Tritax Symmetry (Hinckley) Limited

HINCKLEY NATIONAL RAIL FREIGHT INTERCHANGE

The Hinckley National Rail Freight Interchange Development Consent Order

Project reference TR050007

Environmental Statement
Volume 1: Main Statement

Chapter 15: Hydrogeology

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Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 Regulation 5(2)(a)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 Regulation 14

This document forms a part of the Environmental Statement for the Hinckley National Rail Freight Interchange project.

Tritax Symmetry (Hinckley) Limited (TSH) has applied to the Secretary of State for Transport for a Development Consent Order (DCO) for the Hinckley National Rail Freight Interchange (HNRFI).

To help inform the determination of the DCO application, TSH has undertaken an environmental impact assessment (EIA) of its proposals. EIA is a process that aims to improve the environmental design of a development proposal, and to provide the decision maker with sufficient information about the environmental effects of the project to make a decision.

The findings of an EIA are described in a written report known as an Environmental Statement (ES). An ES provides environmental information about the scheme, including a description of the development, its predicted environmental effects and the measures proposed to ameliorate any adverse effects.

Further details about the proposed Hinckley National Rail Freight Interchange are available on the project website:

http://www.hinckleynrfi.co.uk/

The DCO application and documents relating to the examination of the proposed development can be viewed on the Planning Inspectorate's National Infrastructure Planning website:

https://infrastructure.planninginspectorate.gov.uk/projects/east-midlands/hinckley-national-rail-freight-interchange/

Chapter 15 ◆ Hydrogeology

INTRODUCTION

15.1. This ES Chapter considers the likely significance of the environmental impact of the Proposed Development on the hydrogeology beneath the Main Order Limits Site and the local area. The ES has been undertaken in accordance with the requirements as set out within the National Policy Statement for National Networks, and with reference to relevant local plans.

15.2. The Chapter is supported by the following appendices:

- ES Appendix 15.1 Phase 1 Geo-Environmental Assessment (document reference 6.2.15.1).
- ES Appendix 15.2 Preliminary Ground Investigation Report (document reference 6.2.15.2).

METHODOLOGY AND DATA SOURCES

15.3. The ES assesses the likelihood of existing contamination being encountered during the construction process, such that it could cause significant effects on groundwater if not addressed adequately at the construction and/or operational stages, and physical effects on underlying aquifers from the Proposed Development. Construction will entail bringing materials onto site (such as fuel) which if spilt or leaked could result in groundwater contamination.

15.4. A risk-based approach in accordance with Defra[1] and the Environment Agency[2] guidance has been taken to assess contamination which may have a significant effect upon the construction and operation of the Proposed Development, or upon the wider environment as a consequence of the Proposed Development.

15.5. A desk study has been completed covering the Main Order Limits area with preliminary (Phase 2) ground investigation undertaken at the Main HNRFI Site. Any required additional further ground investigation will be undertaken to support detailed earthworks and foundation design and to investigate and geo-environmentally assess areas that are currently inaccessible, which comprise operational areas within farm yards and adjacent

[1] *Department for Environment, Farming and Rural Affairs; Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance; April 2012.*

[2] *Land Contamination Risk Management (https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm).*

to the railway and M69. Based on the predominantly greenfield nature of the Main HNFRI Site there are unlikely to be significant contaminant linkages present at the Main HNFRI Site that would impact on the viability of the Proposed Development. Additional investigations will be completed following the making of any DCO and prior to construction works commencing on site in order to provide additional data to inform detailed design and associated mitigation. However, the preliminary GI undertaken is sufficient to allow adequate assessment for the purposes of the EIA Regulations. Adequate ground investigation has been completed to demonstrate that there are limited adverse effects from ground contamination and geology at the site. Based on the historical use of the site, the low sensitivity to human health within the commercial development and low sensitivity of underlying aquifers there is negligible risk that unforeseen contamination would be identified that could affect the feasibility of the development.

General approach and data sources

15.6. The general methodology for assessing effects follows standard procedures and involved the following desk-based and intrusive processes:

- Review of national planning policy and local development plan policies (including, but not limited to, land contamination and Aquifer Protection).
- Review of published documents, current standards, and current best practice guidance.
- A reconnaissance of the Main HNRFI Site including the M69 junction area within the Main Order Limits, was completed in February 2018 and updated in August 2018, and the area of the A47 link corridor in May 2019 to confirm desk-based information and identify and confirm the current state and use of land within the Main Order Limits. A further visit was made by BWB in August 2022 confirming no significant changes to the Main Order Limits have occurred since the previous visits.

15.7. Review of the following reports and information sources to provide site specific factual data upon geology, soils, and groundwater and where available and relevant has also been used to support the development of the baseline ground model and assessment of baseline conditions:

- Groundsure reports, reference GSIP-2021-10711-3797 and HMD-214-7439283, included within the Phase 1 Geo-environmental Assessment. Appendix 15.1 (document reference 6.2 15.1);
- 1:2,500 and 1:10,000 scale Historical Ordnance Survey Mapping;
- Historical aerial photographs (Google Earth) and other imagery (Groundsure Report);
- British Geological Survey (BGS) 1:50 000 Scale, *'Coventry'*, Sheet 169, Solid and Drift, (1994);
- BGS online geological maps and exploratory hole records (www.bgs.ac.uk);

- MAGIC website (www.natureonthemap.naturalengland.org.uk/magicmap);
- *'Preliminary Desk Study – Hinckley Strategic Rail Freight Interchange'*; by Hydrock for db Symmetry Ltd; ref. 07700-HYD-XX-XX-RP-GE-1001-S2-P1; dated 16th April 2019;
- Phase 1 Desk Study - Hinckley National Rail, Freight Interchange – A47 Link Road; by Hydrock for db Symmetry Ltd; ref: 07700-HYD-XX-XX-RP-GE-1006; dated 12th June 2019; and
- *'Preliminary Ground Investigation Report – Hinckley Rail Freight Interchange'*; by Hydrock for db Symmetry Ltd; ref. 07700-HYD-XX-XX-RP-GE-1002; dated 14th June 2019.
- Consultations with the Environment Agency (*'EA'*) groundwater protection team and Blaby District Council, Leicestershire County Council, Hinckley and Bosworth Borough Council, contaminated land officers and other relevant stakeholders including National Highways, Forestry Commission, DEFRA, and Historic England undertaken throughout the process.

15.8. The assessment of effects has been undertaken using Qualitative Risk Assessment Matrices set out in Table 15.4 to 15.7 developed from the baseline condition ground model and updated to reflect the effect during both construction and operational phases.

15.9. The construction phase of the Proposed Development to be assessed will comprise a phased enabling works package to prepare development platforms, comprising the demolition of existing buildings, stripping of topsoil and bulk earthworks using site won materials and provision of primary infrastructure. Construction of buildings will follow in a number of phases. It is likely that the earthworks would be completed in a single phase including the earthworks for the M69 J2 improvements and the A47 link road, rail port and construction of development platforms.

15.10. The key activities of the operational phase would comprise road and rail logistics, storage, loading and unloading of goods as reported in Chapter 3: Project description (document reference 6.1.3).

15.11. Where necessary suitable mitigation options are detailed, and their residual effect measured in the same manner using updated and extended qualitative risk assessment matrices to demonstrate the residual effect after mitigation.

15.12. Cumulative effects have been considered in accordance with the principles set out in Chapter 20: *Cumulative and in-combination effects* (document reference 6.1.20) where other committed or proposed developments are planned or being progressed that might affect the same receptors.

Consultation

15.13. A request for a scoping opinion was submitted to PINS in November 2020 (document reference 6.2.6.1), with an opinion returned in December 2020 (document reference

6.2.6.2). Comments relating to Hydrogeology that were received are summarised in Table 15.1 below.

Table 15.1: Summary of scoping opinion and responses

Source		Scoping Comments	Response
PINS	4.9.2 Table 14.1	The Inspectorate notes that a full description of the study area is not provided in the Scoping Report. The study area reflected in the ES should be clearly defined, with supporting figures where necessary, justified, and reflect the anticipated extent of potential impacts.	The Chapter provides a full description of the study area in Sections 15.15 and 15.16 and is shown on Figure 6.3.15.1.
PINS	4.9.3 14.7 14/18	The Scoping Report states that this aspect chapter should be read in conjunction with Chapter 6.1.14 *'Surface water and flood risk'* and Chapter 6.1.*16 'Geology, soils and contaminated land'*, both of which provide relevant additional guidance and potentially significant effects which would be taken account of. The ES should clearly set out the guidance and significant effects relevant to hydrogeology in these other chapters and within any other chapters providing clear cross references to these in the ES where necessary for the assessment.	This is noted, the chapter has significant cross over with the Geology, soils and contaminated land chapter 16 (document reference 6.1.16) and shares a similar methodology. The baseline has been developed based on the Phase 1 Geo-environmental Assessment and preliminary ground investigation for the site.

Source		Scoping Comments	Response
PINS	4.9.4 14.9	The Scoping Report notes the policies that will be considered. Hinckley and Bosworth Borough Council notes that *'Policy DM7: Preventing Pollution and Flooding'* of the Site Allocations and Development Management Policies is also relevant.	Hinckley and Bosworth Council were consulted as part of the Phase 1 Geo-environmental Assessment. The assessment looks at potential for pollution of controlled waters from the Proposed Development in sections 15.90 to 15.92 and 15.99 to 15.100.
PINS	4.9.5 14.11 14.12	The Scoping Report states that the assessment will be supported and informed through consultations with various stakeholders, including the local authority and the EA. It should be clear in the ES how consultees' comments have informed the assessment. Note the request from Hinckley and Bosworth Borough Council to be consulted.	The list of consultees and their responses are listed in Table 15.2.
PINS	4.9.6 14.17 14.19	The Scoping Report states that the baseline conditions will be developed further during the Phase 1 Geo-environmental Assessment. stage and the preliminary stages of the ground investigation. The results of the risk assessment and ground investigation should be included as part of the ES.	The Phase 1 Geo-environmental Assessment and Ground investigation reports are appendices to the ES. The ES sets out the Conceptual Site Model and the significant effects from the Proposed Development. The ES sets out the aquifer classification of

Source		Scoping Comments	Response
		The ES should describe how baseline conditions have been established and how future changes from the which might affect groundwater and surface water quality have been assessed from these baseline conditions using the proposed conceptual model. The Scoping Report states that existing groundwater resources are to be assessed during a desk study phase, including the potential significance of any groundwater resource value. The groundwater resource value(s) should be explicitly explained in the ES and how this has informed the assessment.	the underlying geology and identifies any sensitive abstractions that could be affected by the Proposed Development.
PINS	4.9.7 14.20 14.22	The Scoping Report states that the Proposed Development has the potential to affect the existing groundwater during the construction phase, leading to the mobilisation of existing contaminants or through spillages of construction materials or fuels. The Proposed Development could also lead to the sterilisation of land that may have been a significant future resource for groundwater	The potential for contamination to affect groundwater resources during the construction and operational phases is assessed in Section 15.86 to 15.93.

Source		Scoping Comments	Response
		abstraction. The ES should highlight any likely significant adverse effects and any mitigation as required including remedial measures.	
PINS	4.9.8 n/a	The aspect chapter makes no reference to potential hydrogeological impacts during the Proposed Development's operational phase. The ES should assess impacts to hydrogeology during all phases of the Proposed Development including during operation, if significant effects are likely.	The ES covers impacts from the Operational phase including pollution from fuel storage in Sections 15.90 to 15.92

15.14. Consultations with the regulatory authorities were made prior to and following publication of the PEIR. The following regulatory responses in Table 15.2 below, were received as part of the PEIR submission:

Table 15.2: Summary of section 42 consultation (2022) responses

Consultee	ID/Ref	Consultee Comment	Response
Environment Agency		PEIR review recommended conditions: *"No stage of the authorised development must commence until a remediation strategy to deal with the risks associated with contamination of the site*	The approach undertaken in the ES follows the recommendations of the EA. A preliminary risk assessment accompanies the application Appendix 15.1 (document reference 6.2.15.1). The requirements are agreed in

Consultee	ID/Ref	Consultee Comment	Response
		in respect of controlled waters has, for that stage and after consultation with the Environment Agency, been submitted to and approved by the relevant planning authority. This strategy will include the following components: *1. A preliminary risk assessment which has identified:* *• all previous uses* *• potential contaminants associated with those uses* *• a conceptual model of the site indicating sources, pathways and receptors* *• potentially unacceptable risks arising from contamination at the site* *2. A site investigation scheme, based on (1) to provide information for a detailed assessment of the risk to all receptors that may be affected, including those off-site.* *3. The results of the site investigation and the detailed risk assessment referred to in (2) and, based on these, an options appraisal and remediation strategy giving full details of the remediation measures required and how they are to be undertaken.* *4. A verification plan providing*	principle.

Consultee	ID/Ref	Consultee Comment	Response
		details of the data that will be collected in order to demonstrate that the works set out in the remediation strategy in (3) are complete and identifying any requirements for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action. *Any changes to these components require the written consent of the relevant planning authority. The scheme shall be implemented as approved.* *Reason for the Requirement 1* *To ensure that the development does not contribute to, and is not put at unacceptable risk from or adversely affected by, unacceptable levels of water pollution in line with paragraph 174 of the National Planning Policy Framework.* *Requirement 2* *Prior to each phase of development being brought into use, a verification report demonstrating the completion of works set out in the approved remediation strategy and the effectiveness of the remediation shall, after consultation with the Environment Agency, be submitted to and approved by the relevant planning*	

Consultee	ID/Ref	Consultee Comment	Response
		authority. *The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan to demonstrate that the site remediation criteria have been met.* *Reason for the Requirement 2* *To ensure that the site does not pose any further risk to the water environment by demonstrating that the requirements of the approved verification plan have been met and that remediation of the site is complete. This is in line with paragraph 174 of the National Planning Policy Framework."*	
National Highways		No comments received	N/A
Forestry Commission		No response received	N/A
DEFRA		No response received	N/A
Historic England		No specific information held	N/A

Consultee	ID/Ref	Consultee Comment	Response
Blaby District Council		Reference is made to the need for further deeper strata borehole assessment of the main HNRFI site and the need for all work to the A47 link road land (areas 2 and 3). These assessments should be undertaken but it is acknowledged that they are unlikely to cause any issue in respect of the proposed development.	The deeper boreholes will be completed as part of detailed SI to support design of earthworks. Adequate ground investigation has been completed to demonstrate that there are limited adverse effects from ground contamination and geology at the site. Based on the historical use of the site, the low sensitivity to human health within the commercial development and low sensitivity of underlying aquifers there is negligible risk that unforeseen contamination would be identified that could affect the feasibility of the development.
Leicestershire County Council		Searches confirmed no significant issues with respect to contaminated land associated with the site.	None
Hinckley and Bosworth Borough Council		No further comments on the PEIR.	None
Burbage Parish Council		No additional requirements above those set out in the scoping report.	N/A
Elmesthorpe Parish Council		No relevant response received.	N/A

15.15. The following regulatory bodies have been contacted to ascertain whether they hold any records which may be pertinent to the environmental risk assessment, the responses are shown in table 15.3 below.

Table 15.3: Consultation responses

Stakeholder	Summary of Response	Action within ES
Environment Agency	No response received.	N/A
National Highways	Noted that the NH hold ground conditions information on the M69. HD622 geotechnical reporting will be required for geotechnical design of highway improvements.	Noted for Future Geotechnical Design Work.
Forestry Commission	No relevant response received.	N/A
DEFRA	No response received.	N/A
Historic England	No specific information held.	N/A
Leicestershire County Council	Searches confirmed no significant issues with respect to contaminated land associated with the Main HNRFI Site.	None
Hinckley and Bosworth Borough Council	Noted that Burbage Common is identified as an area of interest due to historical use a as a rifle range between 1885 and 1931. The northern tip of Burbage common falls within Area 2.	Noted as a potential source of contamination.
Blaby District Council	Noted historic land uses and current land uses such as railway activities, fuel storage on existing farms and made ground which is associated with development of M69 and associated bridges.	Covered in Phase 1 Geo-environmental Assessment..

Stakeholder	Summary of Response	Action within ES
Burbage Parish Council	No additional requirements above those set out in the scoping report.	N/A
Elmesthorpe Parish Council	No response received.	N/A

Section 47 Consultation

15.16. On the theme of hydrogeology, Section 47 consultation responses related to the volume and adequacy of the groundwater storage, the use of infiltration disposal methods, the effect on groundwater flow and quality to local wooded areas and the EA request for remediation strategies at each stage.

15.17. The consultation responses have been addressed in this chapter. The areas of highest contamination risk are currently occupied, and a remediation strategy will be prepared following further detailed investigation to be completed as part of the detailed design.

Study Area

15.18. The extent of the study area is the land within the proposed Main Order Limits plus a buffer, extending to 500m from the Main Order Limits Site boundary including land required for construction of compounds, construction/storage sites and other land required for the works. Ground and surface water abstractions have been assessed within a 2km buffer from the Main Order Limits. The extent of this zone has been developed using professional judgement on the basis that contamination migration beyond this distance is likely to be minimal or could be mitigated and off site sources beyond this zone are unlikely to affect the Main Order Limits Site.

15.19. For the purposes of the assessment, the Main Order Limits have been split into three sections as shown on ES Figure 2.1 (document reference 6.3.2.1): Area 1 in blue comprising the Main HNRFI Site, Area 2 in orange comprising the A47 Link Road, and Area 3 in green consisting of the improvements to the M69 Junction 2 road network. There are additional areas within the order limits that will be subject to offsite highway and rail crossing works but will not require any significant physical works which are likely to affect hydrogeology.

Identifying risks

15.20. In line with the *Land Contamination Risk Management*[3], the Preliminary Risk Assessment

[3] *Land Contamination Risk Management (https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm) is the governments primary guidance on the assessment*

includes a Hydrogeological Hazard Identification (*'HAZID'*), which seeks to list all the suspected contaminant sources, the controlled waters receptors that might be harmed by those sources and the pathways via which the sources might reach the receptors to cause the harm. The source-pathway-receptor concept is known as a contaminant linkage (formerly a pollutant linkage) and only when a linkage is complete is there any possibility of risk of harm arising. The source-pathway-receptor concept will be assessed through production of a Conceptual Site Model (*'CSM'*).

15.21. In addition, physical effects on the aquifers from the Proposed Development, for example from earthworks or reduced recharge through sealing of the site with low permeability surfacing or buildings are also considered.

15.22. Beneficial and adverse impacts have been identified, and options have been outlined for mitigating any potential adverse effects from the construction and operation. Cumulative effects of the Proposed Development in relation to other known committed or proposed schemes will also be addressed in accordance with the principles in Chapter 20: *Cumulative and in-combination effects* (document reference 6.1.20) where necessary.

Determining the significance of effects

15.23. The approach described above forms the basis of the methodology used in the assessment. For contamination to present a significant potential effect a link must first be established within the CSM. The likelihood of a contaminant linkage must be demonstrated with an identifiable source (onsite or off site), a receptor and a viable pathway.

15.24. Potential sources have been identified from an assessment of current site uses and activities, review of historical mapping for former uses and a review of regulatory permits, consents and authorisations contained within the Groundsure report for the site for potentially contaminative sites such as landfills, environmental permits, pollution controls.

15.25. Pathways will be specific to the hydrogeology and groundwater type. For example, they could be:

- infiltration and contaminant migration through permeable strata such as the unsaturated zone for groundwater; or
- a secondary pathway from groundwater contamination to surface water.

15.26. The sensitivity of potential receptors can be described qualitatively according to the categories shown in Table 15.4.

and management of the risks from land contamination.

Table 15.4: Criteria for assessing receptor sensitivity

Receptor sensitivity/ Value of Resource	Explanation	Receptor/ Resource
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or is of national importance.	Surface water bodies of high quality e.g., main rivers and primary tributaries with good biological and/or chemical quality and/or Principal Aquifers.
Moderate	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.	Surface water bodies of moderate quality, and/or Secondary A Aquifers.
Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance.	Secondary B and undifferentiated aquifers.

15.27. The magnitude of land contamination effects is assessed by comparing all contaminant linkages at a baseline value (existing condition) to those during construction and operational circumstances. This provides a way of assessing adverse and beneficial effects through the project lifecycle. The magnitude has been assessed using a four-point scale as shown in Table 15.5.

Table 15.5: Effect magnitude criteria

Effect Magnitude	Criteria
High	Results in total loss of attribute and/or likely to cause exceedance of statutory objectives and/or breach of legislation.
Moderate	Results in effect on integrity of attribute/or loss of part of attribute, and/or possibly cause exceedance of statutory objectives and/or breach of legislation.
Low	Results in minor effects on attribute e.g., measurable effect but below a level that would breach legislative or statutory limits.
Negligible	Results in no change or effect on attribute.

15.28. The assessment of significance is based on the magnitude of the effect and the importance or sensitivity of the receptors as set out below in Table 15.6. The significance of the potential effects is identified, as well as those of the residual effects for geological and mineral effects. Appropriate mitigation measures will be recommended in order to reduce/control any significant adverse effects on sensitive receptors. Once remediated, there should be no residual effects with respect to land contamination issues.

Table 15.6: Significance of effect matrix

Magnitude of Change	Sensitivity of Receptor				
		High	**Medium**	**Low**	**Negligible**
	High	Major	Major / Moderate	Moderate	Slight
	Medium	major / Moderate	Moderate	Moderate / Slight	Slight
	Low	Moderate	Moderate / Slight	Slight	Negligible
	Negligible	Slight	Slight	Negligible	Negligible

15.29. Effects have the potential to be adverse, beneficial, or neutral and temporary or permanent. For example, in terms of beneficial effects, the Proposed Scheme may remove a source of contamination, or it may break a pathway that currently links a source to a receptor. The Effects Criteria is presented in Table 15.7.

15.30. The Duration of the effect is also considered.

- Short-term: Temporary effects related to a specific construction event of no more than a year's duration – such as the construction of an individual building or a specific element of infrastructure such as a section of road.
- Medium-term: Temporary effects of longer duration, such as those arising over an extended period of construction ranging from one year to the full construction period, envisaged to be ten years.
- Long-term: Permanent effects arising from the operation of the HNRFI or from the permanent presence or removal of physical features.

15.31. Effects of Moderate Significance or above are considered significant in terms of the ES, where effects are considered to be marginal moderate/slight a precautionary approach has been adopted depending on the severity or likelihood of the effect, and further consideration given as to whether mitigation is necessary, and in some cases mitigation measures outlines are considered 'best-practice' particularly during construction.

Table 15.7: Significance of effect criteria

Significance	Description
Major adverse	Short term (acute) risk of pollution of sensitive water resource. Pollution of drinking water supplies within Zone 1 or 2 Source Protection Zone.
Moderate adverse	Pollution of sensitive water resources.
Slight adverse	Pollution of non-sensitive water resources.
Neutral	Effects, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve.
Slight beneficial	Minor reduction in risk (slight, short, or highly localised effect).
Moderate beneficial	Moderate reduction in risk, Improvement in water quality.
Major beneficial	Major reduction in risk.

Limitations and assumptions

15.32. Intrusive ground investigation has only been completed within Area 1, the Main HNFRI Site and was limited to shallow trial pits and boreholes. Investigation of deeper strata and areas 2 and 3 will be completed as part of detailed design following submission of the ES. Nevertheless, the investigations completed are sufficient in scope to inform the assessment for the purposes of the EIA Regulations.

RELEVANT LAW, POLICY, AND GUIDANCE

15.33. The applicable legislative framework for Contaminated Land is set out in Part IIA of the Environmental Protection Act 1990 and associated statutory guidance. Non statutory Guidance on management of Contaminated Land (Land Contamination Risk Management) is issued by the Environment Agency.

Part IIA of the Environmental Protection Act (1990)

15.34. Part IIA of the Environmental Protection Act (1990) and the associated Statutory

Guidance[4] describes a regulatory role for Local Authorities in dealing with contaminated land.

15.35. The Environment Act (1995) creates a system whereby Local Authorities must identify and if necessary, arrange for the remediation of contaminated sites. The provisions are set out in Section 57, which inserts Part IIA into the Environmental Protection Act, 1990. In addition to these requirements, the operation of the regime is subject to regulation and statutory guidance.

15.36. The Act provides a definition of what constitutes *'contaminated land'* and sets out the responsibilities of the Local Authority and the EA in the identification and management of contaminated land. Under the Regulations, contaminated land is defined as:

- *'Land which is in the opinion of the Local Authority to be in such a condition by reason of substances in or under the land that:*
  - Significant harm is being caused or there is significant possibility of significant harm being caused; and
  - Significant pollution of controlled waters is being caused or there is a significant possibility of significant pollution of controlled waters being caused'.

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

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

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

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

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[4] *Department for Environment Farming and Rural Affairs; Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidancehttp://www.defra.gov.uk/; April 2012 https://www.gov.uk/government/publications/contaminated-land-statutory-guidance.*

National Policy Statement for National Networks (NPSNN) (2014)[5]

'4.46 Issues relating to discharges or emissions from a proposed project which affect air quality, water quality, land quality and the marine environment, or which include noise and vibration, may be subject to separate regulation under the pollution control framework or other consenting and licensing regimes. Relevant permissions will need to be obtained for any activities within the Proposed Development that are regulated under those regimes before the activities can be operated.

4.50 In deciding an application, the Examining Authority and the Secretary of State should focus on whether the development itself is an acceptable use of the land, and on the impacts of that use, rather than the control of processes, emissions or discharges themselves. They should assess the potential impacts of processes, emissions or discharges to inform decision making, but should work on the assumption that in terms of the control and enforcement, the relevant pollution control regime will be properly applied and enforced. Decisions under the Planning Act should complement but not duplicate those taken under the relevant pollution control regime.

4.55 The Secretary of State should be satisfied that development consent can be granted taking full account of environmental impacts. This will require close cooperation with the Environment Agency and/or the pollution control authority, and other relevant bodies, such as the MMO, Natural England, Drainage Boards, and water and sewerage undertakers, to ensure that in the case of potentially polluting developments:

- *the relevant pollution control authority is satisfied that potential releases can be adequately regulated under the pollution control framework; and*
- *the effects of existing sources of pollution in and around the project are not such that the cumulative effects of pollution when the proposed development is added would make that development unacceptable, particularly in relation to statutory environmental quality limits.*

5.168 Applicants should take into account the economic and other benefits of the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification). Where significant development of agricultural land is demonstrated to be necessary, applicants should seek to use areas of poorer quality land in preference to that of a higher quality. Applicants should also identify any effects, and seek to minimise impacts, on soil quality, taking into account any mitigation measures proposed. Where possible, developments should be on previously developed (brownfield) sites provided that it is not of high environmental value. For developments on previously developed land,

[5] *National Policy Statement for National Networks (NPSNN) 2014, Presented to Parliament pursuant to Section 9(8) and Section 5(4) of the Planning Act 2008, December 2014 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/387223/npsnn-web.pdf*

applicants should ensure that they have considered the risk posed by land contamination and how it is proposed to address this.

National Planning Policy Framework (NPPF) (2021)[6]

15.40. The National Planning Policy Framework (NPPF) (2021) sets out the Government's planning policies for England. It makes the following reference to Contaminated Land and ground conditions in the section entitled Conserving and enhancing the natural environment:

'174. Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'

15.41. It also makes the following references to ground conditions and pollution:

'Planning policies and decisions should ensure that:

183. a) 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);

b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and

c) adequate site investigation information, prepared by a competent person, is available to inform these assessments.

184. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.'

15.42. Assessment of the impact of the Proposed Development will also be undertaken in

[6] *Department for Levelling Up, Housing and Communities, The National Planning Policy Framework (NPPF) was first published on 27 March 2012 and updated on 24 July 2018 and 19 February 2019. This sets out the government's planning policies for England and how these are expected to be applied. https://www.gov.uk/guidance/national-planning-policy-framework*

accordance with, but not limited to, the below policies:

- Blaby District Local Plan (Core Strategy) Development Plan, February 2013.
- Blaby District Local Plan (Delivery) Development Plan Document (DPD) Adopted February 2019.
- Hinckley and Bosworth Site Allocations and Development Management Policies DPD.
- District of Harborough, Harborough Local Plan 2011 to 2031, Adopted 30 April 2019.
- Rugby Borough Council Local Plan 2011-2031 June 2019.

15.43. Assessment of the impact of the Proposed Development will also be undertaken in accordance with, national guidance published by the Environment Agency:

- EA Guidance on Land Contamination Risk Management (LCRM); and
- Environment Agency Groundwater Protection Guidance.

Blaby District Local Plan Core Strategy[7]

***Policy CS19 - Bio-diversity* and geo-diversity**

Strategic objectives

vi) To protect the important areas of the District's natural environment (species and habitats), landscape and geology and to improve biodiversity, wildlife habitats and corridors through the design of new developments and the management of existing areas by working with partners.

Blaby District Local Plan Delivery DPD – Adopted February 2019[8]

Policy DM13 Land Contamination and Pollution

Land Contamination and Pollution

Development proposals will be required to clearly demonstrate that any unacceptable adverse impacts related to land contamination, landfill, land stability and pollution (water, air, noise, light and soils) can be satisfactorily mitigated.

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[7] *Blaby District Council Local Plan (Core Strategy) Development Plan Document - Adopted February 2013, Blaby District Local Plan, Local Plan (Delivery) Development Plan Document Adopted February 2019 Https://Www.Blaby.Gov.Uk/Planning-And-Building/Local-Plan/Local-Plan-Delivery-Dpd/ Local Plan (Core Strategy) Development Plan Document Adopted February 2013 Https://Www.Blaby.Gov.Uk/Media/4107/Adopted-Core-Strategy.Pdf*

[8] *Blaby District Local Plan Delivery DPD – Adopted February 2019*

For the following circumstances, development proposals will be supported where they are accompanied by a detailed investigation of the issues and appropriate mitigation measures are identified to avoid any adverse impact upon the site or adjacent areas:

a) Land that is (or has the potential to be) subject to land contamination or land stability issues.

b) Close to an aquifer or surface water feature that may result in groundwater or surface water pollution.

c) Close to or within an air quality management area or key transport corridors that may be affected by air quality.

d) Close to a source of noise or light pollution and/or the proposal may be a source of noise or light pollution.

e) Soils of high environmental value, including best and most versatile agricultural land.

This policy seeks to ensure that development proposals are not affected by or cause land contamination or pollution.

Land contamination, landfill, and land stability.

4.62 The NPPF encourages the effective use of land by re-using land that has previously been developed. However, to prevent unacceptable risks from pollution and land.

4.63 The NPPF makes it clear that where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.

4.64 It is important that such sites are reclaimed to a level that is suitable for the future intended use and also that there is no contamination of water resources during the reclamation and redevelopment.

4.65 Other sources of potential pollution or land contamination include historical industrial sites, current industrial sites and other previously developed contaminated sites. As a general rule, development proposals within 250m of a landfill or contaminated site will require investigation.

Water Quality

4.66 The Water Framework Directive requires member states, among other things, to prevent deterioration of aquatic ecosystems and protect, enhance and restore water bodies to 'good' status. It applies to all surface waters and underground water storage. The Humber River Basin Management Plan provides a holistic framework to protect and enhance the benefits of the water environment to people, the economy and wildlife. It sets out the actions needed to tackle problems that are affecting water quality.

Hinckley and Bosworth Site Allocations and Development Management Policies DPD adopted July 2016[9]

Policy DM7

Preventing Pollution and Flooding

Adverse impacts from pollution and flooding will be prevented by ensuring that development proposals demonstrate that:

a) It will not adversely impact the water quality, ecological value, or drainage function of water bodies in the borough.

b) Appropriate containment solutions for oils, fuels and chemicals are provided.

c) All reasonable steps are taken through design, siting, and technological solutions to ensure the abatement of obtrusive light to avoid sky glow, glare and light intrusion.

d) It would not cause noise or vibrations of a level which would disturb areas that are valued for their tranquillity in terms of recreation or amenity.

e) Appropriate remediation of contaminated land in line with minimum national standards is undertaken.

f) It will not contribute to poor air quality.

g) It will not result in land instability or further intensify existing unstable land; and

h) The development doesn't create or exacerbate flooding by being located away from areas of flood risk unless adequately mitigated against in line with National Policy.

District of Harborough, Harborough Local Plan 2011 to 2031 (Adopted 30 April 2019)[10]

GD8 Good design in development

1. Development will be permitted where it achieves a high standard of design, including meeting the following criteria:

n. where the site has previously been developed:

i. identifying the need for any decontamination and implementing this to an agreed programme; and

ii. ensuring that any contamination is not relocated elsewhere to a location where it could

[9] *Hinckley and Bosworth Site Allocations and Development Management Policies DPD adopted July 2016*

[10] *District of Harborough, Harborough Local Plan 2011 to 2031, Adopted 30 April 2019*

adversely affect the water environment or other wildlife habitats.

GI5 Biodiversity and geodiversity

1. Nationally and locally designated biodiversity and geodiversity sites, as shown on the Policies Map, will be safeguarded.

2. Development will be permitted where:

a. there is no adverse impact on:

iii nationally designated sites;

iv. locally designated sites;

unless, in all cases, the need for, and benefits of, the development in that location clearly outweigh the impact.

b. there is no loss of any 'best and most versatile agricultural land' unless this is demonstrably necessary to facilitate the delivery of sustainable development;

c. there is no net loss or sterilisation of natural resources;

IN4 Water resources and services

Water resources will be protected, and water services provided. Development will be permitted where it would: b. not adversely affect ground water quality by preventing potential sources of water pollution within Source Protection Zones (as identified on the Policies Map).

e. ensure the removal of any contamination from the site and that the development would not result in the migration of any contamination to a location where it could have an adverse effect upon the water environment;

Rugby Borough Council Local Plan 2011-2031 (June 2019)[11]

Policy SDC7: Protection of the Water Environment and Water Supply

Development will not be permitted where proposals have a negative impact on water quality, either directly through pollution of surface or ground water.

Development will not be permitted where the sensitivity of the groundwater environment, or the risk posed by the type of development is deemed to pose an unacceptable risk of pollution of the underlying aquifer.

[11] *Rugby Borough Council Local Plan 2011-2032 June 2019*

BASELINE CONDITIONS

Site description

15.44. The Main Order Limits site comprises an irregular shaped plot of land which is currently utilised for agricultural purposes, comprising fields and farm buildings, and includes sections of the local road and rail network.

15.45. The topography is variable with elevation ranging between c. 83m above ordnance datum (AOD) in the north beside the railway to c. 110m AOD at the M69 J2 motorway roundabout in the south, with levels of c. 93m AOD to 99mAOD in the A47 Link Road Corridor west of the Main Order Limits Site, c. 91m AOD in the east and c. 100m AOD in the centre of the Main HNRFI Site. The topography generally increases in elevation from north east to south west, with a slight ridge feature through the centre of the Main HNRFI Site orientated broadly in a south west to north east direction.

15.46. For the purposes of this section, the Main Order Limits site has been split into three sections: Area 1 comprising the Main HNFRI Site, Area 2 comprising the arm to the north west containing the A47 Link Road Corridor, and Area 3 consisting of the M69 Junction 2 arm. The Areas are set out on Figure 6.3.15.1. Detailed walkovers were completed in 2018 and a further visit in August 2022 to identify if any significant changes to the Main Order Limits Site have occurred since then and to cover changes to the order limits redline boundary .

15.47. Offsite highway works within the Order Limits but outside of the Main Order Limits area are anticipated to require minimal groundworks and any impact on ground conditions is likely to be negligible and therefore the ES chapter relates primarily to the development site, A47 link road and M69 improvements.

Area 1 – Main HNRFI Site Area

15.48. Area 1 comprises a large area of agricultural land, with Woodhouse Farm at the centre. The farm complex comprises several residential premises, agricultural outbuildings and barns and small commercial premises including a farm shop. Three oil tanks, a diesel tank and a propane tank were noted on site, with several corrugated roofs indicated to have been constructed from potentially asbestos containing materials (ACMs).

15.49. A small property utilised for kennelling services is located to the north west of 'Woodhouse Farm'. 'Hobbs Hayes Farm' was located to the south of Woodhouse Farm, with additional farm buildings at 'Freeholt Lodge', located towards the southern extent of Area 1. Two tanks were identified at Hobbs Hayes Farm utilised for diesel and heating oil storage. ACMs were tentatively identified in four barn rooves. Freeholt Lodge appeared to be disused with static caravans, tanks, and abandoned vehicles noted. A propane tank was noted, and ACMs also identified.

15.50. The Main HNRFI Site is crossed by Burbage Common Road, a rural lane running between B4668 at Burbage Common and the B581 Station Road near Elmesthorpe. It crosses the central-northern area of the Main HNRFI Site and provides access to Woodhouse Farm

and Langton Farm. At the northwestern boundary Burbage Common Road crosses a bridge over the railway line. Smaller tracks also crossed Area 1 to the southwest of Woodhouse Farm and to the south away from Hobbs Hayes Farm.

15.51. Drainage ditches ran along most field boundaries, with several small ponds located at various points around the field boundaries. A small stream flowed across the south of Area 1.

15.52. Area 1 is bound to the southeast by the M69 and to the northwest by a railway line. To the southwest of the site there are three wooded areas known as Burbage Wood, Aston Firs (designated as Sites of Special Scientific Interest (SSSI)) and Freeholt Wood. Off Smithy Lane to the south of the Main HNRFI Site are two residential enclaves, Rosevale Caravan Park and Acorn Cottage, in fenced compounds – the Aston Firs Gypsy and Traveller site managed by LCC and the Castle Fields mobile home site, which is privately owned. Burbage Common and Woods are located to the west. Sporadic farm buildings and residential premises are located to the north of Area 1, mainly along Station and Stanton Road.

Area 2 – A47 Link Road Corridor

15.53. Area 2 comprised a strip of land to the north west of Area 1, extending from the railway line to the B4668 (Leicester Road), with Burbage Common Road also crossing this location. The rest of Area 2 is occupied by fields, with a small densely vegetated stream crossing the north of Area 2 and a drain crossing the central area. Small farm outbuildings were present in some of the north western fields.

15.54. Area 2 was bound by the railway line to the south east and Leicester Road to the north west. Immediately west of Area 2 are agricultural fields and Burbage Common, whilst fields and Bridge Farm are located to the east. A sports club are located to the north west of Leicester Road.

Area 3 – M69 Junction 2 Improvements

15.55. Area 3 largely covers the road network around Junction 2 of the M69. Junction 2 provides access to the northbound M69, and egress from the southbound carriageway. The entry/exit ramps lead up to a raised roundabout over the M69 which involved two bridge crossings. Hinckley Road (B4669) joins the roundabout orientated in a west to east direction.

15.56. The boundary of Area 3 covers the roundabout, the northern slip roads, the access points to Hinckley Road, and extends to the south west beyond the point where Aston Lane crosses over the M69. The north eastern extent to Area 3 incorporates a small bridge which provides access for pedestrians and farm vehicles to cross the M69.

15.57. The M69 was predominantly raised above site levels and increases in topography from north east to south west from c. 96m AOD to c. 100m AOD. South-west of M69 Junction 2 the M69 motorway falls gently to a height of c. 96m AOD at the southern extremity of the DCO Site.

15.58. A small stream was culverted under the M69 towards the south of the Area 3. Also, a pond is located immediately west of the M69 which appears to have been constructed at the same time as the motorway and is likely to be an attenuation basin as part of the drainage network.

15.59. The surrounding land use is predominantly agricultural, with a gypsy and traveller site and private mobile home sites located to the north west of Junction 2 and Averley House Farm to the north east.

Site history

15.60. Historical Ordnance Survey (OS) mapping for the Main Order Limits Site area has been reviewed. These maps and plans date from 1886 to 2014. The key points of the historical development of the Main Order Limits Site and surrounding area are summarised in Table 15.8. All distances quoted are approximate.

Table 15.8: Key points of development history

Dates	On Site (Main Order Limits including HNRFI Site and A47, M69 sliproads)	Off-Site (outside Main Order limits)
Potential **SOURCES** in bold and caps. Potential ***Receptors*** in bold and italics.		
1886 – 1938	The earliest site plans show the site as largely undeveloped, agricultural land, relatively similar to present day. **WOODHOUSE FARM** is present in the centre of the site with **HOBBS HAYES FARM** to the south. The **RAILWAY LINE** is mapped in the north west of the site. Numerous small ***ponds*** are mapped across the site with small ***streams*** mapped in the north, central and south of site along the same course as present day.	**ELMESTHORPE RAILWAY STATION** is mapped immediately north east of Area 1, with several **SIDINGS**. ***Old fish ponds*** are mapped c. 100m north of site and indicated to be excavations. A **BRICK WORKS** with associated **KILNS** are mapped adjacent to Hinckley Road immediately south east of Area 3, and also approximately 500m west of Area 1. Small scale associated clay pits are also indicated at the brick works. A rifle range is present immediately west of Area 2. ***Burbage Common***, ***Sheepy Wood***, ***Burbage Wood***, ***Aston Firs***, and ***Freeholt Wood*** are all located immediately west of Area 1 and 2. Both brick yards appear to be disused from 1901 plans, with the south eastern clay pit indicated to have been reduced to a small pond by 1963.

Dates	On Site (Main Order Limits including HNRFI Site and A47, M69 sliproads)	Off-Site (outside Main Order limits)
1950 - 1968	1963 plans show the B4669 (labelled as A5070) Hinckley Road as realigned. 1962 plans label the track to Woodhouse Farm as Burbage Common Road for the first time.	Residential development is mapped along Station Road 200-600m north east of Area 1. A **TANK** is indicated at the railway station from 1962 plans with a **FACTORY** mapped 200m north east of site. A **GARAGE** is mapped 400m south west of Area 3 on 1963 plans.
1977 - 1994	No significant changes noted.	The **M69** and associated access bridges have been constructed. Hinckley Road in the south of Area 3 is realigned as part of the M69 works, and the attenuation pond is constructed. Elmesthorpe Railway Station and sidings are no longer mapped from 1983 plans. The buildings remain, but the tank is no longer labelled. 1984 plans show an **ELECTRICITY SUBSTATION** mapped 200m north of site. 1994 plans indicate the former railway sidings site is occupied by a **SCRAP YARD**.
2002 – Present day	No significant changes noted.	The sports ground to the north west of Area 2 has been developed by 2002 plans. The eastern traveller site appears on mapping from 2002 with the western site mapped from 2010.

Ground conditions

Superficial deposits

15.61. Information published by the BGS has mapped localised Made Ground within the Main Order Limits Site. Made Ground is mapped along the M69 corridor and partially along the railway line, indicating areas which have been artificially raised. The lighter pink areas indicated areas of cut where the M69 passes under the roundabout, and the attenuation basin located to the west of Area 3.

15.62. The BGS data has recorded several superficial deposit units across the Main Order Limits Site, and some areas where superficial deposits are absent.

15.63. The Bosworth Clay Member, also known as Wolston Clay, and Thrussington Member are mapped underlying most of the Main order limits Site, with the latter present towards to the south and south east of Area 1. The Bosworth Clay Member is typically encountered as variable grey and red-brown clays and silt, often without gravels, whilst the Thrussington Member is encountered as brown to reddish brown usually sandy silty clay with gravels present.

15.64. Deposits of the Wolston Sand & Gravel Member, also referenced as Glaciofluvial Deposits, are mapped in two locations in the centre of Area 1. These are younger deposits commonly encountered as yellow or red sand and gravel.

15.65. Localised Alluvium is mapped in the north and north east of Area 1 along the line of the stream and also along the watercourses in Area 2.

15.66. Superficial deposits are locally absent in the south east and east of Area 1, and across much of Area 2.

15.67. Small pockets of the Oadby Member are mapped in the central area. The Oadby member comprises Diamicton encountered as grey/ brown gravelly clay with subordinate lenses of sand and gravel, clay, and silt.

Bedrock deposits

15.68. The bedrock underlying both the main site is indicated to comprise the Edwalton Member Mercia Mudstone. Mercia Mudstone is commonly encountered as red, or occasionally green-grey, mudstones and subordinate siltstones. The bedrock contains thick halite-bearing units in some basinal areas and thin beds of gypsum/anhydrite are widespread.

Third party investigation logs

15.69. The preliminary ground investigation conducted in 2018 Appendix 15.2 (document reference 6.2.15.2) generally confirmed the published geological sequences, with Bosworth Clay was found across much of Area 1 (excluding the central areas) and across the south of Area 3, and the Thrussington Member was recorded predominantly in the centre of Area 1 and across the northern parts of Area 3.

15.70. Limited Made Ground was encountered, predominantly around the farm complexes.

15.71. Localised Alluvium was recorded near to the watercourse flowing through Area 1. The Wolston Sand & Gravel Member was not recorded. Mercia Mudstone was recorded under the Glacial Deposits in the eastern areas, but not to the west of Area 1 of in Area 3.

Aquifer designation

15.72. The Environment Agency (EA) classifies the Alluvium and the Wolston Sand and Gravel as

Secondary A Aquifers. Secondary A Aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

15.73. The Bosworth Clay Member is an unproductive stratum, defined as rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. The Bosworth Clay extends south of the site beneath Aston Firs Wood SSSI and Burbage Common and woods.

15.74. The Thrussington Member is an undifferentiated Secondary Aquifer which has been assigned in cases where it has not been possible to attribute either a Secondary A or B category to a rock type.

15.75. The Mercia Mudstone is categorised as a Secondary B Aquifer which are defined as predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons, and weathering.

15.76. The Main Order Limits Site is not located within an EA designated Source Protection Zone. The Main Order Limits Site lies within the Soar Secondary Combined Water Framework Directive Groundwater Body which recorded a good chemical and overall rating in 2015.

15.77. Significant groundwater ingress was not recorded during the ground investigation. Groundwater was not recorded in any trial pit and in only 4 of the window sampler boreholes during the investigation at depths of between 3.1m and 3.9m bgl within the Thrussington Member and Mercia Mudstone.

15.78. Post investigation monitoring of boreholes recorded sporadic groundwater across the Main HNRFI site within the Thrussington Member, Boswoth Clay Member and Mercia Mudstone at depths of 0.83m to 4.5m bgl.

Surface water features

15.79. Within Area 1, drainage ditches run along most field boundaries, with several small ponds located at various points around the field boundaries. A small stream flows across the south of Area 1, and two small streams are present in the north of Area 1, flowing off site to the north.

15.80. Within Area 2, three small watercourses cross the site, with the southernmost appearing to have been channelised.

15.81. Within Area 3, a small drain is culverted under the M69.

15.82. The River Soar is mapped 175m south east of site.

15.83. Further detailed assessment of surface water features is presented in Chapter 14: *Surface water and flood risk* (document reference 6.1.14).

Soil and groundwater contamination

15.84. The Phase 1 Geo-environmental Assessment. Appendix 15.1 (document reference 6.2.15.1) and preliminary GI and geo-environmental assessment Appendix 15.2 (document reference 6.2.15.2) concluded that limited potential contamination sources had been identified within the Main Order Limits Site. The contamination source within each area is described below. Potential sources located outside the Main Order limits area also considered where they could present a risk to water resources beneath the Main Order Limits Site.

Area 1 Main HNRFI Site

15.85. The following potential sources of contamination have been identified at the Main HNRFI site:

- Made Ground at the site but predominantly located around farm complexes could contain heavy metals, hydrocarbons, asbestos, and a potential source of hazardous ground gasses.
- Asbestos within shallow soils around farm buildings.
- Hydrocarbons, lubricants, and solvents located around tanks.
- Pesticides and herbicides within fields and along railway lines and in storage areas within farm complex.
- Organic rich Alluvium could represent a potential source of hazardous ground gasses.
- Biological contamination associated with cess pit (e.g., E-coli).

Area 2 A47 Link Road Corridor

- Made Ground at the site but predominantly located around farm buildings could contain heavy metals, hydrocarbons, asbestos, and a potential source of hazardous ground gasses.
- Asbestos within shallow soils around farm buildings.
- Pesticides and herbicides within fields and along railway lines and in storage areas within farm complex.
- Organic rich Alluvium could represent a potential source of hazardous ground gasses.

Area 3 M69 Junction 2

- Made Ground at the site related to the construction of the road network. could contain heavy metals, hydrocarbons, and a potential source of hazardous ground gasses.
- Organic rich Alluvium could represent a potential source of hazardous ground gasses.

Off Site Outside Main Order Limits Boundary

- Railway station and scrap yard - potential source of heavy metals, hydrocarbons, volatile compounds, and hazardous ground gasses.
- Landfill – potential for leachate migration towards site.
- Organic rich Alluvium could represent a potential source of hazardous ground gasses.
- Electricity substation located 200m north represents potential source of oils and PCBs, not a potential source If it dates from 1980s onwards.

15.86. The following potential sources are not included within the conceptual site model:

- Infilled brick pits - potential source of hazardous ground gasses, however, they are located near to the proposed road structures rather than buildings. They are located too far from proposed buildings to represent a risk.
- Landfill – Potential ground gas risk associated with landfills is discounted as they are located too far from proposed buildings to represent a risk.

Receptors

15.87. The following Groundwater receptors are considered in this Hydrogeology Chapter.

Within Main Order Limits Boundary

15.88. The majority of the Main HRFI Site is underlain by the Bosworth Clay which is an unproductive strata. Within the Main Order Limits site, the following aquifers are present.

- Underlying Secondary A Aquifer – Wolston Sand and Gravel.
- Underlying Secondary A Aquifer – Alluvium.
- Underlying undifferentiated Secondary Aquifer – Thrussington and Oadby Members.
- Underlying Secondary B Aquifer – Mercia Mudstone.

Outside Main Order Limits boundary

- Wider Secondary A Aquifer – Alluvium and Wolston Sand and Gravel.
- Wider undifferentiated Secondary Aquifer – Thrussington Member.
- Wider Secondary B Aquifer – Mercia Mudstone.
- SSSI, Ancient Woodlands and Local Nature Reserves comprising Burbage Wood and Aston Firs Site of Special Scientific Interest (SSSI) adjoining the south-western boundary of the Main HNRFI Site,

15.89. Three further SSSIs are found to the north-east of the Main HNRFI Site and outside the

DCO Site, which are unlikely to be affected by ground conditions at the site as follows:

- Croft Pasture SSSI (2.8km from the nearest point of the Main Order Limits),
- Croft and Huncote Quarry SSSI (3.1km from the nearest point of the Main Order Limits), designated for geological reasons;
- Croft Hill SSSI (3.2km from the nearest point of the Main Order Limits),

15.90. There is a European-designated Special Area of Conservation (SAC) at Ensor's Pond, 11km to the south-west, which is considered to be beyond the foreseeable impact from the devlopment.

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15.91. The risk to controlled waters is considered to be low based on the potential for contaminants associated with the Made Ground at the Main Order Limits Site to impact upon the underlying aquifer or on-site surface water receptors.

Limitations to assessment

15.92. The assessment is based on a Phase 1 Geo-environmental Assessment comprising desk-based investigation, preliminary intrusive investigation, and site reconnaissance only. Further detailed intrusive investigation will be completed to support detailed design which may reveal previously unforeseen ground conditions or contamination. However, based on the desk study and site history it is unlikely that significant contamination would be identified at the Main Order Limits Site.

POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECTS OF THE PROPOSALS

Construction phase

15.93. The significant effects have been assessed assuming that the earthworks exercise will be completed at the Main Order Limits Site comprising a site strip to remove topsoil and a bulk earthworks cut and fill exercise to prepare development platform(s). A general cut and fill balance is assumed, whereby no material is required to be removed or imported from/to the site. Areas of cut and fill are shown on figure 16.1 (document reference 6.3.16.1) HRF-BWB-HGN-XX-DR-CH-0610 titled "Proposed Plateau levels Isopachytes".

15.94. Shallow groundwater (below surface but within excavation depth of normal plant) has been recorded beneath the Main HNRFI Site which could be encountered within excavations. Perched groundwater will be encountered within the more granular layers within the Superficial Deposits and at the interface between the Superficial Deposits and the underlying bedrock. Localised dewatering may be required for deeper excavations such as for below ground attenuation tanks, or fuel storage tanks. Based on the soil descriptions significant water ingress into excavations is not anticipated.

Risks to Groundwater Quality

15.95. Localised contamination may be mobilised during construction, where soils are excavated, and incident rainfall leaches soluble contaminants. In addition, earthworks in general have the potential to increase erosion and migration of particulate matter and suspended solids into water courses, running across the Main HNRFI Site. Based on the expected development timescales, development plots may be prepared but will remain undeveloped for a considerable period before development, therefore careful management of runoff and stockpiles will be required to prevent excessive suspended solids entering water courses. The effect on controlled waters during construction are considered to be of minor adverse significance, confined to a localised area and of short / medium duration.

15.96. Piled foundations may be required for the proposed buildings particularly where high loadings are required. This will be assessed on a building-by-building basis and will depend on tenant requirements and final detailed design. Piled foundations have the potential to create pathways between surface contamination and underlying aquifers. Any effect is likely to be minor based on the anticipated low levels of contamination and low sensitivity of the underlying aquifers.

Operational phase

Risks to Groundwater Quality

15.97. The presence of significant hardstanding will reduce the infiltration of rainfall and subsequent leaching of any soluble contamination in shallow soils into underlying groundwater and surface waters.

15.98. Storage of fuels in the on site service station Runoff from goods vehicles using the site has the potential to be impacted by heavy metals and petroleum hydrocarbons.

15.99. Railway maintenance areas may involve storage of chemicals including fuels, lubricants, and cleaning products. Temporary waste storage areas may be required. The effect on controlled waters during operation are considered to be of minor adverse significance, confined to a localised area and of short / medium duration.

Risks to groundwater abstractions and baseflow

15.100. Sealing of the site will reduce infiltration and recharge of shallow aquifers, which could lead to reduced groundwater levels. However significant volumes of groundwater are not expected beneath the site and there are no recorded abstractions that could be affected. The ground is generally cohesive with a limited storage capacity, and hence rapidly becomes fully saturated during the normal rainfall events. The drainage strategy as described in Chapter 14: *Surface water and flood* risk (document reference 6.1.14) would increase storage and allow better management of rainfall events and reduce the impact on local watercourses. Infiltration drainage is unlikely to be feasible at the site. The drainage strategy (document reference 6.2.14.2) will comprise several measures to manage rainfall including storage for re-use, onsite storage and attenuation ponds,

diversion of existing watercourses and gradual discharge to Thurlaston Brook Tributary.

15.101. Aston Firs Wood sits on the Bosworth Clay Member which is classified as unproductive strata. The southern part of the site is mostly underlain by Thrussington Member Diamicton Secondary B Aquifer, Groundwater flow to and from Burbage and Ashton Fir Woods to the southwest of the site is likely to be limited by the low permeability of the strata. The superficial deposits have a very low storage capacity which results in much of the incident rainfall at the site running off into the surface water network as discussed in Chapter 14: *Surface water and flood risk* (document reference 6.1.14) rather than infiltrating into the ground. This effect on controlled waters during operation are considered to be of minor adverse significance but would affect the whole site area.

PROPOSED MITIGATION

Construction phase

15.102. The design will incorporate significant earthworks to prepare platforms for development. Detailed investigation of the site will be completed to ensure that excavated materials are suitable for use and any areas of potential contamination fully characterized and remediation strategies prepared. The scale of the Proposed Development will allow any required soil treatment such as bioremediation to be completed and soils retained for re-use. Any remediation would be completed under an Environmental Permit.

15.103. A Construction Environmental Management Plan (CEMP) will be prepared setting out the requirements for management of dust, odours and other sources of nuisance and pollution control measures to be implemented during the construction phase. There will be a particular focus on management of run off and protection of water courses from suspended solids in runoff. This may include construction of temporary settlement ponds, silt fences and seeding of temporary stockpiles.

Risks to groundwater quality

15.104. On-site refuelling should be undertaken in designated areas to prevent infiltration of contaminated waters. The revoked EA Pollution Prevention Guidance provides useful recommendations of best practice for refuelling, including regular testing and maintenance of storage tanks. All fuel tanks will be bunded with secondary containment with a capacity of 110% of the tank volume. Spill kits should be available at all fuelling locations and regular training provided on dealing with spillages. Drip trays should be used under vehicles where appropriate to ensure that oil is collected and contained to prevent infiltration of contaminated waters.

15.105. To avoid infiltration of polluted water from vehicles or accidental spillage, vehicles should be inspected regularly and maintained to reduce the risk of leakages. Vehicle wash-down areas should be at least 10m from any surface waters and located in a designated bunded impermeable area. Any runoff should be treated through oil interceptors prior to discharge.

15.106. Procedures to be set out in the CEMP would be specifically developed in order to reduce the likelihood of such uncontrolled discharge, spillage or pollution incident. If such an occurrence were to occur due to unforeseen incident, actions would be undertaken to limit the spread of any spillage and to clear the spillage prior to discharge to ground. Such actions would be detailed an emergency response plan which would be prepared in accordance with the CEMP.

Operational phase

Risks to groundwater quality

15.107. Maintenance facilities and fuelling areas will be located on hardstanding with all tanks contained within appropriate bunding to accommodate 110% of the tank volume in accordance with best practice. Drainage will pass through three stage interceptors to capture any spillages and prevent contamination entering the drainage system and underlying groundwater.

15.108. The appointed management company and site occupiers will be subject to statutory requirements and under contractual obligation to ensure that adequate inspection of pollution control equipment, including checking of bunding, cleaning of interceptors, wet stock checking and maintenance of spill kits is undertaken.

15.109. Where piling works are required in contaminated ground a piling works risk assessment will be prepared to assess the most suitable piling techniques and mitigation measures to protect the underlying aquifers.

Risks to groundwater abstractions and baseflow

15.110. SUDS will be incorporated into the drainage design for the site as discussed in Chapter 14: *Surface water and flood risk* (document reference 6.1.14), to provide betterment to the surface drainage system and increase the attenuation and storage capacity of the site and provide flood resilience to the catchment.

RESIDUAL ENVIRONMENTAL EFFECTS

15.111. In terms of ES as previously outlined, significant effects of moderate effect or worse are considered to require mitigation. However, there are several less significant effects identified that would still be mitigated as best practice during construction and these measures have also been outlined.

Construction phase

Risk to groundwater quality

15.112. The CEMP will set out the various measures to manage the impacts from earthworks, which may include seeding of stockpiles, silt traps and temporary drainage grips. The residual effect will be slight due to negligible magnitude of impact of a medium to high

sensitivity of controlled water receptors.

15.113. Detailed piling design, if required, and the associated methodology remains subject to intrusive ground investigations, to be undertaken at the appropriate time. If required, piling should be undertaken in accordance with best practice, as agreed with the relevant parties ahead of commencement of the works. The residual effect will be negligible due to negligible magnitude of impact of a low sensitivity resource.

Operational phase

Risks to groundwater quality

15.114. The Main HNRFI site has remained largely undeveloped and there is a low risk of soil or groundwater contamination being present. Completion of ground investigation, and implementation of any required remediation strategy will remove any unacceptable risk to groundwater. The residual effect will be negligible due to negligible magnitude of impact of a medium sensitivity resource.

15.115. There is a low risk of soil or groundwater contamination being present at the site and the Proposed Development will incorporate a predominantly hardstanding covering. This will minimise the infiltration of rainfall and recharge through the unsaturated zone thereby minimising potential contaminant mobility and reducing the risk to the underlying aquifer. The residual effect will be slight due to negligible magnitude of impact of a medium sensitivity resource.

15.116. Lubricants and refuelling facilities will be positioned away from the most sensitive receptors at the application site and incorporate suitable bunding and interceptors to capture any spillages and prevent pollution of underlying groundwater. The residual effect will be slight due to negligible magnitude of impact of a medium sensitivity resource.

Risks to groundwater abstractions and baseflow

15.117. Improved management of run off and attenuation will provide betterment or neutral effect on groundwater levels. No abstractions are likely to be affect by the proposals.

CUMULATIVE AND IN-COMBINATION EFFECTS

15.118. The proposed and committed schemes listed within Appendix 20.1 Long List of Cumulative Sites (document reference 6.2.20.1) have been reviewed and there are no current existing or permitted schemes that are relevant to, or would represent a cumulative impact with, the Proposed Development regarding Hydrogeology. Land contamination is subject to the same national guidance and all developments must meet a common standard for safe development with a requirement to undertake a phased investigation of the site including Phase 1 Geo-environmental Assessment., Phase 2 intrusive ground investigation, remediation strategy, remediation implementation and verification. It is considered that there will be no significant cumulative effects on hydrogeology and contamination

resulting from the Proposed Development and the cumulative schemes considered as part of the assessment, as each development will incorporate appropriate mitigation measures to have overall negligible, or slight positive effects, through for example, remediation of soil contamination associated with farm operations.

15.119. Consequently, it is considered that there are unlikely to be any cumulative effects on hydrogeology. It is assumed that mitigation implemented for nearby schemes will be undertaken to this standard, hence there should be no need for cumulative mitigation measures. Therefore, no cumulative effects are predicted with the relevant committed developments identified for consideration by this ES Chapter.

CLIMATE CHANGE

15.120. Consideration of the potential implications of future climate change has been incorporated into this assessment. Specifically, the mitigation measures have been designed to ensure the Proposed Development will remain safe for its lifetime. Careful control and monitoring of earthworks will ensure that the engineered soils are placed in accordance with the earthworks specification.

SUMMARY AND CONCLUSIONS

15.121. This Chapter assesses the potential effects of the Proposed Development on Hydrogeology. It describes the methods used to assess the effects, the baseline conditions currently existing at the application site and surroundings, the potential direct and indirect effects of the Proposed Development and the mitigation measures required to prevent, reduce, or offset the potential effects and the residual effects.

15.122. The Chapter is supported by a Phase 1 Geo-environmental Assessment Appendix 15.1 (document reference 6.2.15.1) and a Preliminary (Phase 2) Ground Investigation and Geo-environmental Assessment for the Main HNRFI site Appendix 15.2 (document reference 6.2.15.2). The Main HNRFI site has predominantly remained undeveloped agricultural land with several farm buildings located on the Main HNRFI Site.

15.123. The Main Order Limits Site is indicated to be directly underlain by topsoil over drift deposits comprising glacial deposits of the Thrussington Member and Bosworth Clay Member. Localised deposits of Alluvium and the Wolston Sand & Gravel are mapped at the site. Bedrock is indicated to comprise the Mercia Mudstone. Most of the site is underlain by unproductive strata, with small parts of the site designated as Secondary A or B or undifferentiated aquifers of low to moderate sensitivity. The site is not in a Source Protection Zone.

15.124. Potential impacts have been identified during construction associated with mobilisation of dusts and particulates entering water courses, and from piling works creating pathways, however the effect of these impacts is negligible based on the low sensitivity of the underlying aquifers and absence of significant contamination.

15.125. The CEMP will ensure that mobilisation of contamination and impact to controlled waters during the construction phase is minimised. The plan will outline detailed methodologies and monitoring requirements to prevent adverse effects on underlying groundwater.

15.126. No widespread contamination of soils or groundwater is expected at the site. Any contamination is likely to be localised around operational farm buildings and will be addressed through a remediation strategy utilising best practice methodologies.

15.127. Further intrusive ground investigation will be completed at detailed design stage to confirm ground conditions, assess the presence of any soil or groundwater contamination and obtain information for foundation design. Adequate ground investigation has been completed to demonstrate that there are limited adverse effects from ground contamination and geology at the site. Based on the historical use of the site, the low sensitivity to human health within the commercial development and low sensitivity of underlying aquifers there is negligible risk that unforeseen contamination would be identified that could affect the feasibility of the development.

15.128. The underlying strata are of limited permeability and sensitivity and have limited storage capacity. The proposals will have a neutral effect on groundwater levels through use of SUDS techniques and increased storage and attenuation on the site.

15.129. Incorporation of interceptors and sealed drainage systems in operational areas, yards and chemical storage will prevent any deterioration of underlying groundwater quality during the life of the development.

15.130. Nearby developments are subject to the same national guidance, with a requirement to deliver a safe development, including remediation of contamination where necessary, therefore, there are unlikely to be any significant cumulative impacts requiring mitigation.

15.131. Overall, it is considered that potential effects on the hydrogeological regime at the site from the construction and operational phases of the Proposed Development will be negligible to slight adverse following the implementation of appropriate mitigation measures and therefore not significant for EIA purposes.

Table 15.9 - Summary of effects

Description of impact	Inherent mitigation measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional mitigation measures	Residual effect	Proposed monitoring
Contamination of shallow groundwater from fuel spillages during construction	Low sensitivity of aquifers underlying the site	Moderate Local	Medium	Minor Adverse	Set out in CEMP including Provision of secondary bunding to tanks, spill kits available and training of operatives	Negligible	N/A
Contamination of shallow groundwater from existing uses	Low sensitivity of aquifers underlying the site. Restricted to isolated areas around farm buildings	Moderate Local	Medium	Minor Adverse	If contamination is identified through detailed investigation actions will be taken under a remediation strategy to render the site suitable for use	Negligible	Groundwater monitoring around areas of contamination. Soil testing to demonstrate remedial targets have been met
Interference in base flow to underlying	Aston Firs Wood is underlain by	Moderate Local	Low	Minor Adverse	Provision of attenuation ponds within	Not significant	N/A

aquifers to Aston Firs Wood	unproductive strata				drainage strategy to maintain groundwater levels		
Contamination of shallow groundwater from fuel spillages during operation	Hardstanding and sealed drainage from yard and maintenance areas will prevent contaminated run off from impacting groundwater	Moderate	Medium	Minor Adverse	Provision of secondary bunding to tanks, spill kits available and training of operatives. Monito	Negligible	N/A

Table 15.10 – Summary of mitigation

Description of impact	Effect	Mitigation measures adopted as part of the project	Secured by	Responsible party
Contamination of shallow groundwater from fuel spillages during construction	Minor Adverse (not significant)	Set out in CEMP including Provision of secondary bunding to tanks, spill kits available and training of operatives	CEMP to be agreed with LPA as DCO condition	Principal contractor
Contamination of shallow groundwater from existing uses	Minor Adverse (not significant)	Remediation strategy	DCO	Tritax, Environmental Consultant
Interference in base flow to underlying aquifers to Aston Firs Wood	Minor Adverse (not significant)	Provision of attenuation ponds within drainage strategy to maintain groundwater levels	Approval of drainage strategy within DCO	Tritax
Contamination of shallow groundwater from fuel spillages during operation	Minor Adverse (not significant)	Provision of secondary bunding to tanks, spill kits available and training of operatives. Provision of interceptors for hardstanding areas	Obligations within Operations & Maintenance manual	Tritax / Operating Company