! Reference source not found. **10.1** and the magnitude (change) of the potential impact as defined in **Table 10.2**.

Ground Conditions

Table 10.3 Criterion for determining the significance of physical effects on geological receptors

Value/Sensitivity of Receptor	Magnitude of Effects			
	High	Medium	Low	Negligible
Very High	Major	Major	Moderate	Moderate
High	Major	Moderate	Moderate	Minor
Medium	Moderate	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible

10.2.13 The classification of significance of effects in relation to adverse and beneficial effects is based on the criteria defined in Error! Reference source not found. **10.6**.

Land Contamination

10.2.14 The assessment of the potential effects of the Proposed Development on ground contamination, soil re-use and soil waste has been undertaken in two stages which are explained in more detail below:

- Stage 1 – a land contamination risk assessment; and
- Stage 2 – a land contamination impact assessment.

Stage 1 Risk Assessment

10.2.15 The approach is based on the guidance document CLR11¹⁷ and the Good Practice Guide² to EIA. These documents provide a technical framework for the application of a risk management process through the following three steps:

10.2.16 **Develop a Preliminary Conceptual Site Model (PCSM):** A desk study review of available documentary information has been undertaken to develop a preliminary CSM, which describes the linkage between potential contamination hazards/sources, pathways and receptors relevant to the Application Site during baseline, construction and operational phases. Where a source, pathway and receptor are all present or considered likely to be present within a specific phase, this is described as a Potential Contaminant Linkage (PCL) which can then be subject to the risk assessments process.

10.2.17 **Gather site-specific information on the CSM:** No detailed investigation has been undertaken on the Application Site at this outline stage, except for limited trial pitting for soakaway investigation to inform the drainage design. This information in combination with the findings of the desk study will assist in identifying the potential contamination risks as well as inform the requirements for further ground investigation at detailed design stage. This level of information is considered adequate at this outline stage, as agreed with Environmental Protection through the Scoping process.

10.2.18 **Risk assessment:** Chemical testing is not available at the time of writing and therefore this chapter uses available desk-based and ground investigation information (**Section 10.3**). The identified risk will be determined and assessed based on probability and consequence as detailed in **Table 10.4**. Once detailed ground investigation has been undertaken for the detailed design and data becomes available, an appropriate risk assessment should be undertaken and a review of the CSM completed at the appropriate stage of design. Using the information from the ground investigation, the PCSM will be updated to include an estimation of the level of risk of each PCL identified during the baseline, construction, operation. Where risks are identified, consideration is given as to whether these would be appropriately mitigated through design and/or the development of a remediation strategy and its

subsequent validation, as necessary. The residual risks will be determined and assessed based on estimation of likelihood and consequence.

10.2.19 The risk assessment applies the principles given in the National House Building Council (NHBC)⁴, Environment Agency¹⁷ and Chartered Institute of Environmental Health Report R&D66⁵, which provides guidance on the Development and application of the consequence and probability matrix (as presented below in **Table 10.4**) for contaminated land risk assessment. The classifications and definitions of the different levels of probability, consequence and risk, as given in R&D66, are presented in **Appendix 10.1**.

Table 10.4 Estimation of the level of risk by comparison of consequence and probability

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High likelihood	Very high	High	Moderate	Low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very low	Very low

10.2.20 The potential risk to a receptor is a function of the probability of, and the consequence of a PCL being realised. Probability (likelihood of an event occurring) takes into account both the presence of the hazard and the receptor and the integrity of the exposure pathway. Consequence takes into account both the potential severity of the hazard and the sensitivity of the receptor. The classifications and definitions of probability, consequence and the classified risks adopted for this assessment are provided in **Appendix 10.1** (Definitions of Risk, Probability and Consequence).

10.2.21 A PCSM has been produced based on the information available at the time of writing and considering the potential sources, pathways and receptors present during the baseline, construction and operational phases. The PCSM has been characterised using the above method and taking into account probability, consequence and levels of risk. This PCSM was then used to inform the baseline, construction phase, and operational phase CSMs, which consider the current site conditions and predictions relating to the construction and operational phases.

10.2.22 In addition to the above, a value has been assigned to each of the contaminated land receptors with respect to its value and/or sensitivity. The definition of each of these is given in **Table 10.5**. The value of a receptor in terms of land contamination is considered when determining consequence of an effect in the risk assessment.

⁴ <http://www.nhbc.co.uk/Builders/ProductsandServices/TechZone/nhbcstandards/standards2018>

⁵ NHBC, EA and CIEH (2008), Guidance for the Safe Development of Housing on Land Affected by Contamination.

Ground Conditions

Table 10.5 Criteria for classifying the value and/or sensitivity of environmental resources/ receptors in relation to Land Contamination

Value/ Sensitivity	Criteria	Examples
High	Attribute possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the Application Site/receptor. Attribute has a very low capacity to accommodate the proposed change.	Principal aquifer providing potable water to a large population, within an inner or outer groundwater source protection zone (Source Protection Zone (SPZ) 1 or SPZ 2). WFD high status water body (surface water) providing potable water to a small population. Sensitive human receptors, e.g. young children. Buildings, including services and foundations but of high historic value or other sensitivity e.g. Statutory designations, schools, residential dwellings. Ecological statutory designations with high sensitivity e.g. SSSI, Local Nature Reserve (LNR), Special Protection Area (SPA), RAMSAR etc.
Medium	Attribute possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the Application Site/receptor. Attribute has a low capacity to accommodate the proposed change.	Principal aquifer beyond a SPZ, or secondary aquifer. Secondary aquifer providing abstraction water for agricultural or industrial use or Secondary aquifer without abstraction. WFD good status water body (surface water). Buildings, including services and foundations. Less sensitive human receptors, e.g. construction workers using personal protective equipment (PPE).
Low	Attribute only possesses characteristics which are locally significant. Attribute has some tolerance to accommodate the proposed change.	Unproductive strata. WFD moderate - poor status (surface water). Infrastructure (roads, bridges, railways). Non-statutory designated sites of regional importance that are not highly sensitive to damage from change. No sensitive human receptors.

Stage 2 Impact Assessment

10.2.23 The land contamination impact assessment requires comparison of the baseline with the potential impacts that the Proposed Development will have during the construction and operational phases. This approach enables changes in the impact to receptors during the construction and operational phases to be identified, an assessment of the effect of the Proposed Development to be made and appropriate mitigation measures specified. The impact assessments have therefore been undertaken by comparing the baseline CSM with the construction phase CSM and operational phase CSM. The significance of identified effects for land contamination is then determined based on **Table 10.6**.

Assessment of Significance for Physical Effects and Contaminated Land

10.2.24 After developing an understanding of the baseline conditions, the significance of identified physical effects and effects on contaminated land is determined based on the methods described above. The classification of significance of effects is based on the criteria defined in **Table 10.6**.

Table 10.6 Criteria to determine Significance of Effect

Significance Criteria	Typical Criteria
Major adverse	<p>Complete permanent change in topography which impacts the local community.</p> <p>Significant soil erosion, soil compaction or ground instability that is permanent in nature.</p> <p>An increase in contamination impacts from the existing baseline conditions of 4 or 5 risk levels in the risk matrix, e.g. land that has a very low contamination risk in the baseline becomes a high or very high risk.</p> <p>Land that does not meet the statutory definition of Contaminated Land in the existing baseline becomes capable of being determined under Part 2A.</p> <p>The generation of significant volumes of soils classified as hazardous waste requiring off-site disposal to appropriate landfill.</p>
Moderate adverse	<p>Partial long term (> 10 years) change in topography which impacts the local community.</p> <p>Moderate soil erosion, soil compaction, or ground instability that is either permanent or long term in nature.</p> <p>An increase in contamination impacts from the existing baseline conditions of 2 or 3 risk levels in the risk matrix, e.g. land that has a low contamination risk in the baseline becomes a moderate or high risk.</p> <p>Land that does not meet the statutory definition of Contaminated Land in the existing baseline becomes capable of being determined under Part 2A.</p> <p>The generation of a moderate volume of waste requiring off-site disposal.</p>
Minor adverse	<p>Limited medium term (5 to 10 years) change in topography which impacts the local community.</p> <p>Limited medium-term soil erosion, soil compaction, or ground instability.</p> <p>An increase in contamination impacts from the existing baseline conditions of 1 risk level in the risk matrix, e.g. land that has a low contamination risk in the baseline becomes a moderate/low risk.</p> <p>The generation of a minor amount of waste soils.</p>
Negligible (neutral)	<p>No measurable impact on topography, soil erosion, soil compaction, or ground instability or impacts that are only temporary in nature (< 5 years).</p> <p>Negligible change in contamination impacts.</p> <p>No generation of waste soils as part of the development, materials are used sustainably.</p>
Minor beneficial	<p>Limited medium term (5 to 10 years) change in topography which has a positive impact on the local community.</p> <p>Limited medium-term reduction in existing soil erosion, soil compaction, or ground instability issues.</p> <p>A reduction in contamination impacts from the existing baseline conditions of 1 risk level in the risk matrix, e.g. land that has a moderate/low contamination risk in the baseline becomes a low risk.</p> <p>A minor amount of materials reuse as part of the development limiting the offsite disposal of waste soils.</p>

Ground Conditions

Significance Criteria	Typical Criteria
Moderate beneficial	<p>Partial long term (> 10 years) change in topography which has a positive impact on the local community.</p> <p>Moderate permanent or long term reduction in existing soil erosion, soil compaction, or ground instability issues.</p> <p>A reduction in contamination impacts from the existing baseline conditions of 2 or 3 risk levels in the risk matrix, e.g. land that has a high contamination risk in the baseline becomes a moderate/low or low risk.</p> <p>Land that meets the statutory definition of Contaminated Land in the existing baseline is no longer capable of being determined under Part 2A.</p> <p>A moderate amount of materials reuse as part of the development limiting the offsite disposal of waste soils.</p>
Major beneficial	<p>Complete permanent change in topography which has a positive impact on the local community.</p> <p>Significant permanent reduction in existing soil erosion, soil compaction or ground instability issues.</p> <p>A reduction in contamination impacts from the existing baseline conditions of 4 or 5 risk levels in the risk matrix, e.g. land that has a very high contamination risk in the baseline becomes a low or very low risk.</p> <p>Land that meets the statutory definition of Contaminated Land in the existing baseline is no longer capable of being determined under Part 2A.</p> <p>Sustainable use of material including recycling/reusing on site material. No offsite disposal of waste soils to landfill.</p>

10.2.25 The effects of the Proposed Development identified are described as adverse/negative or beneficial/positive, major, moderate, minor or negligible, on the basis of the value of the receptor, area over which the effect may occur, whether the effect is direct, indirect or secondary, the duration of the effect (short, medium or long term), and whether the effect is permanent or temporary.

10.2.26 Following the classification of an effect, a clear statement is made as to whether the effect is 'significant' or 'not significant'. As a general rule, major and moderate effects are significant and minor and negligible effects are not significant, in accordance with standard EIA practice. However, professional judgement is also applied to the circumstances of the effect, where appropriate.

Legislative and Policy Framework

10.2.27 The legislative framework and policies and guidance relevant to the Proposed Development are outlined below:

National Planning Policy and Guidance

National Planning Policy Framework, 2019

10.2.28 The National Planning Policy Framework (NPPF) set out the Government's planning policies and how these are expected to be applied. The NPPF considers three dimensions to sustainable development: economic, social and environmental. In terms of land contamination and physical effects on the ground, the environmental role aims to contribute to protecting and enhancing our environment, by (paragraph 170):

- Protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils;
- Recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
- Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and
- Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land where appropriate.

- 10.2.29 Paragraph 178 indicates that planning policies and decisions should ensure that:
- a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);
 - if a site is subject to remediation, as a minimum, post remediation, the land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and
 - adequate site investigation information, prepared by a competent person, is available to inform these assessments

Planning Practice Guidance, 2014

- 10.2.30 The Planning Practice Guidance (PPG) Land affected by Contamination, released in March 2014 provides guidance in support of the NPPF and states that responsibility for securing a safe development, in relation to land contamination, rests with the developer and/or landowner. However, local planning authorities should be satisfied that a proposed development will be appropriate for its location and not pose an unacceptable risk.
- 10.2.31 The PPG requires that where there is a reason to believe contamination could be an issue, developers should provide proportionate but sufficient site investigation information (a risk assessment) to determine the existence or otherwise of contamination, its nature and extent, the risks it may pose and to whom/what (the 'receptors') so that these risks can be assessed and satisfactorily reduced to an acceptable level. A risk assessment of land affected by contamination should inform an Environmental Impact Assessment if one is required. The guidance indicates that on a low risk site, a desk study and site walkover would suffice.
- 10.2.32 Unless this initial assessment clearly demonstrates that the risk from contamination can be satisfactorily reduced to an acceptable level, further site investigations and risk assessment will be needed before the application can be determined.

Local Planning Policy

Coventry City Council Local Plan, adopted December 2017

- 10.2.33 The Ground Conditions assessment will consider the relevant local planning policies with specific reference to Policies H3, GE3, GB1, EM6, EM8 and EM10 as set out in Coventry City Council Local Plan, adopted 2017. The relevant policies are summarised below:
- H3 - Provision of New Housing – ensures that a suitable residential environment will be safe from environmental pollutants such as land contamination.

Ground Conditions

- Policy GB1 identifies greenbelt areas which will be removed to accommodate future development needs. This includes land at Keresley if it is proposed for residential land use;
- Policy GE3 relates to the principles for protecting any sensitive geological and other conservation sites.
- Policy EM6 requires that any new development on previously developed land does not lead to pollution of controlled water receptors.
- Policy EM8 defines the Council's Waste Management Strategy including requirements for new development proposals to include measures to minimise waste generation during construction, use and life of buildings; and
- Policy EM10 defines the requirements to consult The Coal Authority in areas where proposed non-mineral development is considered in a potential Mineral Safeguarding Area. Although the Application Site is not located in a Mineral Safeguarding Area, it lies within a coal mining reporting area with the potential for deep coal seams, therefore this policy is considered relevant.

Warwickshire County Council, Minerals Core Strategy, 2009 and proposed 2018 updates (currently under consultation)

- 10.2.34 Mineral Resource Information for Development Plans, West Midlands, British Geological Survey (BGS), 2009.

Legislative Context

Part 2A of the Environmental Protection Act, 1990 as amended by the Environment Agency Act 1995

- 10.2.35 The UK legislation on land contamination is principally contained in Part 2A of the Environmental Protection Act, 1990.
- 10.2.36 The Environmental Protection Act 1990 defines, within England, Wales and Scotland, the fundamental structure and authority for waste management and control of emissions into the environment.
- 10.2.37 Part 2A of the Environmental Protection Act (EPA) 1990 introduced a statutory regime for the identification and remediation of 'Contaminated Land'. It introduced, for the first time in the UK, a statutory definition of 'Contaminated Land' based on significant harm or the likelihood of significant harm or the pollution or likely pollution of controlled waters (all groundwater, inland waters and estuaries, excluding water perched above the zone of saturation).
- 10.2.38 Local authorities are the primary regulators under the Part 2A regime, with a duty to identify whether the land in their area is 'Contaminated Land', although provision is made for consultation and co-ordination with the Environment Agency in situations when pollution of controlled waters is an issue.

Contaminated Land (England) (Amendment) Regulations, 2012

- 10.2.39 The contaminated land regime applies a risk-based approach to land remediation, requiring the action taken to be proportionate and appropriate to the risk. The identification of contaminated land is based upon establishing a pollution linkage from a contaminant, through a pathway to a receptor.
- 10.2.40 The regime identifies the 'appropriate' persons to bear responsibility for remediation as those 'who caused or knowingly permitted the substances to be in, on or under

that land' based on the 'polluter pays' principle. If the polluter cannot be found, then responsibility shifts to the owner or occupier of the land.

The Water Framework Directive, 2000

- 10.2.41 The WFD establishes a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater. It requires:
- Environmental objectives be set to ensure that good status of groundwater is achieved and that its deterioration is avoided. This includes that any upward sustaining trend in the concentration of a pollutant must be identified and reversed;
 - A good status of groundwater requires early action and stable long-term planning of protective measures, owing to the natural time lag in its formation and renewal; and

- 10.2.42 Monitoring programmes should cover monitoring of the chemical and quantitative status of groundwater.

The Water Resources Act, 1991 (as amended)

- 10.2.43 The WRA regulates discharges to controlled waters, namely rivers, estuaries, coastal waters, lakes and groundwaters. The WFD implements goals to improve water quality (surface water and groundwater) and drives sustainable use of water.

The Waste Framework Directive, 2008 and Waste Management (England and Wales) Regulations, 2016 (as amended)

- 10.2.44 The waste hierarchy has been transposed into UK law through The Waste (England and Wales) Regulations 2011. The regulations came into force on 29 March 2011. The provisions relating to the hierarchy (set out at in Regulations 12, 15 and 35) came into force on 28 September 2011. The prevention of waste offers the best outcomes for the environment. It is at the top of the priority order, followed by preparing for re-use, recycling, other recovery and disposal, in descending order of environmental preference.

The Environmental Permitting (England and Wales) Regulations, 2016

- 10.2.45 Re-use of soils within the Proposed Development can be managed through either the Environmental Permitting Regulations 2016 or in accordance with the Contaminated Land: Applications in Real Environments (CL:AIRE) Code of Practice Definition of Waste: Code of Practice (CoP)⁶.

- 10.2.46 Under the CL:AIRE CoP, materials excavated within the Proposed Development are not deemed to be waste if it can be demonstrated that they are suitable for re-use within the Proposed Development, subject to appropriate assessments, preparation of Materials Management Plan and declaration by a Qualified Person.

The Control of Substances Hazardous to Human Health Regulations, 2002 (as amended) (COSHH Regulations)

- 10.2.47 The Contaminated Land regime, as implemented through Part 2A and planning, does not address the risks to construction or maintenance workers or other occupations which may have direct exposure to contaminated land. The risks to these human receptors are managed through health and safety legislation, such as the COSHH Regulations and the CDM Regulations which require the employer to carry out an

⁶ CL:AIRE, "The Definition of Waste: Development Industry Code of Practice," 2011

Ground Conditions

assessment of the risks associated with exposure to hazardous substances and then to prevent those risks, and, if this is not reasonably practicable, to adequately control such exposures.

Department of Food and Rural Affairs (DEFRA) – Contaminated Land Statutory Guidance, 2012

10.2.48 The principal objectives of the Contaminated Land legislation are described in the Defra Contaminated Land Statutory Guidance 2012, as follows:

- Identify and remove unacceptable risks to human health and the environment;
- Seek to ensure that contaminated land is made suitable for its current use; and
- Ensure that the burdens faced by individuals, companies and society as a whole are proportionate, manageable and compatible with the principles of sustainable development.

10.2.49 These three objectives underlie the 'suitable for use' approach to the assessment and remediation of 'land contamination'. This approach recognises that the risks presented by any given level of land contamination will vary greatly according to the use of the land and a wide range of other factors, such as the sensitivity of the underlying geology and the receptors which may be affected. The 'suitable for use' approach consists of three elements:

- Ensuring that land is suitable for its current use;
- Ensuring that land is made suitable for any new use; and
- Limiting requirements for remediation to the work necessary to prevent unacceptable risks to human health or the environment in relation to the current use or future use of the land.

DEFRA and the Environment Agency – Model Procedures for the Management of Land Contamination, Contaminated Land Report 11, 2004

10.2.50 Primary guidance for assessing and managing land contamination is presented in CLR11 and GPLC. These documents provide a technical framework for the identification and remediation of contamination through the application of a risk management process.

Scoping Criteria

10.2.51 In line with the scoping opinion and the government's Good Practice Guide² for Environmental Impact Assessment (EIA), the following potential environmental effects should be considered by the Ground Conditions chapter for both the construction and operational phases of the Proposed Development:

- Physical effects of the Development: for example changes in topography, soil compaction, soil erosion, ground stability, etc.;
- Effects on soil as a valuable resource: for example loss or damage to soil of good agricultural quality;
- Effects associated with ground contamination that may already exist on the Application Site (including risks to human health, controlled waters, ecological and property receptors) and its immediate surrounds within a 500m radius. It will also consider effects such as introduction /changing pathways and receptors;
- Effects associated with the potential for polluting substances used (during construction/operation) to cause new ground contamination issues on the Application Site, e.g. introducing/changing the source of contamination and/or pathways; and

- Effects associated with re-use of soils and waste soils: re-use of site-sourced materials on- or off-site, disposal of site-sourced materials off-site, importation of materials to the Application Site, etc.
- 10.2.52 Effects on geology as a valuable resource and soils as an agricultural resource were scoped out at Scoping stage, as the Proposed Development is unlikely to impact on any Local Geological Sites or mineral resources and the Application Site does not lie within BMV land. The effects on soil as a valuable resource has also been scoped out at this stage as mapped evidence suggests limited superficial deposits and or limited value for quarrying.
- 10.2.53 The effects on geology was scoped out because BGS records indicates there are no records of mine shafts or deep mining on the Site. The historical colliery approximately 600m of the Site have closed down and so there is unlikely to be a viable source of mineral resource to mine and it is beyond 500m of the Proposed Development.
- 10.2.54 This chapter therefore assesses the physical effects of the Proposed Development; the potential for contamination to be introduced to the environment or mobilised from the works; and effects associated with the re-use of soils and generation of waste soils.
- 10.2.55 The proposed construction details and methods are not currently available at this outline stage, however soils will be excavated and likely waste generated. The re-use of soils and waste soils is considered within this chapter.
- 10.2.56 Therefore, in accordance with the EIA Scoping Report⁷, the relevant environmental effects associated with the Development on Ground Conditions and Contamination relate to:
- Physical effects of the Proposed Development;
 - existing ground contamination;
 - impacts associated with the potential for polluting substances used during construction and operation of the Development; and
 - implications of soil / material quality for reuse or waste disposal.
- 10.2.57 The assessment has considered the construction and operational phase of the development, a decommissioning phase has been scoped out in the Scoping Report. Environmental impacts are likely to be greatest during construction, with reduced impacts likely during operation due to the contamination and physical risks being mitigated through the detailed design.
- 10.2.58 Hydrogeology will only be considered in this chapter in terms of a pathway and receptor for contamination. The effect of the works on groundwater regime will be considered in **Chapter 11** (if necessary).

Extent of Study Area

- 10.2.59 For effects associated with ground contamination sources, receptors within 500m of the Application Site are considered. The study area for contamination covers the Application Site as shown on the red line boundary (**Figure 1.2**) and extends to the area within 500m of the Application Site. The study area has been selected to consider the movement of potential contaminants of concern in the environment and the connectivity of these contaminants via pathways of migration/exposure to sensitive receptors.

⁷ Pegasus Group, Environmental Impact Assessment: Scoping Report. Thompsons Farm, Keresley, Coventry. October 2018.

Ground Conditions

10.2.60 In relation to physical effects, the study area will be the Application Site as defined by the red line boundary shown on **Figure 1.2**.

Assessment Assumptions and Limitations

10.2.61 The following assumptions have been made for the assessment:

- As the planning application seeking consent is outline in nature, the detailed design has not been finalised. The 'reasonably likely worst case' impact has therefore been assumed in the assessment and is sought to be mitigated;
- The assessment is based on the Proposed Development as presented in the current red line boundary (**Figure 1.2**) and parameters assessed;
- Construction of the Proposed Development is likely to take place with several building parcels being constructed concurrently;
- There will be areas used for the parking of cars during the construction and operational phase, which could be anywhere within the Proposed Development;
- There will be areas used for the storage of materials, waste and containers during the construction and operational phase. Where storage / stockpiling of materials occurs, the material will stay within the Proposed Development boundary;
- Construction best practice will be adhered to at all times during the works;
- This chapter does not address risks to construction or maintenance workers, as the assessment presented herein relates to the long-term (chronic) risk posed by contamination, not short-term exposure (acute risk) which is applicable to construction workers and which will be managed through the application of suitable health and safety assessments and working methods;
- The assessments presented within this chapter provide some information which can be used by contractors for the development of the construction workers' risk assessments and method statements to mitigate potential risks; and
- Other, conservative assumptions are highlighted throughout this chapter, which ensure a robust approach to the assessment.

10.2.62 The following limitations applies to the assessment:

- Intrusive ground investigations were undertaken solely for the purposes of drainage and soakaway testing. This comprised a total of eight trial pits, no soil sampling for contaminated land or geotechnical purposes has been undertaken.
- There is no soil, leachate, groundwater, or gas monitoring data available for the Application Site.
- The risk assessment and impact assessments have been carried out using the information provided in Atkins Desk Study⁸, Envirocheck Report¹⁵ and publicly available desk-based information, i.e. a qualitative assessment.
- The desk study was completed based on published information recommended and limited intrusive ground investigation undertaken on the Application Site.

10.3 BASELINE CONDITIONS

10.3.1 The baseline ground condition at the Proposed Development is provided in the Desk Study report⁸ (see **Appendix 10.2**) with summary provided in this section.

Data Sources

10.3.2 The following information sources have been used in establishing the baseline conditions within the Application Site and the wider study area, with information pertinent to this assessment included within this Chapter and supporting appendices:

- Envirocheck Report for Keresley, Coventry dated March 2017;
- Current online aerial photography – Google Maps and Bing Maps, accessed 7 January 2019;
- British Geological Survey (BGS) Geology of Britain online viewer, accessed 7 January 2019;
- British Geological Survey (BGS) borehole scans, accessed 7 January 2019;
- Environment Agency website, accessed 8 January 2019;
- MAGIC website, accessed 8 January 2019;
- Coal Authority Interactive online and Coal Authority website, accessed 8 January 2019;
- Atkins, Phase 1 Desk Study Report for the Application Site at Thompsons Farm, Keresley. Dated 2018; and
- Factual data from soakaway testing and associated trial pitting undertaken in 2018.

Site Description and Context

10.3.3 The Application Site is irregular in shape and covers an area of approximately 20.7 hectares. A site location plan is provided in **Figure 2.1**.

10.3.4 The Application Site is comprised predominantly of arable land within broadly rectangular parcels, with a number of field boundary hedgerows, trees and a single pond. Two buildings are located in the eastern area of the site, these comprise a two story dwelling, Thompsons Cottage and an associated single-story outbuilding. Overall ground level within the Site slope up towards a slight ridge to the west (c.146m AOD) which runs between Burrow Hill and Hounds Hill, although with some localised gentle undulations. A pond is located in the centre of site and a smaller one towards the north-eastern part of the Application Site.

10.3.5 The boundaries of the site are defined as follows:

- Northern edge – defined by existing hedgerows and tree planting, with Keresley Rugby Football Club, farms and associated farmland beyond;
- Eastern edge – the majority is defined by the backs of properties (typically 2 storey houses) fronting onto Bennetts Road North;
- Southern edge – defined by the rear of properties (typically 2 storey houses) fronting Thompsons Lane, and also the retained Thompsons Farm and associated land; and
- Western edge – defined by an existing hedgerow and farmland beyond.

⁸ Atkins, 2018. Thompsons Farm Keresley Geo-Environmental Desk Study Report. For Lioncourt Strategic Land.

Ground Conditions

Baseline Survey Information

Site History

- 10.3.6 A review of the historical land use of the Application Site and study area (within 500m of the Application Site boundary) has been undertaken as part of the Phase 1 Report (see **Appendix 10.2**) to identify nature and location of potentially contaminative activities that may have taken place on or adjacent to the Application Site.
- 10.3.7 Historical Ordnance Survey (OS) maps dated between 1887 and 2017 were reviewed as part of the Phase 1 and the assessment is summarised in **Table 10.7** below.

Table 10.7 Historical Ordnance Survey Assessment Summary

Map	On-site	Off-site
1887 – 1888 1:10,560	The Application Site is shown as undeveloped agricultural land.	The Application Site is surrounded by agricultural land, woodland and ponds.
1905 – 1906 1:10,560	No significant changes shown.	A pumping station is marked 50m north of the Application Site near two covered reservoirs.
1915 – 1926 1:10,560	No significant changes shown.	Coventry Colliery with associated shafts, railway line and mine workings. An electric power station is also marked south of the colliery. Several farms, small mineral workings / excavations / old quarried areas are shown approximately 600m from the Site
1936 – 1938 1:10,560	No significant changes shown.	Residential development is shown immediately east and south east of the Application Site. Sewage works are marked 500m east of the Application Site. A saw mill is shown approximately 380m to the south.
1955 1:10,000	No significant changes shown.	Further expansion of the residential development in the surrounding area. The pumping station north of the Application Site no longer exists.
1962 – 1968 1:10,000	A footpath is shown along the northern boundary of the Application Site.	Residential expansion in the wide area continues. The sewage works are no longer present.
1970 – 1999 1:10,000	No significant changes shown.	The former pumping station area is now occupied by playing fields. A number of ponds are observed in the area surrounding the Application Site.
2006 – 2017 1:10,000	No significant changes shown.	A number of structures and the railway line associated with Coventry Colliery are shown to have been replaced by several large buildings.

Geology and SoilsPublished Geological Maps

- 10.3.8 The British Geological Survey (BGS) 1:50,000 Solid and Drift geological map no. 169⁹ indicates that the Application Site is underlain by a sequence of sandstone, conglomerate and argillaceous rocks associated with the Keresley Member. The Keresley Member is described as:
- 10.3.9 'Redbed sequence; mudstone dominated in lower part but becoming increasingly arenaceous (sandy) towards top. Thin Spirorbis limestone beds at some levels. Impersistent conglomerates in upper part'.
- 10.3.10 A geological fault is recorded within the westernmost part of the Application Site. The likely depth of any fault is unknown at this stage, however the fault is unlikely to be of significant concern for the Proposed Development but will need to be considered at detailed design stage.
- 10.3.11 No superficial deposits are recorded underlying the Application Site or in the vicinity of the Application Site.
- 10.3.12 Historical borehole logs available in the BGS GeoIndex Onshore portal have recorded topsoil over sandy clay to approximately 1.80m below the existing ground level (bgl), overlying a sequence of red and grey sandstone and marl (argillaceous limestone) to a maximum depth of 21.8m bgl.

Ground Investigation

- 10.3.13 A preliminary intrusive ground investigation was undertaken by Ian Farmer Associates in 2017 across the Application Site. The investigation comprised the excavation of eight no. trial pits with soakaway testing. No contamination sampling or testing undertaken as part of this investigation.
- 10.3.14 Topsoil was encountered overlying the upper strata of the Keresley Member. These were typically described as reddish brown clayey sand to sandy clay with variable proportions of gravel overlying reddish brown, extremely weak to very weak sandstone. The top soil varied between 0.35 and 0.5m thick. No made ground was reported in trial pits excavated.
- 10.3.15 Soakaway tests were undertaken at each trial pit location to determine the soil infiltration rate. The testing demonstrated a very limited infiltration capacity within the soils with most of the tests failing.

Identified Geological Hazards

- 10.3.16 The Application Site is generally considered to have very low risk from typical ground stability hazards. It is noted however that a fault is mapped on the western corner of the Application Site. Although the likely depth of any fault is unknown, the available information reviewed at the time of writing indicates that there is currently no significant ground stability risks identified due to the presence of the fault. However, it is anticipated this will be assessed further at detailed design stage. **Table 10.8** provides a summary of the ground stability hazards on or within 250m of the site based on the records in the Envirocheck Report.

⁹ British Geological Survey, 1994. 1:50,000 geological map series, Coventry, Solid and Drift, sheet number 169.

Ground Conditions

Table 10.8 Summary of Ground Stability Hazards,

Hazard	Hazard potential on-site	Hazard potential off-site
Collapsible ground stability	Very low	Very low
Compressible ground stability	No hazard	No hazard
Landslide ground stability	Low	Low
Running sand ground stability	No hazard	No hazard
Shrinking or swelling clay ground stability	Very low	Very low
Ground dissolution	No hazard	No hazard

10.3.17 The Application Site lies within a lower probability radon area, as less than 1% of the homes are above the action level¹⁰. Therefore, no radon protection measures are necessary in the construction of new dwellings or extensions.

Potential for Unexploded Ordnance

10.3.18 Reference to the Zetica UXO Risk maps¹¹ indicates a Low Risk from unexploded ordnance at the Application Site.

Important Geological Sites

10.3.19 No Local Geology Sites or geological SSSI have been identified within 500m of the Application Site.

Mining / Mineral Resources

10.3.20 Reference to the Coal Authority online records¹² indicates that the Application Site lies within an area with potential for deep coal seams to be present between 50m and 1,200m bgl. However, the BGS Onshore portal does not show any record of shafts or historical coal mining sites within 250m of the Application Site. The historical colliery and small mineral workings / excavations / old quarried areas identified on the historical mapping are generally beyond 500m of the Site.

10.3.21 There is no evidence of quarrying or mineral workings on the Site, however, off-site, up to 10 locations of potentially infilled land was identified in the historical mapping records within 250m of the Site boundary. These are associated with the creation or infilling of ponds, marshes, rivers, or streams. Available records for the Warwickshire area indicate that the site does not lie within a Mineral Safe Guarding Area, therefore it is considered that there is no viable mineral resource within 250m of the site.

Soils and Agricultural Land Classification

10.3.22 The Magic Website¹³ indicates that the soils at the Application Site are described as freely draining slightly acidic sandy soils.

10.3.23 A review of the agricultural land classification map for the West Midlands Region does not provide sub classifications for the Application Site. However, Coventry City Council (CCC) commissioned an Agricultural Land Classification (ALC) of 880 ha of land to the west of Coventry in 2008 completed by Soil Environmental Services Limited indicates that the Site is mapped as grade 3b soils (moderate).

¹⁰ <https://www.ukradon.org/information/ukmaps>

¹¹ <https://zeticauxo.com/downloads-and-resources/risk-maps/>

¹² <http://mapapps2.bgs.ac.uk/coalauthority/home.html>

¹³ <https://magic.defra.gov.uk/>

- 10.3.24 Anecdotal evidence indicates that the farm is currently being used for crop growing and has been an agricultural site since the earliest available historic mapping in 1887.

Hydrogeology

Groundwater Level

- 10.3.25 There is currently no information on groundwater levels and flow underneath the Application Site. Based on the topography of the Application Site and the surrounding area, it is anticipated that the regional groundwater flows in a north easterly direction towards the watercourses.

- 10.3.26 During the Ian Farmer Associates ground investigation in 2017, groundwater seepage was only encountered in one of the eight trial pits excavated to depths of between 2.1m and 3m bgl. The seepage of groundwater was encountered at a depth of 3mbgl within the Keresley Member in TP102 at the northern part of the Site.

Aquifer Designations

- 10.3.27 The Keresley Member bedrock underlying the Application Site is designated as Principal Aquifer.

- 10.3.28 Principal Aquifers are permeable layers capable with high intergranular and/or fracture flow permeability and capable of supporting high level of water storage, often for water supply and/or river base flow at strategic scale.

Groundwater Vulnerability

- 10.3.29 Reference to the MAGIC online maps¹³ indicates that the Application Site is located within a Source Protection Zone (SPZ) III (Total Catchment).

- 10.3.30 The soils underlying the Application Site are classified as Minor Aquifer with intermediate to high groundwater vulnerability.

Licensed Groundwater Abstractions

- 10.3.31 There is record of two licenced groundwater abstractions located within approximately 500m of the Application Site⁸. Both groundwater abstractions are part of a single licence and are located at c. 430m east of the Application Site and are associated with industrial processing and cooling.

- 10.3.32 There are four other groundwater wells recorded by the BGS¹⁴ within 250m of the Application Site. Two of these are located immediately north of the Application Site, along Burrow Hill Lane, and are both installed in the Keresley Member (formerly identified as Meriden Formation). Two deep wells (between 590m and 660m), possibly associated with historical coal mining, are also recorded south of the Application Site along Thompson's Farm.

Discharge Consents

- 10.3.33 There is no record of discharge consents to groundwater within 500m from the Application Site¹⁵.

¹⁴ <http://mapapps2.bgs.ac.uk/geoindex/home.html>

¹⁵ Envirocheck, 2017. Envirocheck Report for the Application Site at Keresley, Coventry.

Ground Conditions

Hydrology

Hydrological and Drainage Information

- 10.3.34 Details of the Application Site hydrology is provided in **Chapter 11** and summarised here.
- 10.3.35 A number of ditches and small watercourses within and adjacent within the Application Site and its immediate surroundings.
- 10.3.36 The nearest surface water courses to the Application Site are Breach Brook and Hall Brook which are located approximately 800m to the north east and 600m to the south west of the Site respectively. Two smaller unnamed watercourses are present downstream of the Application Site. These are likely to be tributaries of the Breach Brook as they convey water from the Application Site and Bennetts Road North into the Breach Brook to the east, and ultimately the River Sowe.

Flood Risk

- 10.3.37 The Application Site is located within a Flood Zone 1¹⁶ with low risk of flooding.

Licensed Surface Water Abstraction

- 10.3.38 There is no record of licenced surface water abstractions within 500m of the Application Site.

Discharge Consents to Surface Water

- 10.3.39 There is no record of a discharge consents to surface water within 500m of the Application Site.

Other Environmental Issues

Waste Management Sites / Landfill Sites

- 10.3.40 There are no waste management sites or operational landfill sites within 500m of the Application Site. However, there are 10 locations of potentially infilled land within 250m of the Application Site identified due to the creation or infilling of ponds, marshes, rivers or streams.

Recorded Pollution Incidents

- 10.3.41 There are no recorded pollution incidents within 500m of the Application Site.

Contemporary Potentially Contaminative Land Uses

- 10.3.42 There is record of two active commercial land uses within 500m of the Application Site boundary. These comprises a car garage situated approximately 380m north-east of the Application Site, and Cash registers and check-out equipment marked approximately 440m south-east of the Application Site.
- 10.3.43 There are no fuel station entries recorded within 500m of the Application Site.

¹⁶ Zone 1 Low Probability – Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)

Preliminary Conceptual Site Model

10.3.44 A Preliminary CSM (PCSM) identifies the potential or known sources of contamination, receptors and pathways between the two in accordance with CLR11¹⁷. Where all three are present or are considered likely to be present (source-pathway-receptor linkage), they are called a PCL. Three CSMs (baseline, construction and operation) have been developed from the PCSM for the Application Site using the information summarised above and based on professional judgement. A summary of potential contamination sources, pathways and receptors identified within the PCSM are provided in **Tables 10.9 - Table 10.11**. The baseline and construction CSMs are included in **Appendix 10.3** On-Site is considered to be within the boundary of the Application Site and off-Site is considered to be within the study area (500m buffer).

Potential contamination sources

10.3.45 Potential sources of contamination have been identified and assessed from the current and historical land use within the Proposed Development and the study area and are summarised in **Table 10.9** below;

Table 10.9 Potential sources of contamination

	Potential source of contamination	Potential contaminants
On-site	Agricultural land use (fertiliser/chemical usage/fuel spillages/buried wastes (e.g. asbestos or animal wastes)	Asbestos Metals Fertilisers/pesticides /herbicides Polycyclic aromatic hydrocarbons (PAHs)
	Infilling of Historical drains and ponds	Hydrocarbons Organic Compounds (VOCs and SVOCs) Polychlorinated Biphenyls (PCBs) Ground gases (methane, carbon dioxide, hydrogen sulphide or carbon monoxide).
Off-site	Agricultural land use (north, west & south)	Asbestos Metals Fertilisers/pesticides/ herbicides Polycyclic aromatic hydrocarbons (PAHs)
	Made Ground associated with adjacent infrastructure and residential development (east) and pockets of infilled land across the area	Hydrocarbons Polychlorinated Biphenyls (PCBs)
	Made Ground and groundwater contamination associated with reservoirs and historic pumping station to the north	Ground gases (methane, carbon dioxide, hydrogen sulphide or carbon monoxide).
	Former Coventry Colliery and associated activities, railway line (375m south)	
	Former electrical power station (380m south)	
	Former sewage treatment works (500m east)	
	Former sewage tank (200m south)	
	Former saw mill (380m south)	

¹⁷ Defra and Environment Agency, 2004. Model Procedures for the Management of Land Contamination, Contaminated Land Report 11.

Ground Conditions

Potential contamination receptors

10.3.46 A summary of the receptors relevant to the current and future land use during the construction and operation of the Proposed Development are summarised in **Table 10.10** below.

Table 10.10 Potential contamination receptors

Receptor Group	Baseline	Construction	Operation
Human health (on-site)			
Future user of the Application Site (residential occupants, visitors)	Not present	Not present	Present
Farmers working on agricultural land	Present	Not present	Not present
Future users of the proposed open space area	Not present	Not present	Present
Human health (off-site)			
Farmers working on nearby agricultural land	Present	Present	Present
Members of the public accessing the surrounding area	Present	Present	Present
Occupants of nearby residential, commercial properties and visitors	Present	Present	Present
Controlled waters: groundwater (on site and off site)			
Groundwater in Principal Aquifer (Keresley Member)	Present	Present	Present
Controlled waters: surface water (on site)			
Pond located in centre of the Application Site and pond located close to the north-western boundary.	Present	Present	Present
Controlled waters: surface water (off site)			
Two unnamed watercourses, likely tributaries of the Breach Brook, located approximately 110m north and 260m south-west of the Application Site flowing in a south easterly direction.	Present	Present	Present
Various ponds and drains within 500m of the Application Site.	Present	Present	Present
Property and services (on site)			
Proposed residential properties	Not present	Not present	Present
Proposed on-site services	Not present	Not present	Present
Property and services (off site)			
Existing residential and commercial properties	Present	Present	Present
Existing off-site services	Present	Present	Present
Crops and livestock in nearby agricultural land	Present	Present	Present

Potential Exposure Pathways

10.3.47 Potential exposure pathways between the sources of contamination and receptors identified above are outlined in **Table 10.11**.

Table 10.11 Potential exposure pathways

Receptor	Potential exposure pathway
Human Health Receptors (on and off site)	<ul style="list-style-type: none"> • Dermal contact with and / or ingestion of contaminants in soils, soil-derived dusts and water; • Inhalation of soil derived dust, fibres and gas/vapours; • Dermal contact with and/or ingestion of contaminants in windblown soil-derived dusts and water that may have migrated off site; and • Inhalation of windblown soil derived dust, fibres and gas/vapours which may have migrated off site.
Controlled Waters Receptors: Groundwater	<ul style="list-style-type: none"> • Leaching / migration of contaminants in soil to groundwater in underlying aquifers; and • Migration of contaminated water through preferential pathways such as underground services, pipes and granular material to groundwater in underlying aquifers.
Controlled Waters Receptors: Surface waters	<ul style="list-style-type: none"> • Lateral migration of contaminated groundwater with discharge to surface watercourses as base flow; and • Discharge of contaminants entrained in groundwater and/or surface water run-off followed by overland flow and discharge.
Property Receptors: buildings and services (on Site and off Site)	<ul style="list-style-type: none"> • Direct contact of contaminants in soil and/or groundwater with existing and proposed structures and buried services; and • Migration of contaminated groundwater, ground gas and/or vapours along strata and preferential pathways such as service routes or differentially permeable strata.
Property Receptors: crops and livestock (off Site)	<ul style="list-style-type: none"> • Migration of contaminated waters/dust/fibres and subsequent uptake by crops or ingestion/inhalation/dermal contact by livestock.

10.4 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

10.4.1 This section presents the findings of the assessment for the construction and operational use of the Proposed Development and identifies any significant effects.

Construction Effects

Physical Effects

10.4.2 A qualitative approach has been undertaken to assess the likely effects of the Proposed Development on topography, soil compaction, contamination, soil erosion and ground stability. The effects have then been categorised in accordance with the methodology outlined in the sections above and confirmed as direct; indirect; secondary; short; medium and long-term; permanent and temporary; positive and negative

10.4.3 The Proposed Development may cause physical effects associated with stripping of topsoil, vegetation clearance, bulk earthworks to level the Application Site, temporary stockpiling of materials and construction of new buildings and infrastructure. These are discussed in more detail below.

Ground Conditions

Physical Effects: Topography

- 10.4.4 From a review of the existing data available at the time of writing, it is considered that the proposed works are likely to have a limited effect on the topography of the Application Site. The Application Site currently lies at between 124m AOD in the east of the Application Site to 146m AOD to the west of the Application Site. There is likely to be earthworks required during the construction phase, including the excavation of foundations and for the construction of new infrastructure, the majority of impacts associated with the earthworks will be limited, temporary and will be managed through mitigation by design.
- 10.4.5 The effects on topography are therefore considered to be temporary, short term and direct and adverse/negative. The value / sensitivity of the receptor is classed as **low** in accordance with **Table 10.1** and the magnitude of the impact is considered to be **negligible** in accordance with **Table 10.2**. The overall effect is therefore considered to be **negligible** and classed as **not significant**.

Physical Effects: Soil Erosion

- 10.4.6 There is likely to be increased temporary soil erosion from the stripping of topsoil, vegetation clearance, general earthworks, excavations for the underground services and foundation as well as temporary stockpiling and the movement of heavy plant. There is also the potential for increased runoff during earthworks carrying a high sediment load to affect surface water receptors. However, designed mitigation will reduce potential impacts from soil erosion. Areas required for temporary works will also be reinstated.
- 10.4.7 The effect on soil erosion is considered to be temporary, short term and direct and adverse/negative. The value / sensitivity of the receptor is classed as **low** and the magnitude of the impact is considered to be **negligible**. The overall effect is therefore considered to be **negligible** and classed as **not significant**.

Physical Effects: Soil Compaction / Ground Stability

- 10.4.8 The desk study report indicates that there is either no hazard or a very low potential for landslide ground stability hazards, ground dissolution stability hazards, and shrinking or swelling clay across the Application Site. The BGS records indicates there are no records of mine shafts or deep mining on the Site or within 250m of the Proposed Development. The Site is also identified as having a low unexploded ordnance (UXO) risk.
- 10.4.9 It is anticipated that further assessment of the ground conditions and designed mitigation/remedial measures will be undertaken as part of the detailed design to reduce any potential effects of ground instability, compaction and settlement where necessary. If and where required, the Proposed Development will incorporate ground stabilisation/improvement, which will reduce ground hazards and permanently improve ground stability and compaction.
- 10.4.10 Therefore, the effect on ground stability and ground compaction is considered to be permanent, long term, beneficial/positive and indirect. The value / sensitivity of the receptor is classed as **low** and the magnitude of the impact is considered to be **negligible**. The overall effect is therefore considered to be **negligible** and classed as **not significant**.

Land Contamination

- 10.4.11 The construction PCSM and risk assessment are presented in **Appendix 10.3** and the impact assessment in **Appendix 10.4**. The construction impact assessment is undertaken by comparing the baseline land contamination risks to those predicted during construction, while considering any new sources and pollution pathways introduced by construction activities.
- 10.4.12 It should be noted that, given the information known at the time of writing, professional judgement has been applied in some cases to adjust the significance of the effect where the introduction or removal of a receptor has automatically triggered a minor adverse or minor beneficial effect.
- 10.4.13 The construction will potentially introduce new sources of contamination and disturb and mobilise existing sources of contamination. Construction activities may introduce new pathways for migration of existing contamination such as excavation and exposure of contaminated soil, remobilisation of contaminants through soil disturbance and the creation of preferential pathways for surface water run-off and ground gas migration pathways. Potential changes to the baseline situation creating PCLs, which have been assessed within this chapter are:
- Potential for mobilising contaminants by excavation and stockpiling of material, increasing the risk to controlled water receptors through leaching and run-off. Earthworks could provide opportunities for run-off to contain suspended solids if not managed properly;
 - Potential for exposure of human receptors by generation of potentially contaminated dust and vapours released by the construction works; and
 - Potential for creation of new pathways to groundwater during groundworks, through opening up ground temporarily and construction activities, such as earthworks, installation of below-ground services and foundations.
- 10.4.14 Mitigation measures will be incorporated into the construction process as outlined in **Section 10.5**. These will include the adoption of working methods during construction to manage appropriately groundwater impacts, implementation of appropriate pollution incident control and implementation of appropriate and safe storage of fuel, oils and equipment.
- 10.4.15 With the design mitigation, risks identified to human health, controlled waters and property receptors during construction are assessed as **very low to low**. Compared to the existing baseline, the level of risk to receptors has remained generally the same due to the design mitigation for the prevention of impacts from land contamination. The impacts on land contamination are therefore considered to be permanent, long term and direct. An overall **negligible effect** has been predicted, which is classed as **not significant**.
- 10.4.16 The assessment of land contamination effects during the construction phase is summarised in **Table 10.12** below:

Ground Conditions

Table 10.12 Land contamination construction phase effects for the Proposed Development

Receptor	Value/ Sensitivity	Baseline risk	Construction risk	Effect
Human Health	High	Very low	Very low	Negligible
Controlled waters (groundwater)	High	Low	Low	Negligible
Controlled waters (surface water)	Low	Low	Low	Negligible
Property (existing and future structures and services)	Medium	Very low	Very Low	Negligible
Property (crops and livestock)	Medium	Very low	Very Low	Negligible

Waste Soils and Soil Re-use

- 10.4.17 Significant volumes of excavated site won soil are not anticipated and the majority of materials are likely to be suitable for re-use on Site. Excess material may be generated during the construction phase through ground re-profiling as part of the Proposed Development. While it is likely that the majority of the excess material may be suitable for re-use, there is a potential that some of it may contain hazardous material such as asbestos associated with any made ground / infilled materials.
- 10.4.18 An appropriate Materials Management Plan (MMP) will be prepared for the construction works to allow the re-use of suitable soils on the Application Site and to ensure excess / waste materials are minimised and managed appropriately. The design of the Proposed Development will also seek, as far as reasonably practicable to source local materials, to reuse and recycle materials on Site. Therefore, the impacts of soil reuse and waste are assessed to be **minor beneficial** and **minor adverse** respectively and are classed as **not significant**.
- 10.4.19 Therefore, the impacts on waste soils and soil re-use are considered to be temporary, short term, positive and negative, and direct and classed as **not significant**.

Operation

Physical Effects

- 10.4.20 Impacts in relation to physical effects are considered to be mainly related to the construction phase of the Proposed Development. It is also assumed that designed mitigation (**Section 10.5**) will be undertaken and will improve the condition of the Application Site for the Proposed Development. During operation, the Application Site will have settled sufficiently for the design, the topography will be set and there will be limited soil erosion and soil compaction anticipated due to the ground coverage and end use.
- 10.4.21 Therefore, the effect on topography, soil erosion, ground stability and compaction are considered to be temporary, short term, positive and direct and assessed as **negligible** and **not significant**.

Land Contamination

- 10.4.22 The operational PCSM and risk assessment are presented in **Appendix 10.3** and the impact assessment in **Appendix 10.4**.
- 10.4.23 The operational phase impact assessment has been undertaken by comparing the land contamination risks at the baseline stage to those predicted during operation of the Proposed Development.
- 10.4.24 The operation will potentially introduce new sources of contamination. Below ground services could create additional potential pathways for the migration of potential contamination that were not present at baseline and construction stages. However, the Proposed Development will be operated in accordance with the relevant regulations, best practice guidance and pollution prevention.
- 10.4.25 Therefore, the risks identified to human, controlled waters and property receptors during operation are assessed as very low. Compared to the existing baseline, the level of risk to receptors has remained generally the same. An overall **negligible to minor beneficial effect** has been predicted which is **not significant**.
- 10.4.26 The assessment of land contamination effects during the operational phase is summarised in **Table 10.13** below.

Table 10.13 Land contamination operational phase effects for the Proposed Development

Receptor	Value/ Sensitivity	Baseline risk	Operational risk	Effect
Human Health	High	Very low	Very low	Negligible
Controlled waters (groundwater)	High	Low	Very low	Minor Beneficial
Controlled waters (surface water)	Low	Low	Very low	Minor Beneficial
Property (existing and future structures and services)	Medium	Very low	Very Low	Negligible
Property (crops and livestock)	Medium	Very low	Very Low	Negligible

Waste Soils and Soil Reuse

- 10.4.27 The potential for generation of waste soils and opportunity for re-use mainly relates to the construction phase as land take and disturbance of land will occur as part of the construction work. Therefore, impacts during the operational phase is classed as **negligible** and **not significant**.

Ground Conditions

10.5 MITIGATION, ENHANCEMENT AND RESIDUAL EFFECTS

10.5.1 As outlined above, the following mitigation measures will be incorporated into the design, construction and operation of the Proposed Development to reduce impacts of physical effects, and effects associated with land contamination, soil waste and soil re-use.

Mitigation by Design

10.5.2 The following section provides a summary of the design mitigation assumed to be adopted during detailed design, construction and operation stages to reduce the effects on ground conditions and contamination from the Proposed Development.

10.5.3 It is assumed that mitigation measures associated with the legal requirements or standard practices will be implemented as part of the detail design and construction works. These standard measures will include but not be limited to:

- Suitable levels of Ground Investigation, ground gas and groundwater level monitoring, groundwater and surface water sampling, and if necessary, Contaminated Land Risk Assessment to confirm risks from the historical land use of the Application Site and surroundings. The assessment will include appropriate remediation (if necessary) and enable materials management strategy to be developed;
- Design of and completion of any remedial works considered necessary following the investigation and assessment in accordance with regulatory standards and current best practice including but not limited to CLR11¹⁷ and BS10175¹⁸;
- Design to include quarantine area for any contaminated wastes;
- Design of earthworks to allow retention of as much material as possible on Site, and the long term storage and management of materials on Site to be minimised;
- Design of structures and selection of construction materials in accordance with British Standards and best practice guidance at the time of the design. The design will be required to take into account the ground conditions including the potential for movement, the geological fault, ground gas and ground aggressivity.
- Drainage strategy / SUDs design / flood prevention measures considering the ground conditions and level of contamination present on Site.

10.5.4 Piling is not anticipated as part of the works. However, if piling is required and if there is confirmed evidence of ground contamination on the Application Site, piling risk assessment in accordance with the Environment Agency guidance document Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination will be undertaken. Piling techniques deemed appropriate to identify and manage potential risks as a result of creating pathways for unknown contamination to groundwater will be implemented.

Mitigation by Design – Operational Phase

10.5.5 It is assumed for the purposes of this assessment that those mitigation measures identified for the construction phase will be undertaken and will improve the condition of the Proposed Development (for contamination and physical effects) and will mitigate the risks during operation. Therefore, no further mitigation is required at the operational phase.

¹⁸ British Standards Institute, 2017. Investigation of potentially contaminated sites, code of practise; BS 10175:2017.

Additional Mitigation

10.5.6 It is assumed that the above designed mitigation will be adopted accordingly as part of the design and construction of the Proposed Development and the development will be operated in accordance with the relevant regulations, best practice guidance and pollution prevention. However, the following additional mitigation over the legal requirements which may be incorporated into the construction phase are listed below.

- Appropriate best Practice measures included in Construction and Environmental Management Plan (CEMP);
- Health and safety risk assessments, method statements and appropriate Personal Protective Equipment (PPE) for the protection of construction workers will be implemented in accordance with the Control of Substances Hazardous to Health Regulations;
- Environmental awareness training will be provided and documented to all staff working on the Project, including daily site briefings (Toolbox Talks);
- Hand washing facilities will be made available to site operatives, site rules will be created insisting on hand washing prior to breaks and at the end of the working day, and eating and drinking will be limited to site welfare facilities during agreed break periods;
- Limiting the area of earthworks at any one time to reduce temporary effects on topography, soil compaction and erosion;
- Limiting the duration of soil exposure and timely reinstatement of vegetation or hardstanding to prevent soil erosion;
- Silt management to limit runoff of exposed soil into surface waters which would include bunds, drainage covers and silt traps;
- Hydro-seeding or covering of surcharged areas / stockpiles where necessary to reduce soil erosion;
- Implementation of appropriate dust suppression measures to prevent migration of contaminated dust and asbestos fibres;
- Working methods during construction will be implemented to appropriately manage groundwater and surface water and ensure that there is no run-off from the works, any material / waste stockpiles, and storage containers into adjacent surface watercourses; in accordance with PPG: Working at Construction and Demolition Sites¹⁹ (although withdrawn is still a useful guidance);
- Efforts should be made to source local material, or reuse of material within the wider scheme;
- Consideration should be given to the design to maximise off-site construction which will reduce both materials used and waste generated on Site;
- Reduction in the need to store materials and equipment on Site for long periods of time;
- Designated areas will be utilised for the refuelling of plant, equipment and site vehicles on hardstanding with interceptor drainage, bunds or similar;
- Implementation of appropriate pollution incident control e.g. plant drip trays and spill kits;
- Implementation of appropriate and safe storage of fuel, oils and equipment during construction;
- Implementation of an appropriate Materials Management Plan (MMP) and verification report in accordance with the CL:AIRE Code of Practice current at the time of the works. The MMP will be produced using the information from the available ground investigation data on the Application Site to document how the excavated materials will be dealt with; and

¹⁹ Environment Agency, 2012. Working at construction and demolition sites: PPG6; Pollution Prevention Guidelines.

Ground Conditions

- Where required after design of any relevant remediation works, the appointment of a suitably qualified contractor to safely remove and dispose of any hazardous materials such as asbestos.

Table 10.14: Mitigation

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	How measure would be secured		
		By Design	By S.106	By Condition
1	Suitable level of investigation to ensure that the risks of ground contamination is adequately assessed	X		X
2	Best Practice measures included in Construction and Environmental Management Plan	X		
3	Suitable management of materials to minimise waste including Materials Management Plan	X		
4	Design and selection of structures in line with best practice	X		
5	Design of drainage strategy with due consideration to the ground conditions			X

Enhancements

- 10.5.7 In relation to ground conditions and contamination, enhancement measures considered to be 'construction best practice' should be adopted. The Construction and Environmental Management Plan (CEMP) for the Development will set out the measures to be implemented during construction. In relation to ground conditions and contamination, these measures are likely to include but not be limited to:
- A procedure will be included within the CEMP to manage previously-identified contaminated material that is encountered during the works;
 - Storage areas for materials will be identified, and surplus soil arisings from levelling or excavation works appropriately especially where there is some evidence of contamination prior to its removal or treatment; and
 - Where possible, recycled and secondary aggregates should be specified in the design, thereby reducing the demand for virgin material.

Residual Effects

Construction

- 10.5.8 Residual effects relate to those impacts which remain following the implementation of the mitigation and enhancement measures. Many of the mitigation measures were considered as part of the construction design (i.e. integral) and assessed at that time. Negligible effects (which are assessed as not significant) were anticipated during the construction period. Consequently, taking into consideration any additional measures, it is anticipated that the residual effects will remain negligible. Therefore, no residual adverse effects are anticipated.

Operation

- 10.5.9 Similarly, negligible effects are anticipated during the operational period following implementation of the proposed mitigation and enhancement. These effects are assessed as not significant. Therefore, no residual adverse effects are anticipated.

10.6 CUMULATIVE AND IN-COMBINATION EFFECTS

- 10.6.1 Potential cumulative impacts may occur from interaction with other proposed (committed) developments located near the Proposed Development.
- 10.6.2 Inter and Intra cumulative effects in relation to ground conditions could occur through:
- An increase in the amount of dust generated through a larger construction area, affecting human health receptors;
 - An increase in the mobilisation of contaminants in the air, ground and groundwater through the disturbance of a larger area of potentially contaminated ground mobilising contaminants; and
 - Destabilisation of ground, where the developments are particularly close.
- 10.6.3 As detailed in the Scoping Document, the following recently approved projects have been identified:
- 10.6.4 Land bounded by Hall Brook, Bennetts Road South, Sandpits Lane and Tamworth Road. (OUT/2014/2282) Approved 12/02/2018 for 800 dwellings, with associated Local Centre comprising a Retail/Commercial Units; primary school; public open space; allotments; nature conservation area and landscaping. This approved project forms part of the wider Housing Strategic Allocation at Keresley. It is approximately 800m to the south of the Application Site.
- 10.6.5 It is noted that 2 parcels of the allocation have also been subject to screening and / or planning applications as follows:
- Land between Tamworth Road and Fivefield Road (SCR/2018/0456, Applicant Bellway Homes): 550 dwellings with associated access, parking, landscaping, public open space and associated infrastructure. This parcel of land lies approximately 400m to the south of the subject Site, adjacent to the area subject to planning approval; and
 - Land at Bennetts Road (SCR/2018/0468, Applicant David Wilson Homes): 450 dwellings with associated works. This parcel of land also lies approximately 1km to the south east of the subject Site, to the east of Bennetts Road and the area subject to planning approval.
- 10.6.6 These proposed developments are generally located at least 400m from the Application Site and are considered unlikely to have cumulative impacts in relation to ground conditions and have been screened out of the assessment. However, it is acknowledged that the land allocation at Bennetts Road could be wider based on the wider Housing Strategic Allocation at Keresley and there could be cumulative impacts depending on the proximity to the Proposed Development.

Ground Conditions

10.7 SUMMARY**Introduction**

- 10.7.1 Following an assessment of the baseline conditions for the Application Site using publicly available environmental information including existing ground investigation information, an assessment of the potential impacts of the Proposed Development on ground conditions was undertaken.
- 10.7.2 The assessment of the impacts was undertaken in line with IEMA guidelines and the Good Practice Guidance. The assessment considered the following:
- Physical effects of the Proposed Development;
 - The potential ground contamination effects on the Proposed Development;
 - The impacts from polluting substances during the construction and operational phases; and
 - The implications of soil / material quality for reuse or waste disposal.
- 10.7.3 The assessment considered the construction and operational phases of the development. Environmental impacts are likely to be greatest during construction, with reduced impacts likely during operation due to the contamination and physical risks being mitigated through the detailed design.

Baseline Conditions

- 10.7.4 The Application Site comprised greenfield / arable land. The surrounding land also comprised agricultural land with some industrial activities including a pumping station, mineral workings and quarries (beyond 500m of the Proposed Development Site).
- 10.7.5 The Site is directly underlain by the Keresley Member (Sandstone and Argillaceous rocks) bedrock with no superficial cover. Made Ground associated infilled areas may potentially be present on the site.
- 10.7.6 The Keresley Member is a Principal Aquifer but there are no groundwater abstractions within 250m of the Site. The groundwater level and regime across the Application Site is unconfirmed as no detailed ground investigation was undertaken at this stage except for infiltration testing.
- 10.7.7 The Application Site and the surrounding area has low or very low risk of ground instability and there are no important/sensitive geological sites within 500m of the Application Site and the site has a low to moderate risk of Unexploded Ordnance (UXO).
- 10.7.8 The potential contamination sources at the Application Site include the current and historical use of the Site as an agricultural land, potential Made Ground associated with the infilling of ponds on site and historical drains. Potential sources of contamination off-site include a pumping station and some historical mineral workings and quarries (although these are generally beyond 500m of the Site).
- 10.7.9 A preliminary risk assessment concluded that there was a potential moderate to low risk to human health and controlled water receptors, mostly associated with off-site historical land uses and the potential presence of unknown filled (Made Ground) areas on the Application Site.

Likely Significant Effects

- 10.7.10 The impact assessment concluded that, with the implementation of appropriate mitigation measures, there will be an overall **negligible** effect on the ground conditions during the construction phase.
- 10.7.11 For the operational phase, those mitigation measures identified for the construction phase will improve the overall ground condition on the Proposed Development, therefore the operational effects are also **negligible**.

Mitigation and Enhancement

- 10.7.12 Designed mitigation generally will be in accordance with the relevant legislation, regulations, best practice guidance and pollution prevention methods. Additional mitigation / enhancement measures identified generally relate to the suitable management of materials and excavations, silt management, covering stockpiles, sourcing of materials locally, suitable storage of materials, environmental awareness training and the provision of a Construction Environmental Management Plan.

Conclusion

- 10.7.13 A detailed impact assessment was undertaken with respect to ground conditions at the Application Site following a review of the available baseline information.
- 10.7.14 The assessment follows the general principles outlined in the Institute of Environmental Management and Assessment (IEMA) guidelines for Environmental Impact Assessment (EIA) and the requirements of the Government's Good Practice Guide for EIA.
- 10.7.15 The assessment identifies that with the proposed mitigation and enhancement measures in place, there will be **negligible** effects predicted for the ground conditions during both the construction and operational phases of the Proposed Development. Therefore, the Proposed Development at the Application Site is considered to be acceptable and there would be no adverse significant effects.
- 10.7.16 A summary of the significance of overall effects is provided in **Table 10.14** below.

Ground Conditions

Table 10.14 Summary of Effects, Mitigation and Residual Effects

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
Construction								
Physical Effects: Ground Conditions	Soil erosion	<i>Negative Temporary Short Term Direct</i>	Low	Negligible	Local	Negligible (Not significant)	Limiting the duration of soil exposure and timely reinstatement of vegetation or hardstanding to prevent soil erosion. Hydro-seeding or covering of surcharged areas / stockpiles where necessary to reduce soil erosion. Limiting the area of earthworks at any one time to reduce temporary effects on topography, soil compaction and erosion.	Negligible
	Soil compaction and ground stability	<i>Positive Permanent Long Term Indirect</i>	Low	Negligible	Local	Negligible (Not significant)	Limiting the area of earthworks at any one time to reduce temporary effects on topography, soil compaction and erosion.	Negligible
	Topography	<i>Negative Temporary Short Term Direct</i>	Low	Negligible	Local	Negligible (Not significant)	No mitigation / enhancement measures required over and above designed mitigation.	Negligible
Land Contamination : human health, controlled water and property receptors	Contamination from on-site sources	<i>Negative Permanent Long Term Direct</i>	Low (surface waters), Medium (properties), and High (human health and groundwater)	Negligible	Local	Negligible (Not significant)	A procedure will be included within the CEMP to manage previously-unidentified contaminated material that is encountered during the works. Where required after design of any relevant remediation	Negligible

ENVIRONMENTAL STATEMENT

Ground Conditions

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
							<p>works, the appointment of a suitably qualified contractor to safely remove and dispose of any hazardous materials such as asbestos.</p> <p>Reduction in the need to store materials and equipment on Site for long periods of time.</p> <p>Silt management to limit runoff of exposed soil into surface waters which would include bunds, drainage covers and silt traps.</p> <p>Environmental awareness training will be provided and documented to all staff working on the Project, including daily site briefings (Toolbox Talks).</p>	
Waste Soils and Soil Re-use: soils	Generation of waste soils	<i>Temporary Short Term Direct</i>	Low	Minor beneficial (soil re-use) and Minor adverse (waste)	Local	Minor beneficial for re-use and Minor Adverse for waste (Not significant)	<p>Efforts should be made to source local material, or reuse of material within the wider scheme.</p> <p>Consideration should be given to the design to maximise off-site construction which will reduce both materials used and waste generated on Site.</p>	Negligible

ENVIRONMENTAL STATEMENT

Ground Conditions

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
							Where possible, recycled and secondary aggregates should be specified in the design, thereby reducing the demand for virgin material.	
Operation								
Physical Effects: Ground Conditions	Soil erosion	<i>Negative Temporary Short Term Direct</i>	Low	Negligible	Local	Negligible (Not significant)	No mitigation / enhancement measures required over and above designed mitigation.	Negligible
	Soil compaction and ground stability	<i>Positive Permanent Long Term Indirect</i>	Low	Negligible	Local	Negligible (Not significant)	No mitigation / enhancement measures required over and above designed mitigation.	Negligible
	Topography	<i>Negative Temporary Short Term Direct</i>	Low	Negligible	Local	Negligible (Not significant)	No mitigation / enhancement measures required over and above designed mitigation.	Negligible
Land Contamination : human health, controlled waters and property receptors	Contamination from on-site sources	<i>Negative Permanent Long Term Direct</i>	Low (surface waters), Medium (properties), and High (human health and groundwater)	Negligible to Minor Beneficial	Local	Negligible / Minor Beneficial (Not significant)	No mitigation / enhancement measures required over and above designed mitigation.	Negligible
Waste Soils and Soil Re-use: soils	Generation of waste soils	<i>Temporary Long Term Indirect</i>	Low	Negligible	Local	Negligible (Not significant)	No mitigation / enhancement measures required over and above designed mitigation.	Negligible
Cumulative and In-combination								
Physical Effects:	Destabilisation of ground where	<i>Negative Temporary Short Term</i>	Low	Negligible	Local /Borough / District	Negligible (Not Significant)	It is anticipated that the developments themselves will be subject to the NPPF	Negligible

ENVIRONMENTAL STATEMENT

Ground Conditions

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
Ground Conditions	developments are very close	<i>Direct / Indirect</i>					and will require mitigation and control measures to be adopted during the construction through CEMPs to reduce impacts to the environment including dust generation and potential mobilisation of contaminants.	
Land Contamination : human health, controlled water and property receptors	Increase in the mobilisation of contaminants in the air, ground and groundwater through the disturbance of a larger area of potentially contaminated ground mobilising contaminants	<i>Negative Temporary Short Term Direct / Indirect</i>	Low (surface waters), Medium (properties, and High (human health and groundwater	Negligible	Local /Borough / District	Negligible (Not Significant)		Negligible

Ground Conditions
