Intermodal Logistics Park North Ltd

INTERMODAL LOGISTICS PARK NORTH (ILPN)

Intermodal Logistics Park North (ILPN) Strategic Rail Freight Interchange (SRFI)

Project reference TR510001

Preliminary Environmental Information Report (PEIR)

Chapter 15: Geology, soils and contaminated land

October 2025

Planning Act 2008

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

This document forms a part of a Preliminary Environmental Information Report (PEIR) for the Intermodal Logistics Park North (ILPN) project.

A PEIR presents environmental information to assist consultees to form an informed view of the likely significant environmental effects of a proposed development and provide feedback.

This PEIR has been prepared by the project promoter, Intermodal Logistics Park North Ltd. The Proposed Development is described in Chapter 3 of the PEIR and is the subject of a public consultation.

Details of how to respond to the public consultation are provided at the end of Chapter 1 of the PEIR and on the project website:

https://www.tritaxbigbox.co.uk/our-spaces/intermodal-logistics-park-north/

This feedback will be taken into account by Intermodal Logistics Park North Ltd in the preparation of its application for a Development Consent Order for the project.

Chapter 15 ◆ Geology, soils and contaminated land

INTRODUCTION

15.1 This PEIR chapter considers the likely significant environmental effects of the Proposed Development of the Main Site and Western Rail Chord of the DCO Site on the geology, soils and contaminated land at the Main Site and Western Rail Chord of the DCO Site and the local area, including consideration of hydrogeology. This PEIR chapter also includes agricultural land condition (ALC) survey information, which covers the Main Site and Western Rail Chord of the DCO Site and also covers the Soils Reuse Area (Appendix 15.5).

15.2 This chapter provides a description of the methods used in the assessment, followed by a description of the baseline conditions on the Main Site and Western Rail Chord of the DCO Site and surrounding area, and an assessment of the likely resulting environmental effects during the construction works and during the operation of the ILPN SRFI. Mitigation measures are identified (where appropriate) to avoid, reduce or offset any significant adverse effects identified, together with the nature and significance of likely residual effects. All mitigation measures will be updated in the finalised chapter of the Environmental Statement (ES) submitted as part of the Application.

15.3 This chapter includes an assessment of the potential significant effects of the Proposed Development alone and in combination with other surrounding existing and/or approved projects using the information available at the time of writing (e.g. public access planning webpages and freely available datasets as set out in Chapter 20 of the PEIR). There is a level of design work still on-going in respect of the Proposed Development, and these will help inform the technical assessments presented in the final version of the ES.

15.4 In line with the 2017 EIA Regulations, this PEIR chapter has been compiled by appropriately qualified, experienced, and competent experts. The author of this chapter is Richard Robinson BSc (Hons) MCIWEM a Geo-Environmental Consultant (Associate Director) with 22 years of industry experience, in the UK. This chapter has been reviewed by Chris Rhodes BSc MSc FGS (14 years of relevant UK experience) and approved by Tim Hull BSc MSc CGeol FGS SiLC SQP (25 years of relevant UK experience).

RELEVANT LAW, POLICY AND GUIDANCE

15.5 The applicable legislative framework for contaminated land against which the EIA must be undertaken with reference to, and in accordance with is set out in Part 2A of the Environment Act 1990 and associated statutory guidance, while the National Policy Statement for National Networks (NPSNN) 2014 also refers to policy associated with contaminated land, land stability, and minerals safeguarding.

Law

Environmental Protection Act, (1990)

15.6 Part 2A of the Environmental Protection Act, (1990) and the supporting statutory guidance describes a regulatory role for Local Authorities in dealing with contaminated land.

15.7 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. In addition to these requirements, the operation of the regime is subject to regulation and statutory guidance.

15.8 The Contaminated Land (England) (Amendment) Regulations (2012) 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/or
- significant pollution of Controlled Waters is being caused or there is a significant possibility of significant pollution of Controlled Waters being caused'.

National Policy

National Policy Statement for National Networks (NPSNN) 2024

15.9 Issues relating to discharges or emissions from a proposed development 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 development that are regulated under those regimes before the activities can be operated (paragraph 4.46 of the NPSNN).

15.10 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 (paragraph 4.50 of the NPSNN).

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

- 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.

15.12 Where necessary, land stability should be considered in respect of new development, as set out in the National Planning Policy Framework and supporting planning guidance. Specifically, proposals should be appropriate for the location, including preventing unacceptable risks from land instability. If land stability could be an issue, applicants should seek appropriate technical and environmental expert advice to assess the likely consequences of proposed developments on sites where subsidence, landslides and ground compression is known or suspected (paragraph 5.117 of the NPSNN).

15.13 A preliminary assessment of ground instability should be carried out at the earliest possible stage before a detailed application for development consent is prepared. Applicants should ensure that any necessary investigations are undertaken to ascertain that their sites are and will remain stable or can be made so as part of the development. The site needs to be assessed in the context of surrounding areas where subsidence, landslides and land compression could threaten the development during its anticipated life or damage neighbouring land or property. This could be in the form of a land stability or slope stability risk assessment report (paragraph 5.118 of the NPSNN).

15.14 Applicants should safeguard any mineral resources on the proposed site 'as far as possible' (paragraph 5.169 of the NPSNN).

15.15 The NPSNN emphasizes the importance of protecting Best and Most Versatile (BMV) agricultural land. BMV land is defined as land in Grades 1, 2, and 3a of the ALC system (paragraph 5.177). This land is considered the most flexible, productive, and efficient for food and non-food crop production. Where significant development of agricultural land is demonstrated to be necessary for a national network project, the NPSNN generally requires applicants to seek to use areas of poorer quality land (Grades 3b, 4, and 5) in preference to higher quality BMV land (5.176).

National Planning Policy Framework (NPPF)

15.16 The NPSNN is the overarching policy framework against which ILPN SRFI will be assessed and consideration will also be given to the NPPF (December 2024, as amended February 2025). The NPPF 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'.

15.17 Paragraph 187 of the NPPF states that:

'planning policies and decisions should contribute to and enhance the natural and local environment by:

…

(b) recognising the intrinsic character and beauty of the countryside and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland…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.'

15.18 Footnote 65 emphasises the requirement to refer development of land of poorer agricultural land quality, stating:

'Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.'

15.19 Paragraph 196 of the NPPF also makes the following references to ground conditions and pollution by stating 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);

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.'

15.20 Paragraph 197 sets out 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.

Local Policies and Relevant Guidance

15.21 Assessment of the impact of the Proposed Development will also be undertaken in accordance with, but not limited to, the below policies:

- St Helens Borough Local Plan up to 2037, adopted in July 2022. Particularly:
  - Policy LPC14: Minerals:
    - 1. The Council will seek to ensure that the Borough of St Helens provides a steady and adequate supply of minerals to contribute towards local, regional, and

national needs. To minimise the need for primary mineral extraction, provision of substitute, secondary or recycled sources will be encouraged in preference to land-won resources. This will include the provision of suitably designed and located temporary materials-recycling facilities on the sites of major demolition or construction projects and suitably designed and located permanent recycling plants for construction and demolition waste.

- 2. A Mineral Safeguarding Area has been defined around deposits of coal, clay (including brick clay and fire clay) and sandstone, considered to be of current or future economic importance. Proposals for non-mineral related development will be permitted (subject to compliance with other Plan policies) within the Mineral Safeguarding Area where it has been demonstrated that: a) the mineral resource would be extracted satisfactorily prior to the nonmineral development taking place (in accordance with paragraphs 4 and 5 of this Policy, and other relevant policies); or b) the minerals are either not present, are no longer of any economic value, or have already been fully extracted; or c) the prior extraction of minerals is not feasible, for reasons such as the depth of the deposit or because extraction would lead to or exacerbate ground instability; or d) the prior extraction of minerals would have unacceptable impacts on neighbouring uses, the amenity of local communities or on the environment; or e) the prior extraction of minerals would result in abnormal costs and / or delays that would jeopardise the viability of the development; or f) the need for the proposed development outweighs the need to safeguard the mineral resource; or g) the proposed development is compatible with the purposes of safeguarding the mineral; or h) the proposed development is of a temporary nature and can be completed and the site restored to a condition that does not inhibit future extraction of the minerals; or i) the development is included on the list of exempt developments (as set out in the reasoned justification of this policy).

- 3. Development for non-mineral related use(s) on or close to existing mineral workings or existing or planned mineral infrastructure will be permitted provided it would not have an unacceptable impact on the continuation of mineral workings or on the operation of the mineral infrastructure. Where the development is likely to have a significant impact on the continuation of mineral working or on the operation of the mineral's infrastructure, the applicant will be required to clearly demonstrate that either:

  - a) the mineral working and / or mineral infrastructure is no longer required to meet the current or anticipated future needs of the minerals, construction, or waste management industries; or

  - b) the need for the proposed development outweighs the need to continue the mineral working and / or the need to safeguard the mineral infrastructure; or

  - c) an alternative site within an acceptable distance would be provided for the mineral working or infrastructure that is at least as appropriate for the relevant mineral working or infrastructure use(s) as the safeguarded site.

- 4. Proposals for the exploration, extraction, storage, processing and / or distribution of minerals will be permitted if it has been demonstrated that: a) any adverse impacts relating to any of the criteria set out in paragraph 5 of this Policy would be avoided or appropriately mitigated; b) the location of the proposed development would be suitable, taking into account all relevant environmental, geological and technical considerations; and c) provisions for the restoration and aftercare of the site have been made and will be implemented at the earliest opportunity to an agreed timescale and to a standard and manner consistent with an agreed end use and the character, setting and landscape context of the surrounding area.

- 5. The criteria referred to in paragraph 4(a) of this Policy include:

  - amenity (e.g., dust, noise, visual intrusion, vibration or other nuisance);
  - b) air and water quality;
  - c) lighting;
  - d) landscape character and setting;
  - e) traffic, including air and rail, and access;
  - f) risk of contamination to land;
  - g) soil resources and the impact on best and most versatile agricultural land;
  - h) flood risk and drainage;
  - i) disposal of mineral waste;
  - j) land stability, including subsidence and risk of damage to buildings, structures and land;
  - k) ecology, including habitats, species and designated sites (particularly the internationally important nature sites); and
  - l) heritage assets and their setting.

- Policy LPD01: Ensuring Quality Development:

  - 2. Environmental Quality:

    - a) Ensure protection of watercourses and other water bodies from encroachment, modification and degradation and enable water bodies that are already modified or degraded to be improved to form sustainable, natural environments where feasible;
    - b) Minimise and mitigate to acceptable levels any effects that the development may have on air quality; light, land and / or water pollution (including

contamination of soil, surface water and groundwater resources); and levels of noise, vibration, smells, dust and electromagnetic fields in the area;

- c) Ensure that any contamination or ground stability issues that exist on the site of the proposed development would be remediated to an appropriate standard, taking into account its intended use and making use of sustainable remediation technologies; and

- d) Include satisfactory arrangements for the disposal of foul sewage, liquid waste, trade effluent and contaminated surface water.

– 3. Resource Management:

- d) Avoid loss of or damage to high quality agricultural land and / or soils (except where clearly justified by wider public benefits) and minimise such loss or damage where this is shown to be unavoidable.

- Places for Everyone Joint Development Plan Document for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, and Wigan:

  - Policy JP-G4: Lowland Wetlands and Mosslands: Positively manage land adjacent to lowland raised bog and other sensitive wetland habitats in a complementary and coordinated manner, ensuring that their hydrology is not adversely affected and the water table is restored.

  - Policy JP-G8: A Net Enhancement of Biodiversity and Geodiversity: Includes for protecting sites designated for their geological importance, and safeguarding, restoring and sustainably managing the most valuable soil resources, tackling soil degradation/erosion and recovering soil fertility, particularly to ensure protection of peat-based soils and safeguard 'best and most versatile' agricultural land.

- Wigan Local Plan Core Strategy, Development Plan Document, Remaining policies, March 2024.

  - Policy CP 17 Environmental Protection:

    – (1.) Protecting our 'best and most versatile' agricultural land from irreversible loss in accordance with national planning policy and where appropriate seeking to retain and re-use soils on major development sites.

    – (3.) Tackling land contamination and land stability issues, primarily on sites affected by past industrial uses and coal mining activities, by promoting the appropriate re-use of sites, supporting the identification of contamination and stability issues and requiring appropriate remediation.

    – (5.) Ensuring that new development does not give rise to the pollution of any watercourse, groundwater or moss land or result in the transfer of contaminated run-off to surface water sewers.

- Warrington Local Plan, 2021/22 – 2038/39, adopted December 2023:
  - Policy ENV3 - Safeguarding of Minerals Resources:
    - 1. Mineral Safeguarding areas (MSAs) are defined on the Policies Map.
    - 2. Sand, gravel and shallow coal resources and sandstone and brick clay workings within the Minerals Safeguarding Areas will be protected from permanent sterilisation by other development.
    - 3. Planning permission will be granted for non-mineral development within a MSA, as defined on the Policies Map, where it is demonstrated that:
      - a. the mineral is not of economic value or potential value, or does not exist; or
      - b. that extraction of the mineral would not be physically viable or practicable; or
      - c. the mineral can be extracted satisfactorily prior to the non-minerals development taking place without adversely affecting the viability or deliverability of the non-minerals development; or
      - d. the development is of a temporary nature that can be completed and the site returned to a condition that would not prevent future mineral extraction; or
      - e. material considerations indicate that the need for the development overrides the presumption for mineral safeguarding such that sterilisation of the mineral can be permitted following the exploration of opportunities for prior extraction; or
      - f. it constitutes development that is exempt from mineral safeguarding policy.
    - 4. Planning applications for development within the MSA defined on the Polices Map will need to demonstrate that impacts, e.g. noise, dust, light and air emissions, that may legitimately arise from the activities taking place in the safeguarded areas would not be experienced to an unacceptable level by occupants of the proposed development and that vehicle access to and from the area would not be constrained by the development proposed.
  - Policy ENV4 – Primary Extraction of Minerals. Aggregate Extraction within Mineral Safeguarding Areas:
    - Applications for the extraction and/or processing of sand, gravel or sandstone/gritstone within the MSAs identified on the Policies Map will be permitted where:
      - a. the mineral is required to meet the required landbank of:
        - i) at least 7 years for sand and gravel; or

- ii) at least 10 years for crushed rock; and

- b. the site contains adequate resources of the mineral, in terms of quality and quantity for extraction to take place; and

- c. the proposal accords with all other policies of the Local Plan in relation to the protection of the environment, public amenity and sustainable transport or demonstrates that other material considerations outweigh any policy conflict.

- Policy ENV8 – Environmental and Amenity Protection: points 6 to 8 relate to land quality, and 9 and 10, water quality:

  - (6.) The Council will ensure that any development proposals on or adjacent to potentially contaminated land; unstable ground or that have a sensitive end use, are suitable for their intended use. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account.

  - (7.) Development proposals on land that is (or suspected to be) affected by contamination; unstable ground or has a sensitive end use must include an assessment of the extent of the issues and any possible risks. Development will only be permitted where the land is or can be made suitable for the proposed use.

  - (8.) Development proposals will need to demonstrate that any loss of the Borough's best and most versatile agricultural land will be minimised.

  - (9.) Development proposals will not be permitted where it would have an adverse effect on the quality or availability of groundwater resources, watercourses or water bodies.

  - (10.) Any proposals for new development within Groundwater Source Protection Zones must accord with central government guidance set out in its Groundwater Protection guides, or any subsequent iteration of the guidance. New development within Groundwater Source Protection Zones will be required to:

    - (a.) be planned so as to mitigate the risk of pollution to the public water supply and the water environment;

    - (b.) undertake a risk assessment and mitigation strategy with respect to groundwater protection to manage the risk of pollution to public water supply and the water environment; and

    - (c.) produce a Construction Management Plan to identify the potential impacts from all construction activities on both groundwater, public water supply and surface water and identify appropriate mitigation measures necessary to protect and prevent pollution of these waters.

- Greater Manchester Joint Minerals Plan, April 2013, notably:
    - Policy 1 – The Presumption in Favour of Sustainable Minerals Development. This policy states that positive consideration will be given to minerals development which accords with the policies set out in the Joint Minerals Plan.
    - Policy 8 – Prior extraction of Mineral Resources. This policy related to non-mineral development proposals within MSAs should extract any viable mineral resources present in advance of construction. Non-mineral developments within these areas will be permitted where compliance with criteria set out in the policy is demonstrated. Warrington Borough Council, Environmental Protection, Supplementary Planning Document, Adopted July 2024: Chapter 3 related to contaminated land considerations.
- Wigan Council Guidance Note, construction Environmental Management Plans, August 2019.

Construction (Design & Management) Regulations

15.22 The Construction (Design & Management) (CDM) Regulations make explicit duties that exist under the Health and Safety at Work Act and the Management of Health and Safety at Work Regulations. This requires clients to use their influence to ensure that the arrangements made by other duty holders are sufficient to safeguard the health and safety of those working or those affected by that work.

Other Guidance

15.23 Alongside the policies and guidance listed above, there is a range of non-statutory guidance material and British Standards which, where relevant, have been considered in this assessment, including:

- British Standards Institution (BSI): BS 10175:2011+A2:2017, (2017), Investigation of Potentially Contaminated Sites, Code of Practice;
- British Standards Institution (BSI): BS 5930:2015+A1:2020, (2020), Code of Practice for Ground Investigations;
- British Standards Institution (BSI): BS 8485:2015+A1:2019, (2019), Code of Practice for the Characterization and Remediation from Ground Gas in Affected Developments;
- British Standards Institution (BSI): BS 8576:2013, (2013), Guidance on Investigations for Ground Gas – Permanent Gases and Volatile Organic Compounds (VOCs);
- British Standards Institution (BSI): BS EN 1997-1:2004, (2004), Eurocode 7: Geotechnical Design – Part 1: General Rules;
- British Standards Institution (BSI): BS EN 1997-2:2007, (2007), Eurocode 7 Geotechnical Design – Part 2: Ground Investigation and Testing;

- Environment Agency Report, Land Contamination Risk Management (2020);
- CD 622 Managing geotechnical risk, National Highways (formerly Highways England), Design Manual for Roads and Bridges (DMRB), March 2020 (Revision 1);
- Construction Industry Research and Information Association (CIRIA) Report C665, (2007), Assessing Risk Posed by Hazardous Ground Gases to Buildings;
- Construction Industry Research and Information Association (CIRIA) Report C736, (2014), Containment systems for the prevention of pollution;
- Construction Industry Research and Information Association (CIRIA) Report C741, (2015), Environmental Good Practice on Site 4th Edition;
- Construction Industry Research and Information Association (CIRIA) Report CIRIA C681, 'Unexploded Ordnance (UXO) A Guide for the Construction Industry.'
- Contaminated Land: Applications in Real Environments (CL:AIRE) Definition Toxicological Assessment of Contaminants in Soil;
- Environment Agency Science Report SC050021/SR3, (2009), Updated Technical Background to the CLEA Model, 2009;
- Environment Agency Science Report SC050021/SR4, (2009), CLEA Software (Version 1.06) Handbook;
- Environment Agency, The Environment Agency's approach to groundwater protection February 2018 Version 1.2;
- Guidance for Design, Construction, Modification, Maintenance and Decommissioning of Filling Stations, APEA/EI Blue Book, 5th Edition (published November 2024);
- MAFF (1988). Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land;
- Natural England (2012). Technical Information Note 049 - Agricultural Land Classification: protecting the best and most versatile agricultural land, Second Edition; and
- The Control of Pollution (Oil Storage) (England) Regulations 2001.

CONSULTATION TO DATE

15.24 A request for an EIA Scoping Opinion was submitted to PINS in November 2024, with a Scoping Opinion returned on 12 December 2024. Comments relating to Geology, Soils and Contaminated Land that were received are summarised in Table 15.1 below.

Table 15.1 Scoping and informal consultation summary

Consultee	Consultee comment	Response
EIA Scoping Consultation		
Planning Inspectorate ID 3.9.1	**Impacts on or loss of soils and geology as a Resource – construction:** The Scoping Report seeks to scope out the effects from construction on soils and geology as a resource. The Inspectorate considers that given the location of the Main Site on agricultural land, that there is potential for significant effects on soils and agricultural land from the Proposed Development. This matter cannot therefore be scoped out of the assessment at this stage. Please see the Inspectorate's comments in ID 3.9.10 that effects on soils and potential loss of Best and Most Versatile Land (BMV) should be considered within the assessment.	This has been scoped in and assessed in this chapter.
Planning Inspectorate ID 3.9.2	**Impacts on receptors from construction related activities:** The Scoping Report does not define 'construction related activities' and seeks to scope out effects from construction on all receptors on the basis that appropriate mitigation, such as a CEMP and Materials Management Plan (MMP) would be provided within the ES. Given that it is not clear what effects this matter would include and how it would affect the different receptors listed in paragraph 14.59, the Inspectorate does not agree to scope this out of the assessment at this stage. The assessment of construction effects on receptors should therefore be clarified in the ES. The Applicant is reminded that details of the measures within the CEMP and MMP should be informed by the assessment of	This has been scoped in and assessed in this chapter, informing the outline Construction Environmental Management plan (oCEMP) and Site Waste and Materials Management Plan (SWMMP), which have been prepared as part of the statutory consultation. An MMP in accordance with the Definition of Waste Code of Practice will be prepared by the Contractor, and a CL:AIRE

Consultee	Consultee comment	Response
EIA Scoping Consultation		
	effects.	declaration lodged.
Planning Inspectorate ID 3.9.3	**Encountering Unexploded Ordnance – construction:** The Scoping Report seeks to scope this matter out, on the basis that the Proposed Development site is in a low Unexploded Ordnance risk area. The ES should confirm the evidence of the Proposed Development being sited in an area of low risk, but on that basis the Inspectorate agrees that this matter can be scoped out of the assessment.	Noted
Planning Inspectorate ID 3.9.4	**Mining related impacts – operation:** The Scoping Report seeks to scope out impacts during operation related to mining, explaining that the Proposed Development is not in a Development High Risk Area as designated by the Coal Authority. The Inspectorate considers given the location of the Proposed Development that significant effects are unlikely to occur. On that basis, this matter can be scoped out of the assessment.	Noted
Planning Inspectorate ID 3.9.5	**Study Area:** The geographical scope study area is stated to include a 250m radius from the Proposed Development. The Inspectorate notes the recommendation of the Environment Agency that a 500m study area should be applied, and the ES should take account of the study areas for other relevant assessments (please see ID 3.8.4 of this Scoping Opinion).	The Study Area has been increased in recognition of this feedback as confirmed in Paragraph 15.37 of this PEIR chapter.
Planning Inspectorate ID	**Receptors:** Receptors should include source protection zones, drinking water safeguard zones, groundwater abstractions and confirm if locally or	The Applicant considers that source protection zone and, drinking water

Consultee	Consultee comment	Response
EIA Scoping Consultation		
3.9.6	regionally designated geological sites could be affected by the Proposed Development. These should be assigned a sensitivity and an assessment provided, where significant effects are likely to occur.	safeguard zones fall under 'Principal Aquifers used for public water supply' in the submitted EIA Scoping Report. However, these are now explicitly listed in the receptors (Table 15.3). There are no geologically sensitive sites on/near the Main Site and Western Rail Chord (paragraph).
Planning Inspectorate ID 3.9.7	**Battery Storage:** The ES should include an assessment of effects arising from the possible battery storage as part of the Proposed Development.	This has been identified as a possible contamination source and included in the assessment within this chapter.
Planning Inspectorate ID 3.9.8	**Effects from hydrogeological changes:** The assessment of effects from changes to the hydrogeological regime should consider the potential of the Proposed Development to affect regional groundwater flow regimes during construction and operation, in addition to effects on Highfield Moss SSSI.	The Principal Aquifer of the Chester Formation (Drinking Water Safeguarded Zone) has been investigated in the Phase 2 report (Appendix 15.2) for the Main Site and used to inform this PEIR chapter.
Planning Inspectorate ID	**Contamination – operation:** Potential effects on groundwater, source protection zones and potable water supplies from potential sources of	These potential effects have been included in the assessment

Consultee	Consultee comment	Response
EIA Scoping Consultation		
3.9.9	contamination during operation, including from possible battery storage, should be scoped into the assessment.	presented within this PEIR chapter.
Planning Inspectorate ID 3.9.10	**Agricultural Land:** The Scoping Report identifies that the Main Site comprises agricultural land and refers to an Agricultural Land Classification (ALC) being undertaken and submitted with the DCO application. With reference to ID 3.9.1 of this Scoping Opinion, the ES should include an assessment of effects on soils and on BMV agricultural land. The ES should contain a clear tabulation of the areas of land in each BMV classification to be temporarily or permanently lost as a result of the Proposed Development, with reference to accompanying map(s) depicting the grades. Specific justification for the use of the land by grade should be provided. An assessment of effects of the loss of agricultural land should therefore be provided in the ES and supported by appropriate ALC and soil surveys. Consideration should be given to the use of BMV land in the Applicant's discussion of alternatives.	The Main Site has been. surveyed and an assessment based on potential loss of BMV land is included in the potential effects in this PEIR chapter.
Informal Consultation		
Warrington Borough Council	It is noted that this paper recognises that part of the south area of the DCO site is defined as a Mineral Safeguarding Area in the Local Plan. Depending on the final extent of the red line boundary, more of the site could fall within an MSA and/or within 250m of safeguarded minerals infrastructure	Southworth Quarry has been removed from the Order Limits since the original informal consultation. Land has been added

Consultee	Consultee comment	Response
EIA Scoping Consultation		
	(Southworth Quarry).	to the Main Site, forming the eastern part of the Main Site. Part of this land is classified as an MSA as designated by Wigan Council.
Warrington Borough Council	It is also noted that the agricultural land classification survey has only assessed part of the main site. As above, once the final extent of the boundary is defined, a full assessment of all agricultural land, including that in Warrington, will be required to clearly identify land which is 3a and 3b so that the impact on the Best and Most Versatile agricultural land can be considered.	The Main Site has been surveyed and an assessment based on potential loss of BMV land is included in the potential effects in this PEIR chapter.
Lancashire Wildlife Trust	It is also essential that the full extent of the peat soils is known and mapped and should include the mapping of even shallow peat deposits. Even at shallow depths, these soils have a part to play in maintaining the function of the adjacent mossland habitat.	Confirming the absence, or otherwise, of Peat on the Main Site has been investigated through an intrusive investigation comprising a series of boreholes and trial pits immediately surrounding the Moss and reported in PEIR Appendix 15.2. The Ground Investigation (GI) indicates that there are no peat deposits extending from Highfield Moss SSSI onto the Main Site.
Lancashire Wildlife Trust	The International Union for Conservation of Nature (IUCN) highlighted in their report 'Use of peat depth criteria: Accounting for the lost peatlands' that too often, these shallow peat areas are ignored and discounted. Deeper peats almost never end abruptly, but instead grade into shallower peat, then into mineral ground.	
Leigh Ornithological	We seek confirmation that the Environmental Impact Assessment (EIA) will:	A contamination risk assessment,

Consultee	Consultee comment	Response
EIA Scoping Consultation		
Society (LOS)	Assess impacts on Highfield Moss SSSI directly and indirectly, including hydrological and pollution-related effects.	hydrogeological, and hydrological assessment have been undertaken to inform this PEIR chapter and is presented as PEIR Appendix 15.2. This includes intrusive GI to assess existing ground and groundwater conditions, the contamination status and how these could affect the groundwater feed to Highfield Moss SSSI. The EIA considers pollution from surface water runoff and changes to the hydrological regime. The assessment covers both the construction and operational phases.
United Utilities	UU requests that the assessment of potential environmental impact from ground conditions including any contamination, hazardous materials or dewatering fully considers the impact on our assets, water resources, the groundwater environment and water quality as a result of construction of the proposed development.	The Applicant recognises that the Main Site is underlain by the Chester Formation which is a valuable potable water resource. Assessment of potential impacts upon this resource from the Proposed Development is included

Consultee	Consultee comment	Response
EIA Scoping Consultation		
		within this PEIR and PEIR Appendix 15.2. A GI has been undertaken to assess current contamination concentrations and groundwater flow regimes. This has informed an outline CEMP (oCEMP) prepared as part of statutory consultation to ensure construction activities do not adversely impact water resources.
United Utilities	We have identified the following receptors which should be considered in future risk assessments, and their protection ensured throughout the construction phase and for the lifetime of the development: 1. The Principal Aquifer underlying the site (associated with Total Catchment of several groundwater SPZs). There is potential for construction to create a direct pathway for contaminants into the underlying aquifer, and there is a lack of confining superficial deposits providing protection to surface contaminants; and 2. Various water mains within the site.	A oCEMP has been prepared to manage potential risks to water / groundwater resources during the construction phase. Piling / a deep foundation solution is not anticipated although if required, a foundation works risk assessment (FWRA) will be undertaken and methodologies adopted to minimise impact on receptors. Approval will be obtained from the EA before implementation.

Consultee	Consultee comment	Response
EIA Scoping Consultation		
United Utilities	There is potential for the development to result in disturbance and/or contamination of the water mains.	GI and laboratory analysis of soil samples has been undertaken to assess organic contaminant concentrations and is presented in PEIR Appendix 15.2. The results will inform a UU Risk Assessment for Water Pipes in accordance with UU "Supplementary guidance for the selection of water pipes in land potentially affected by contamination" and appropriate water supply construction materials will be specified.
United Utilities	Future reports we would expect to review are: - Geo-environmental Risk Assessments; - Ground Investigation Reports; - Remediation and Verification Reports (as required); - CEMP; - Hydrogeological Impact Assessment (in line with the Environment	A GI covering the Main Site and the Western Rail Chord of the DCO Site commenced in April 2025 and has informed a Geo-environmental risk assessment and a Hydrogeological Impact Assessment. The report is presented as PEIR Appendix 15.2. A oCEMP has been prepared which includes soil, contamination and hydrogeology considerations.

Consultee	Consultee comment	Response
EIA Scoping Consultation		
	Agency's approach to groundwater protection); - Surface and foul water drainage plans; and - Piling Risk Assessment (if required).	Piling or another dep foundation solution is not anticipated to be required. If this changes, then a FWRA will be completed if significant contamination is present due to the sensitivity of the underlying aquifer. EA approval will be obtained before being implemented.

15.25 Following the feedback received as part of the EIA Scoping and the informal consultation, consultation has also been undertaken with Natural England and Lancashire Wildlife Trust in regard to potential impacts on Highfield Moss SSSI. This consultation is being led by the Applicant's ecological advisors (see Chapter 11: Ecology and Biodiversity for further details) and is also covering consideration of the hydrogeological regime.

Table 15.2 Other consultation

Consultee	Date	Consultee comment	Response
Lancashire Wildlife Trust	Teams Meeting - 9th June 2025	A general meeting where the Applicant's advisors presented the preliminary findings from the ground investigation and there were general discussions on what the buffer zone should be planted with / how it should be constructed.	While no formal response has been received the verbal feedback in the meeting was generally positive and the general consensus was that the 50m buffer would be appropriate. Further details on the ecological implications and similar with Lancashire Wildlife Trust and Natural England are included in Chapter 11 (Landscaping and visuals), and Chapter 11 (Ecology and biodiversity).

METHODOLOGY AND DATA SOURCES

15.26 This PEIR chapter assesses the likelihood of any existing contamination being present at the Main Site and Western Rail Chord of the DCO Site, such that it could cause significant environmental or health effects if not addressed adequately at the construction and/or operational stages. Additionally, the construction will entail bringing materials onto the DCO Site (such as fuel) which if spilt or leaked, could result in land or groundwater contamination. Impairment and sterilisation of geological and mineral resources, and impacts to important geologically designated sites, will likewise be addressed.

15.27 A risk-based approach in accordance with Defra, and the EA 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.

15.28 The following reports have been prepared for the DCO Site to inform this chapter:

- PEIR Appendix 15.1: Intermodal Logistics Park North (ILPN) Strategic Rail Freight Interchange (SRFI); Phase 1 Geo-Environmental Assessment; Ref. PSE-BWB-EGT-XX-RP-YE-0001_Ph1; rev. P2 dated July 2025 – A desk study report covering the Main Site and Western Rail Chord. (BWB for Intermodal Logistics Park North (ILPN) Ltd);

- PEIR Appendix 15.2: Intermodal Logistics Park North (ILPN) Strategic Rail Freight Interchange (SRFI); Phase 2 Ground Investigation and Geo-Environmental Assessment; Ref. PSE-BWB-EGT-XX-RP-YE-0003_Ph2 - GI and assessment has been undertaken the Main Site and Western Rail Chord excluding the land west of Parkside Lane on the Main Site (BWB for Intermodal Logistics Park North (ILPN) Ltd). Proposed Earthworks Isopachyte Contours; Drawing Ref. ILPN-BWB-HGN-ZZ-DR-CH-0601; dated 20th December 2024.

- PEIR Appendix 15.3: Parkside East, St Helens; Phase 2 Site Investigation; Ref. 4597-ROC-ZZ-XX-RP-ES-P2SI01; dated 18th July 2023 - GI and assessment on the Main Site on land west of Parkside Road. (ROC Consulting for Harworth Estates Property Group Ltd);

- PEIR Appendix 15.4: Intermodal Logistics Park North (ILPN) Strategic Rail Freight Interchange (SRFI); Minerals Resource Assessment; Ref. PSE-BWB-EGT-XX-RP-YE-0002_MRA - A Mineral Assessment Report that covers the Main Site area that is within the stewardship of Wigan Council and the part of the DCO Site that is within a Minerals Safeguarded Area (BWB for Intermodal Logistics Park North (ILPN) Ltd;).

- PEIR Appendix 15.5: Junction 22, M6, St Helens; Agricultural Land Classification and Soil Resources –Report; dated August 2025 (Reading Agricultural Consultants for Tritax Symmetry).

15.29 With regards to sites of geological interest, information has been obtained from Natural England, and the British Geological Survey (BGS), who hold information on such sites.

15.30 These reports and information provide details of the basic ground conditions at the Main Site and Western Rail Chord of the DCO Site, including information on the geology, minerals, ground conditions, the history, hydrogeology, and contamination to inform this PEIR chapter. The assessment considers the results of the specific GI works and takes into consideration the Conceptual Site Model (CSM) when assessing the potential impacts and effects of the Proposed Development. Where appropriate, this chapter proposes mitigation measures and considers the residual impacts following implementation of appropriate mitigation. Final mitigation proposals will be made once the full design and assessments have been concluded in a final ES chapter in due course.

General Approach and Data Sources

15.31 The general methodology for assessing effects followed standard procedures and involved the following desk-based and intrusive processes:

- review of local, regional and national planning strategies and development plan policies (including, but not limited to, land contamination, aquifer protection, mineral resources);
- review of published documents, current standards, and current best practice guidance; and
- a site reconnaissance to identify and confirm the current state and use of the Main Site and Western Rail Chord of the DCO Site.

15.32 A review of the following reports and information sources has been undertaken to provide site specific factual data upon geology, soils and groundwater to support the development of the baseline ground model and assessment of baseline conditions:

- regulatory records and environmental data within Groundsure reports, reference GSIP-2021-10846-4671 and HMD-214-7439283 included within the Phase 1 Report (Appendix 15.1);
- 1:2,500 and 1:10,000 scale Historical Ordnance Survey Mapping;
- historical aerial photographs (Google Earth) and other imagery (Groundsure Reports within Appendix 15.1);
- BGS 1:10,000 and 1:50,000 scale geological mapping;
- BGS online geological maps and exploratory hole records;
- Multi-Agency Geographic Information for the Countryside (MAGIC) website;
- Mining Remediation Authority Interactive Map Viewer; and
- regional unexploded ordnance (UXO) risk maps.

15.33 The earthworks construction phase of the Proposed Development will comprise a phased

enabling works package to prepare development platforms, comprising the stripping of topsoil and bulk earthworks using site won materials and provision of primary infrastructure. Construction of the Rail Terminal will commence, and buildings will follow in several phases as set out in Chapter 3 of the PEIR. Current earthwork models indicate up to 10.0m of earth will be cut from of the Main Site and re-engineered across the central and eastern extents to raise levels and create suitable development platforms. The greatest cut is near the west end of the Rail Terminal.

15.34 The key activities of the operational phase will comprise road and rail logistics, maintenance of vehicles and rail stock, and the storage and distribution of goods. Where necessary suitable mitigation options are detailed and their residual effect measured using updated and extended qualitative risk assessment matrices to demonstrate the effect, and post mitigation effects. Cumulative effects have been considered where other schemes are planned that might affect the same receptors.

Study Area

15.35 There is no defined radius in the guidance or British Standard. The geographical area included in this assessment is a 500m radius from the Main Site and Western Rail Chord of the DCO Site boundary. This is considered a reasonable distance based on standard practice and professional judgment to which contamination sources can migrate and potentially cause impact to the Main Site and Western Rail Chord of the DCO Site and is agreed based on the feedback from PINS and the EA through the EIA Scoping process.

15.36 The Northern Mitigation Area and Soils Reuse Areas of the DCO are unaffected by the proposals in regard to geology, soils, and contaminated land covered in this chapter including minerals sterilisation. The exception to this is the Soils Reuse Areas which will have an ALC survey completed and included in the final ES Chapter.

Identifying Risks

15.37 A preliminary risk assessment is included in this PEIR chapter in line with Land Contamination Risk Management, which includes a geo-environmental Hazard Identification ('HAZID') that seeks to list all the suspected contaminant sources, the 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 'CSM'. Each contaminant linkage is risk assessed in accordance with the risk assessment methodology set out in CIRIA C552. Those risks assessed as low/moderate or greater are considered to be potentially significant and so have been considered as potentially significant in the context of EIA.

15.38 Beneficial and adverse impacts have been identified, and options have been outlined for mitigating any potential adverse effects from the construction and operation in this PEIR chapter.

15.39 In addition to the effects of contamination, other ground related issues / risks have been assessed, such as ground instability issues or other ground related development constraints

(e.g. worked ground, mining), geologically sensitive sites, loss of best most versatile agricultural land and loss of mineral resources.

15.40 The methodology for the assessment of contamination is described below. For contamination to present a significant potential effect a link must first be established within the CSM. The likelihood must be demonstrated with an identifiable source (on site or off site), receptor and viable pathway. Potential contamination sources have been identified from an assessment of:

- current Main Site and Western Rail Chord of the DCO Site uses and activities;
- review of historical mapping for former uses;
- review of regulatory permits, consents and authorisations contained within the Groundsure report for the Main Site and Western Rail Chord of the DCO Site reproduced with PEIR Appendix 15.1, such as landfills, environmental permits, pollution controls;
- review of mining and ground instability risk ratings from BGS and Coal Authority records;
- site visit to assess evidence of ground instability and contamination;
- ground gas monitoring; and
- chemical laboratory analysis of soils and groundwater samples recovered from the Main Site and Western Rail Chord of the DCO Site.

15.41 Pathways are specific to the receptor type. For example, they could include:

- ingestion, inhalation, dermal contact for human health receptors;
- infiltration and contaminant migration through permeable strata such as the unsaturated zone for groundwater;
- a secondary pathway from groundwater contamination to surface water;
- migration of ground gases and vapours such as permanent gases, landfill gas and volatile hydrocarbons into buildings; and
- direct contact and uptake by plants.

15.42 For potential loss of minerals resource and other ground and ground stability related effects, the identification of receptors is based on relevant guidance and the professional judgement of a qualified technical specialist who has undertaken a desk study for the Main Site and Western Rail Chord of the DCO Site, has visited the Main Site and Western Rail Chord of the DCO Site and its surroundings, and reviewed GI data and published records and mapping (e.g. BGS maps). In some cases, even without quantified information, it is reasonable to assume that some potential receptors will not experience significant effects. This is sometimes the result of tried and trusted mitigation measures that have been incorporated into the scheme, which might reasonably be expected to be effective.

15.43 The sensitivity of potential receptors can be described qualitatively according to the

categories shown in Table 15.3.

Table 15.3 Criteria for assessing ground related receptor sensitivity

Receptor sensitivity	Explanation	Receptor / Resource
Very high	The receptor has no, to low, ability to absorb change without fundamentally altering its present character, is of high environmental value, or is of national or international importance.	Human health of vulnerable users of residential areas, schools and playing fields. Surface water bodies of high quality e.g. main rivers and primary tributaries with good biological and/or chemical quality and/or Principal Aquifers used for public water supply including drinking water safeguard zones, and groundwater abstractions. Nationally designated areas e.g. Ramsar sites, SSSIs or Ancient Woodland. >20ha of Grade 1 and 2 BMV land.
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.	Human health of users of residential areas. Surface water bodies of high quality e.g. main rivers and primary tributaries with good biological and/or chemical quality and/or Principal Aquifers which are not used for drinking water. Major strategic mineral resource areas, e.g. areas associated with a particularly high grade or quality resource or rare minerals. <20ha Grade 1 and 2 BMV Land, but >20ha total BMV land.
Moderate	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.	Human health of users of retail and business parks (public and work places). Ground instability associated with occupied or part-time occupied commercial structures, associated pavements, and earth structures. Surface water bodies of moderate quality, and/or Secondary A Aquifers. Regionally or locally important mineral resource

Receptor sensitivity	Explanation	Receptor / Resource
		areas (Mineral Planning Area (MPA) or Mineral Safeguarding Area (MSA)). Underground structures. <20ha BMV land.
Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance.	Human health of users of commercial or industrial development. Ground and construction workers. Ground instability associated with non-occupied buildings and infrastructure. Mineral Areas of Search/ Consultation Areas (MCA). Secondary B and undifferentiated aquifers. Non BMV agricultural land.
Very Low	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.	Human health of users of commercial or industrial development.
Negligible	No change or indiscernible change from baseline conditions.	Unproductive Strata. Non-agricultural land.

15.44 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 assesses adverse and beneficial effects through the Proposed Development lifecycle. The magnitude will be assessed using the scale shown in Table 5.3 (PEIR Chapter 5).

15.45 The assessment of significance is based on the magnitude of the effect and the importance or sensitivity of the receptors as set out in PEIR Chapter 5. The significance of the potential effects is identified, as well as those of the residual effects for agricultural and mineral effects. Appropriate mitigation measures will be recommended to reduce / control any significant

adverse effects on sensitive receptors. Once remediated / mitigated, there should be no significant residual effects with respect to land contamination issues.

15.46 Effects have the potential to be adverse, beneficial and temporary or permanent. For example, in terms of beneficial effects, the Proposed Development may remove a source of contamination, or it may break a pathway that currently links a source to a receptor. The effects criteria are presented in Table 5.3 (Chapter 5). The duration of the effect is also considered:

- Long-term: Permanent effects arising from the operation of the SRFI or from the permanent presence or removal of physical features.
- 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.
- 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.

15.47 Effects of moderate or greater significance are considered to be significant in terms of the EIA. Where effects are considered as marginal, i.e. moderate / slight a precautionary approach will be adopted when identifying mitigation requirements, and the effect taken to be significant.

Limitations and Assumptions

15.48 As with all GI, a targeted approach has been undertaken to assess prevailing ground conditions and the contamination status of the Main Site and Western Rail Chord of the DCO Site. However, it is always possible that previously unforeseen sources of contamination could be identified during the Proposed Development. Contingency measures for dealing with such contamination will be included within a Remediation Strategy / Remediation Design Statement for the land parcels within the Main Site and Western Rail Chord of the DCO Site, which will be prepared post-DCO and are expected to be secured by DCO condition and are a CL:AIRE requirement for an MMP under Definition of Waste: Development Industry Code of Practice (DoWCoP).

BASELINE CONDITIONS

Baseline Environment

15.49 Baseline conditions are summarised in this section based on the desk studies and GIs completed (Appendix 15.1 to 15.5) covering the draft Main Order limits consisting of the Main Site and the Western Rail Chord the Main Site of the DCO Site. The Northern Mitigation Area and Soils Reuse Area, which predominantly comprise agricultural land have not been subject to baseline surveys and are not significant in regards to contamination, or minerals sterilisation, although the Soils Reuse Area will be subject to ALC surveys which will be included in the final ES.

ILPN SRFI Site Key Features

15.50 A detailed site description is presented in Chapter 2 and so is not repeated here. However, a summary of the key features relevant to this chapter are highlighted. The key features (sources, pathways and/or receptors) have been identified from mapping and site walkover visits.

The Main Site

15.51 The Main Site predominantly comprises open fields used agriculturally. Overhead pylons run throughout, oriented east/west in the north of the central area of the Main Site. Highfield Farm is located within the northern portion. Within the north east portion of the Main Site is an airfield strip, comprising a grass landing strip, adjacent to which is the former Mains Pit, and Moss Pits. The airstrip is used by light aircraft and also has a model flying club adjacent. The former Mains Pit and Moss Pits comprises shallow ponds/marsh that had Made Ground locally visible at the surface. The pits are present within small parcels of woodland, which are densely vegetated.

15.52 The northeast of the Main Site comprises a small compound used for dog training, which is accessed from its own gate on Winwick Lane. Numerous old vehicles and vehicle parts are also present in this compound which is in a general state of disrepair. The ground in this area is approximately 2m higher than the surrounding fields.

15.53 Another dog training area with gravel parking is present southeast of the airstrip along a footpath towards the A579. Adjacent, is an area used for burning agricultural waste.

15.54 Parkside Farm is located in the central area with recently planted trees located just off Parkside Farm, the unnamed concrete road, and Parkside Road.

15.55 A railway within a cutting, and Highfield Moss SSSI borders the Main Site to the north, the M6 borders the Main Site to the west and the south, and the A579 borders the Main Site to the east and the south.

The Western Rail Chord

15.56 The Western Rail Chord is accessible via Newton Park Drive to the west. The general area is heavily vegetated and inaccessible. Several buildings off the access road are derelict and supported by scaffolding. Some evidence of minor fly tipping is visible off this access road. A footpath running approximately south at the entrance to the Newton Park Farm provides pedestrian access towards the Former Parkside Colliery access road. The farm itself was in use during the walkover and therefore not accessed. Much of this area adjacent to the path is still heavily vegetated and inaccessible.

Site History

15.57 The Main Site of the DCO Site has remained predominantly undeveloped comprising open fields with several farms / residences and ponds noted throughout its mapped history. A rail line ran east / west in the far north of the Main Site, and a tank was mapped adjacent to this, from 1906 to 1956. Several ponds which are no longer displayed on mapping have the

potential to have been infilled. In the 21st-century, a grass airstrip opened southeast of Highfield Moss SSSI. Parkside Colliery encroaches the Western Rail Chord slightly.

15.58 The land surrounding the Main Site is similarly used as predominantly agricultural land throughout the mapped history. Several industrial processes and sandstone quarrying activity is noted throughout the surrounding areas mapped history. The former Parkside Colliery was mapped from 1964, which is immediately adjacent to the Western Rail Chord and Gaskell Bros WM&C Ltd quarry is located to the southeast of the Main Site.

Ground Conditions

Published Information

15.59 Information published by the BGS indicates that the nature of superficial deposits vary. The central area of the Main Site is underlain by a combination of Devensian Till deposits or absence of any superficial deposits. The far north and northeast of this section are underlain by Glaciofluvial Ice Contact deposits (Devensian sand and gravel); a small Lacustrine Deposit also underlies the northeast of the Main Site. It is worth noting that peat deposits are mapped within Highfield Moss SSSI which is situated immediately to the north of the central section and therefore may well extend onto the Main Site.

15.60 The vast majority of superficial deposits overlie the Chester Formation (sandstone) bedrock. The Kinnerton Sandstone Formation, and the Manchester Marls Formation are located beneath superficial deposits in the west of the Main Site.

15.61 The geology mapped beneath the Western Rail Chord is similarly mapped to be underlain by Devensian Till as well as being devoid of superficial deposits in some areas. The superficial deposits overlie the Chester Formation bedrock.

15.62 The BGS Lexicon database provides the following descriptions of the geology mapped at the Main Site and Western Rail Chord of the DCO Site:

- Till: unsorted and unstratified drift, which is over consolidated. Consisting of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape.
- Glaciofluvial Ice Contact deposits: stratified sand and gravel with interbedded diamicton deposited by meltwater and ice under (subglacial), within (englacial), and at the margins of, glaciers.
- Glaciofluvial Deposits: mostly coarse-grained sediments (i.e. sand and gravel) with some finer-grained layers (i.e. clay and silt).
- Lacustrine deposits: deltaic, lake bottom and shore sediments in lakes. It includes fine-grained sediments (i.e. clay and silt), commonly laminated, and can contain thin layers of organic material or sand.
- The Chester Formation: coarse-grained, typically well-cemented proximal facies, changing to a fine-grained, less well-cemented distal facies northwards.

- The Kinnerton Sandstone Formation: dominantly aeolian, reddish brown to yellow, generally pebble-free, fine to medium-grained, cross-stratified sandstone.

- The Manchester Marls Formation: red marl (calcareous mudstone and siltstone) with thin beds of fossiliferous marine limestone and dolomite; locally green; sandy in places especially in top part; local breccias and pebbly beds.

15.63 Several geological faults are located on the DCO Site. One runs northwest to southeast through the northern section of the Main Site. Two run north / south through the Chat Moss Line in the northwest of Main Site. Another encroaches on the western edge of the Western Rail Chord.

Encountered Ground Conditions

15.64 Investigation locations are shown on the PEIR Figure 15.1. Topsoil was encountered consistently across the Main Site and Western Rail Chord at typical thicknesses of between 0.20m and 0.40m, locally up to 1.0m, and averaging circa 0.35m. The composition was typically dark brown clayey sand or sandy clay with rootlets and rare sandstone and quartzite gravel.

15.65 Made Ground was recorded at seven locations from the surface at thickness of between 0.2m and 1.6m. The material was typically natural Topsoil and Subsoil with anthropogenic materials mixed in including brick, plastic and concrete.

15.66 Lacustrine deposits were recorded in one location in the northeast of the Main Site at a thickness of 0.25m and comprised of firm light brown and light grey clay.

15.67 Peat was recorded at two locations:

- 0.6 to 2.9m at TP04 in the northeast of the Main Site; and

- 0.3 to 1.1m at TP14 located immediately adjacent to Moss Pits in the northeast of the Main Site.

15.68 Both of the above trial pits were positioned to target former pond locations so that material encountered is considered reflective of organics in the former ponds. The material comprised partially decomposed leaves and rootlets in a dark grey and black silty clay matrix. No Peat has been encountered within exploratory holes positioned around Highfield Moss SSSI.

15.69 Till deposits were recorded across the majority of the Main Site, and intermittently across the Western Rail Chord directly beneath Topsoil or localised Made Ground. Across the Main Site, the Till was encountered most commonly around Highfield Moss SSSI and particularly in the north east of the Main Site where the thickest deposits of Till were recorded. Thicknesses of the Till deposits ranged in between 0.40m and >9.00m. Till deposits generally comprised red to brown slightly gravelly sandy silty clay. Gravel was recorded as coal, sandstone, quartzite and shale.

15.70 Weathered Chester Formation deposits were recorded in most exploratory holes from immediately beneath the topsoil to depths of up to 4.0m beneath the Till. The base of the

sandstone was not proven at any location. The Weathered Chester Formation deposits generally comprised of weathered sandstone recovered as red or orange gravelly sand, sandy gravel or brown sand.

Hydrology

15.71 Several watercourses are located on the Main Site; a drain flows alongside Highfield Moss SSSI. This feature was noted to be largely dry with localised standing water during the site visit. There are several ponds in the northeast of the Main Site associated with Moss Pits and Mains Pit.

15.72 Newton Brook is located approximately 60m west of the Main Site, flowing in a southerly direction. Cockshot Brook is located directly east of the Main Site and also flows in a southerly direction. A further unnamed watercourse is indicated to flow northward (based on site topography) from the Chat Moss Line within the central-northern edge of the Main Site.

15.73 The DCO Site fall within the following Water Framework Directive (WFD) surface water body and surface water body catchments:

- the majority of the Main Site is within the Spittle Brook Catchment which achieved a moderate overall and ecological rating, with a failed chemical rating;
- the very northeast of the Main Site is within River Glaze Catchment; it achieved a bad overall and ecological rating, with a failed chemical rating; and
- the Western Rail Chord is within the Millingford (Newton) Catchment which achieved a moderate overall and ecological rating, with a failed chemical rating.

15.74 No surface water abstraction points are indicated within 1km of the dDraft Main Order Limits. There have been thirty-three records of licensed discharges to controlled waters within 500m of the Main Site and Western Rail Chord of the DCO Site. The closest was approximately 50m west, relating to sewer storm overflow into Newton Brook.

Hydrogeology

Published Information

15.75 The EA classifies the geology mapped at the Main Site and Western Rail Chord of the DCO Site as the following:

- Devensian Till: Secondary Undifferentiated Aquifer.
- Glaciofluvial Ice Contact deposits: Secondary A Aquifer.
- Lacustrine deposits: unproductive strata.
- The Chester Formation: Principal Aquifer.
- The Manchester Marls Formation: Secondary A Aquifer.

- Kinnerton Sandstone Formation: Secondary B Aquifer.

15.76 The vast majority of local BGS borehole records did not record groundwater or described wells as dry. BGS borehole SJ69NW49 located in the east of the Main Site adjacent to Winwick Lane recorded a water strike at 14.30m bgl.

15.77 There is an active groundwater abstraction approximately 500m southeast of Main Site of the DCO Site at Southworth Quarry for dewatering. Two active potable abstractions points are located within 1km at a United Utilities facility approximately 470m west and 840m east of the Main Site.

15.78 No significant pollution incidents relating to contaminated waters have occurred near the draft Main Order Limits of the DCO Site.

15.79 The draft Main Order Limits is indicated to be predominantly within an EA groundwater Source Protection Zone 3 (total catchment), with a small portion of the Western Rail Chord being within a Zone 2 (outer catchment).

15.80 The draft Main Order Limits is indicated to be within the Lower Mersey Basin and North Permo-Triassic Sandstone Aquifers WFD groundwater body, which has a poor overall, chemical and quantitative rating.

15.81 The majority of the draft Main Order Limits has a negligible to low risk of groundwater flooding, with small areas of moderate risk in the northeast and west of Main Site.

Encountered Hydrogeological Conditions

15.82 During the GI PEIR Appendix 15.2 limited minor groundwater strikes in the shallow superficial deposits or weathered sandstone were encountered. These appeared to be perched pockets of groundwater rather than being reflective of any significant continuous body of groundwater. The deeper rotary boreholes recorded groundwater strikes in the sandstone of the Chester Formation at depths of between 12m and 29m bgl.

15.83 Post-investigation groundwater monitoring is on-going. However, most shallow wells have been ‘dry’ on all occasions. This is consistent with the predominantly granular ground conditions without a confining cohesive soil layer, with movement of any surface water being vertical into the deeper Principal Aquifer of the Chester Formation. Groundwater in the Chester Formation has been recorded at depths of between 6.2m below ground level (bgl) beneath the north of the Main Site and 18.87m bgl beneath the south east of the Main Site.

Hydrogeological Connectivity

15.84 The data collected to date indicates that there is no connectivity between the shallow groundwater beneath the Main Site and shallow groundwater in the peat on the adjacent Highfield Moss SSSI. This indicates that the peatland at Highfield Moss SSSI acts as a ‘bog’, which is precipitation recharged, rather than a ‘fen’, which is groundwater recharged.

Hazardous Ground Gases

Radon

15.85 The majority of the draft Main Order Limits is indicated to be in an area where less than 1% of properties are above the Radon Action Level, although a small area near the middle of the Main Site has a radon risk of between 1-3%. In both cases, no radon gas protection is required.

Methane, Carbon Dioxide and Other Gasses

15.86 Lacustrine and Peat are superficial deposits that could contain organic materials, acting as a source of hazardous ground gas if the organic content is high. A small section of Lacustrine deposits are mapped in the northeast of the Main Site, with Peat being mapped within Highfield Moss SSSI, immediately north of the Main Site. Localised Made Ground associated with the potentially infilled ponds/pits, and in close proximity to farms, also provide a source of hazardous ground gas.

15.87 A programme of ground gas monitoring is in progress with three rounds of monitoring completed to date. The monitoring has recorded no significant methane or flow rates and only low levels of carbon dioxide. This indicates that there is no significant gas risk and indicate no requirement for gas protection measures. This will be updated on completion of the gas monitoring programme.

Contamination

15.88 The contamination assessment is Presented in the draft Phase 2 Geo-environmental Assessment Report provided as Appendix 15.2.

15.89 Laboratory analysis of soil samples recovered from the draft Main Order Limits has not identified any significantly elevated contaminant concentrations.

15.90 Trace levels of polycyclic aromatic hydrocarbons (PAHs) and Perfluorooctanoic acid (PFOA) have been identified in the topsoil of numerous samples. The concentrations are considered reflective of background concentrations in a semi-urban environment.

15.91 Trace levels of the organochlorine insecticide Dieldrin, and the herbicide Pendimethalin have also both been identified at trace concentrations at the draft Main Order Limits in the Topsoil. Neither are present at concentrations that are considered to present a risk to either human health or controlled waters.

15.92 No organic contamination has been identified that presents a risk of tainting new or existing water supply pipes.

Sensitive Land Uses

15.93 Highfield Moss SSSI (located immediately north of the Main Site) is a SSSI, a Network Enhancement Zone 1, a National Nature Reserve, and a Primary Habitat. It is also an area of Open Access Land, and a Priority Habitat (Lowland fens). The impact on Highfield Moss SSSI will be considered in the context of the hydrogeological conditions and how the Proposed Development could alter this.

15.94 The following sensitive sites have also been identified:

- two Nitrate Vulnerable Zones are located on the Main Site (Sankey Brook for surface water and Winwick for groundwater);
- the draft Main Order Limits are within an SSSI Impact Risk Zone; and
- an area of Open Mosaic Habitat is located within the northwestern area of the Main site.

15.95 No geologically sensitive sites have been identified on or near the draft Main Order Limits..

Mineral Resources

15.96 The Proposed Development is a non-mineral commercial development. The Main Site is located partially in a Minerals Safeguarded Area (MSA). The MSA comprises parts of the north eastern area of the Main Site where geological mapping indicates Till and Glaciolacustrine Deposits to be present. The MSA also covers land north of the Chat Moss Line within the DCO Site but this area will not be sterilised by the Proposed Development. The safeguarded mineral is sand and gravel.

15.97 The MSA is designated based on BGS minerals maps with an additional 250m buffer added. This reduces the already limited extents of sand and gravel viable for extraction that are likely present. The glacial sand and gravel deposits are considered to be of limited value at the Main Site of the DCO Site in terms of potential extraction with the DCO Site not being in an area where silica sand is typically extracted. It is noted that the same ground conditions within the DCO Site that fall within the St Helens stewardship, rather than Wigan, are not classified as a MSA. The proximity to Highfield Moss SSSI, also adds a potentially significant constraint to significant minerals extraction at the Main Site and Western Rail Chord of the DCO Site due to potentially significant alterations to surface water and groundwater flow patterns.

15.98 GI data has indicated that sand and gravel deposits in the MSA have a limited patchy distribution with significant fine particle presence within the material reducing its quality.

Agricultural Land Classification

15.99 The Main Site have been surveyed. Land across the surveyed areas broadly matches the mapped soil associations, though some areas of Grade 1 (excellent quality) have been identified. With sandy and coarse loamy profiles, the land classified as Grades 1 and 2 is largely located within the areas mapped as the Bridgnorth and Newport 1 associations. Fine loamy over clayey soils surround these and are restricted to Subgrade 3b by soil wetness. These largely correlate to areas of the Main Site mapped as the Salop association. Some coarse loamy and coarse loamy over clayey soils are present between the two soil types and are mostly restricted to Subgrade 3a, with a smaller portion of Grade 2.

15.100 A summary of the ALC grades at the draft Main Order Limits, based on the survey completed to date, is summarised below in Table 15.4.

Table 15.4 ALC Grades

Grade	Description	Area (ha)	%
Grade 1	Excellent Quality	29.2	16
Grade 2	Very Good Quality	48.9	28
Subgrade 3a	Good Quality	33.6	19
Subgrade 3b	Moderate Quality	60.2	34
4	Poor Quality	0.9	1
Non-agricultural	-	4.1	2
Total		176.9	100

Geotechnical

15.101 The earthworks could require the cut and fill of approximately 1.36Mm^3 of soils across the draft Main Order Limits to create development platforms, railbeds and roadways. A review of proposed earthworks isopachytes and groundwater levels at the site indicates that the earthworks are not expected to encounter permanent groundwater. While shallow bedrock is present across large parts of the draft Main Order Limits it is highly weathered and expected to be excavated using standard heavy plant excavators.

15.102 Shallow spread foundations and ground bearing floor slabs are expected to be suitable across most of the Main Site. For buildings in Phase 3, ground improvement, such as vibro stone columns, may be required to achieve this. This will improve the stiffness of the more compressible cohesive Till deposits.

Post Development Features

15.103 The Development will include an energy centre incorporating battery energy storage site (BESS) which introduces a potential source of contamination that could affect the ground. Fire is the most significant risk for contamination from BESS, as it can release toxic gases into the atmosphere and lead to contaminated firewater runoff. Lithium-ion batteries contain hazardous materials, including lithium salts (flammable), cobalt, nickel, and manganese (toxic metals), and organic solvents (flammable).

15.104 The ILPN SRFI and overnight HGV lorry park will both include fuelling facilities. Small-scale use of chemicals and/or lubricants, such as in the Engineer's Stores and Vehicle Maintenance will also be included.

EMBEDDED MITIGATION MEASURES

15.105 An outline CEMP (oCEMP) for the Proposed Development has been prepared for the statutory consultation. The Principal Contractor is required to produce a detailed CEMP which details mitigation measures to control the risks to surface water receptors and the health of construction workers during each construction phase. It will be a requirement of the DCO that the detailed CEMP is submitted to and approved by the Local Planning Authorities prior to the commencement of each phase of development.

15.106 The oCEMP draws on good practice such as CIRIA C811 Environmental Good Practice on Site Guide and CIRIA C670 Site Health Handbook during construction works. Adequate standard personal protective equipment (PPE) and the development of basic hygiene measures will be implemented. Measures will be undertaken to minimise the potential for the movement of sediments into surface watercourses, which may include seeding stockpiles, silt traps and temporary drainage grips.

15.107 Spillages (such as oil, fuel, cement, chemicals etc.) and soil erosion or the generation of suspended solids during construction activities will be controlled through the implementation of the oCEMP. Designated fuelling areas for plant would be set up with suitable double bunding for tanks, spill kits available and an emergency plan in place for dealing with any spills.

15.108 The positioning of the energy centre incorporating a BESS facility is away (circa 850m south) from Highfield Moss SSSI and so it does not represent a potential impact on this receptor.

15.109 A draft Site Waste Minimisation and Management Plan (SWMMP) has been prepared for the statutory consultation. This includes for maximising the reuse of topsoil to enrich / promote ecological habitat on the Northern Mitigation Area, and use of BMV agricultural soils for enrichment of agricultural land on the Northern Mitigation Area and Soils Reuse Area to the south east of the Main Site. While this embedded mitigation will promote reuse of soils in areas creating BMV agricultural land, the loss of BMV land will remain.

15.110 The earthworks model has been designed to balance the amount of cut taken and the amount of fill required. Earthworks modelling for the highways is currently being assessed in detail with the aim of establishing a cut fill balance, negating unnecessary import or export requirements.

15.111 The development of the Main Site includes a circa 50m buffer between the development and Highfield Moss SSSI. Detailed proposals for the landscaping in this zone are covered in Chapter 10 (Landscape and Visual Effects). The drainage design avoids surface water runoff between the Proposed Development and Highfield Moss SSSI. The proposals for surface water drainage in the buffer zone is for positive discharge at greenfield runoff rates as described in PEIR Chapter 14 and drawing reference ILPN-BWB-EW-ZZ-DR-C-0515. This is covered in more detail

in Chapter 14 (Surface Water and Flood Risk). This will prevent any significant migration of surface contamination resulting from the operational ILPN SRFI impacting the Highfield Moss SSSI via surface runoff.

15.112 The surface water drainage strategy provided as Embedded Mitigation (see Chapter 14: Surface Water and Flood Risk) includes measures that will treat runoff prior to it being discharged to surface waterbodies that are being used for attenuation. This will improve the water quality infiltrating from attenuation features into the Principal Aquifer beneath the Main Site. The effect on the underlying Principal Aquifer will therefore be slight, based on negligible impact of a very high sensitivity receptor.

POTENTIAL EFFECTS PRIOR TO ADDITIONAL MITIGATION

Construction Phase

Risks to Human Health

15.113 No significant risk to Human Health has been identified during the Construction Phase. No sources of contamination have been identified and no specific measures other than standard good hygiene and PPE will be required to protect groundworkers. The effect is negligible. There is the possibility of encountering previously unforeseen sources of contamination during the groundworks which could impact construction workers without the correct PPE. This exposure to contamination could present a moderate impact on a low sensitivity receptor, resulting in a minor adverse effect and not significant.

Risks to Controlled Waters

15.114 Use of deeper foundation solutions such as piles or vibro stone columns have the potential to create preferential pathways for shallow contamination to migrate vertically and impact upon the very high sensitivity Principal Aquifer. At this stage, the requirement for any deeper solutions is limited to Plots 3 and 3b northeast of the rail terminal on the Main Site. In this area the likely solution is vibro stone columns in the cohesive Till deposits, which would limit the potential for migration. The specific extent and depth that any penetrative solution would be to is subject to detailed geotechnical design and specific ground investigation. With a minor magnitude of impact, the effect would be Moderate adverse on a high sensitivity receptor which would be significant.

Risks to Geology, Buildings and Structures

15.115 There could be adverse impacts on soils and geology through loss of soil resource and over compaction during to construction activities as a result of heavy plant tracking across the DCO Site. The effect is slight adverse based on a minor impact of a low sensitivity receptor and is not significant.

15.116 The earthworks require the cut and fill of approximately 1.36Mm^3 of soils across the Main Site and Western Rail Chord Site to create development platforms, railbeds and roadways. Earthworks have a low likelihood to cause local instability of moderate magnitude particularly around existing slopes and retaining structures associated with the Chat Moss Line cutting

and M6 embankments. The effect on buildings and structures during construction are considered to be of slight adverse significance, confined to localised areas but could be permanent duration. There is the low possibility that climate change could increase precipitation inundation in the short term potentially increasing the likelihood of failure of temporary earth structures that could result in an increase from a slight adverse to moderate adverse effect.

Loss of Agricultural Land

15.117 Significant areas of BMV land will be lost across the draft Main Order Limits during the ground works resulting in major impact through permanent loss of a very high sensitivity receptor (i.e. >20ha Grade 1 and 2 agricultural land). This results in an overall very large adverse effect which would be significant.

Other Risks

15.118 Control on the impacts of noise, vibration, dust, and odour will be employed throughout the construction in consideration of the residential properties in the vicinity of the DCO Site. These effects are considered in detail in Chapter 8: Air quality, Chapter 9: Noise and Vibration and Chapter 11: Ecology and Biodiversity of this PEIR.

Operational Phase

Risks to Human Health

15.119 The Main Site and Western Rail Chord will be predominantly hard cover and therefore there is a low likelihood of future DCO Site users being exposed to any soil or groundwater contamination. Contact with potentially contaminated materials is unlikely and limited to areas related to former farm buildings (i.e. Rough Farm in the south of the Main Site, and Highfields Farm in the north of the Main Site), where chemical or fuel storage may have occurred, asbestos containing materials may have been used, and Made Ground present. The magnitude would be moderate, and the receptor is of low sensitivity and so the potential effect is slight adverse and not significant.

15.120 Clean uncontaminated soils will be reused within the works including within the soil re-use area. The effect will be neutral.

Risks to Controlled Waters

15.121 Fires and/or leaks associated with the fuel storage facility and the BESS could lead to soil and groundwater contamination including fuel hydrocarbons from fuel storage and heavy metals (lithium, cobalt, and nickel) and corrosive materials (electrolytes) from the BESS. The predominantly high permeability of the underlying granular soils and firefighting runoff could lead to significant leaching of heavy metals and organic solvents into soil and groundwater of the underlying Principal Aquifer and drinking water SPZ. Similarly, fuel hydrocarbons associated with the fuelling facilities at the ILPN SRFI and lorry park could lead to leaks and/or spills that impact the Principal Aquifer beneath the Main Site and Western Rail Chord. Given the potential volume of contaminants, the rapid and direct pathway through the permeable soils, and the very high sensitivity of the receptor (drinking water safeguarded aquifer), a

contamination event would be a moderate magnitude impact. This would result in a large adverse effect on a very high sensitivity receptor, which would be considered significant..

Changes to the Hydrogeological Regime

15.122 The Proposed Development will have negligible effect on the shallow aquifer at the draft Main Order Limits as no significant groundwater body has been identified.

15.123 The proposals for surface water drainage at the Main Site is for positive discharge at greenfield runoff rates as described in PEIR Chapter 14 and drawing reference ILPN-BWB-EW-ZZ-DR-C-0515. The design does not allow for infiltration but the attenuation basins proposed will be largely unlined and so will make best use of infiltration to ground, but this is not currently quantified. This may have a slight adverse effect on groundwater levels as a result of slightly lower infiltration across the Main site and Western Rail Chord with a negligible magnitude on a very high sensitivity receptor. The effect is not significant.

Loss of Mineral Resource

15.124 The Proposed Development is not considered to represent a constraint to surrounding potential mineral resources. The distance to surrounding potential resources provides a degree of separation from potential further extraction sites.

15.125 Limited mineral resource is available at the Main Site which is unlikely to be economically viable for abstraction (Appendix 15.4). There is therefore slight adverse effect because of the low sensitivity of loss of mineral resource having minor magnitude of impact and is not significant.

PROPOSED ADDITIONAL MITIGATION MEASURES

15.126 In terms of the PEIR as previously outlined, effects of moderate effect or greater are considered significant and require mitigation to be considered to minimise these effects as far as possible. However, there are a number of less significant effects identified that would still be mitigated as best practice during construction and these measures have also been outlined.

Construction Phase Mitigation

Risk to Human Health and Controlled Waters

15.127 In the unlikely scenario of previously unforeseen contamination being encountered, the significant 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, Position Statement, Treatment License or appropriate exemption obtained by the remediation contractor. If previously unidentified contamination is identified, the Contaminated Land Officer at the relevant local council and EA shall be informed. Suspected contaminated materials should be stockpiled separately for subsequent analysis, and if necessary, off-site disposal. Any remedial approach will require written approval from the local authority prior to implementation.

15.128 Where required, a FWRA will be prepared for any deeper solutions in accordance with CL:AIRE Report "Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention, March 2025". The report will assess the potential impact that intrusive ground improvement and piling techniques can have on pollution of the groundwater environment. The assessment will examine the seven pollution scenarios defined in the guidance to allow selection of suitable ground improvement or piling methods for the Proposed Development, to ensure prevention of contaminant migration. The installation of penetrative foundations shall not commence until a FWRA has been submitted to and approved by the EA.

Risks to Geology, Buildings and Structures

15.129 The design will require significant earthworks to prepare platforms for development. A cut and fill balance of subsoil will be targeted to avoid importation or export of materials (included within Appendix 15.2). Topsoil will be stripped and a volume retained for use in soft landscaping and material shall be transferred to the in northern and eastern mitigation areas of the DCO Site. Should surplus topsoil be generated, it will be stockpiled and additional receiver sites identified over the course of the works. An earthworks specification will be prepared setting out the methods by which materials will be handled and re-engineered and the verification requirements to demonstrate that works have been completed to an acceptable standard.

15.130 Stripped topsoil shall be stored in separate resource bunds no more than 3m high and kept grassed and free from construction traffic until required for re-use. The Construction Code of Practice for Sustainable Use of Soils on Construction Sites (Defra, 2009) provides guidance on good practice in soil handling.

15.131 The cut/fill earthworks strategy is designed to achieve a subsoil balance at the DCO Site. If this cannot be achieved, e.g. through unforeseen ground conditions, or poor workability of soils the timescales for the Proposed Development allow receiver sites to be found as the construction progresses to avoid disposal of any surplus material to landfill.

15.132 The timescales for the Proposed Development allow receiver sites to be found as Construction Phases progress to avoid disposal of material to landfill. Re-use of soil materials would be facilitated under a Material Management Plan (MMP) under the CL:AIRE Definition of Waste Code of Practice (DoW:CoP) prepared prior to earthworks commencing. While the DoW:CoP is a voluntary scheme, it is best practice, and the contractor should be contractually obliged to complete and comply with an MMP. No earthworks shall commence until a CL:AIRE declaration has been returned with a timestamp.

15.133 The CL:AIRE DoW:CoP is used to demonstrate that excavated soils that are re-used meet the criteria for:

- protection of human health and protection of the environment;
- suitable for use without further treatment;
- quantity of use; and

- certainty of use.

15.134 Fill materials will be placed to an end-product specification to avoid differential settlement issues and additional reinforcement is likely to provide support where any structures span over cut and fill areas. Additionally, cut and fill slopes will be suitably designed to achieve global stability and ensure health and safety of any workers, and the public is ensured.

15.135 Works near to existing rail and road structures will be subject to detailed geotechnical design and assessment approval in accordance with Highways England Design Manual for Roads and Bridges (DMRB) CD 622 in the case of the National Highways and to Network Rail Standards. Slopes will require detailed assessment and appropriate design, retaining and temporary shoring.

Operational Phase Mitigation

Risks to Human Health

15.136 Implementation of the eventual remediation strategy, completed as part of detailed design to be secured through DCO requirements, will remove any unacceptable risk to future DCO Site users. The residual effect will be slight adverse due to a negligible magnitude impact on a low sensitivity receptor. The requirements will ensure that development shall not commence on any phase until a remediation strategy for that phase has been submitted to and approved by the relevant planning authority in consultation with the EA, where necessary. The relevant part phase, will not be occupied until a verification report has been submitted to and approved by the local authority.

15.137 There will be a small increased potential for direct human exposure to potential contamination identified in shallow soils through ingestion, direct contact or inhalation of contaminated soil to future construction workers. To mitigate against such risks, services personnel will follow guidance stated in 'HSE 66 Protection of Workers and the General Public during Development of Contaminated Land' during construction works. Adequate standard personal protective equipment and the development of basic hygiene measures will be undertaken. Implementation of the eventual remediation strategy will remove any unacceptable risk to users of the Main Site and Western Rail Chord of the DCO Site.

Risks to Controlled Waters

15.138 Currently, BESSs in the UK do not explicitly require an environmental permit under the Environmental Permitting Regulations 2016 (as amended) for operation. However, this is expected to change. The UK government is actively reviewing the inclusion of BESS within the Environmental Permitting and Regulation framework. Draft guidance (e.g., "Waste Batteries: Appropriate Measures for Permitted Facilities" from the Environment Agency) is already being consulted on, and a Lithium-Ion Battery Storage (Fire Safety and Environmental Permits) Bill has been presented to parliament. For lithium-ion battery fires, large volumes of water are often required for cooling and extinguishing. The facilities will be designed to include the following control measures:

- Bunds/Secondary Containment: Impermeable bunds around battery storage areas to capture any leaks or firewater.

- Blind Sump Drainage Systems: Storage areas should be on surfaces with blind sump drainage, unless there's legal consent to discharge to sewer.

- Automatically Self-Actuating Valves: Valves at outfalls from battery storage areas that close automatically in a fire to isolate drainage from the wider environment.

- Adequate Storage for Firewater: Design external firefighting water storage structures with sufficient capacity.

15.139 Lubricants and fuelling facilities will be positioned away from the most sensitive receptors during the operational phase at the Main Site and Western Rail Chord of the DCO Site and operate in accordance with best practice.

15.140 All tanks will be designed, constructed, maintained and decommissioned in accordance with APEA/EI Blue Book. Tanks must be within a secondary containment system (bund) capable of holding at least 110% of the tank's maximum capacity, or 25% of the total volume stored if multiple tanks are within the same bund, whichever is greater. Bunds must be impermeable to oil and water, and their base or walls should not have an opening that allows drainage. Other control measures will include:

- Impermeable Surfaces: Fuelling and dispensing areas must be on impermeable surfaces.

- Drainage Control: Drainage from refuelling areas should be isolated from surface water drains and routed through an appropriate oil separator (interceptor) before discharge to a watercourse or foul sewer (with consent).

- Pipework: Pipes should be protected from damage, and where they leave the bund, measures should be in place to prevent leaks. Underground pipework should be avoided where possible, and if used, requires regular leak testing.

- Overfill Prevention: Tanks must have devices to prevent overfilling, such as automatic shut-off valves or alarms.

- Locks: All taps, valves, and pumps must be lockable when not in use to prevent unauthorised access and vandalism.

15.141 The current proposals for surface water drainage at the DCO Site is for positive discharge at greenfield runoff rates. The design does not allow for infiltration but the attenuation basins proposed will be largely unlined and so will make best use of infiltration to ground, although this is not currently quantified.

15.142 The predominantly hardstanding cover across the Main Site and Western Rail Chord which will be present during the operational phase 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.

Geology, Buildings and Structures

15.143 Detailed foundation design, and the associated methodology remains subject to post

submission detailed intrusive GIs for final geotechnical design, to be undertaken at the appropriate time (post consent) once detailed engineering designs are sufficiently developed. Detailed intrusive GI will be site-specific, targeting the footprints of major structures like foundations, bridges, and retaining walls. The GI will be designed by a competent geotechnical engineer and will include a range of tests (e.g. boreholes, cone penetration tests, trial pits) to establish the ground profile and derive geotechnical parameters. Implementing appropriate geotechnical design in accordance with industrial standards including BS EN 1997 "(Eurocode 7): Geotechnical design" and BS 8004:2015+A1:2020 "Code of practice for foundations" would mean that the possible instability effect is negligible on a medium sensitivity receptor resulting in slight adverse effect and is not significant. No part of the authorised development that includes foundations, retaining walls or other below-ground structures shall commence until a detailed geotechnical design report has been prepared, and the development shall be constructed in accordance with the approved geotechnical design report.

RESIDUAL ENVIRONMENTAL EFFECTS

Construction Phase Mitigation

Risk to Human Health and Controlled Waters

15.144 There will be no change to receptors following implementation of remediation / soil treatment and adherence to a FWRA (if required) and so there is neutral effect, in the unlikely event that contamination is present.

Risks to Geology, Buildings and Structures

15.145 Implementation of specifications to industry standards will result in negligible geotechnical instability issues and so the resulting effect is slight adverse and not significant

15.146 Following good practice including implementation of the embedded SWMMP and DoW:CoP will result in slight adverse effect on soils based on negligible impact to medium sensitivity soil resource.

Operational Phase Mitigation

Risks to Human Health

15.147 Implementation of the eventual remediation strategy will remove any unacceptable risk to future DCO Site users, with its effectiveness demonstrated by implementation of a verification plan. The residual effect will be slight adverse due to the low likelihood of a negligible magnitude impact to a low sensitivity receptor and not significant.

Risks to Controlled Waters

15.148 Following implementation of design features including containment measures for tanks and BESS, and in infiltration from the surface water attenuation system there will be a slight adverse effect on groundwater quality based on a negligible impact of a very high sensitivity receptor and not significant.

15.149 The provision of hard cover with a positive drainage system may have a slight adverse effect on groundwater levels as a result of slightly lower infiltration across the Main Site with a negligible magnitude on a very high sensitivity receptor.

15.150 The provision of hard cover will prevent infiltration and leaching contamination into the underlying Principal Aquifer and the residual effect will be slight based on a negligible magnitude impact on a very high sensitivity receptor.

Geology, Buildings and Structures, including Off-site Highway Works

15.151 Implementation of appropriate geotechnical design would mean that the possible instability effect is negligible on a medium sensitivity receptor resulting in slight adverse effect and not significant.

Agricultural Land

15.152 Significant areas of BMV land will be lost across the Main Site during the ground works resulting in major impact through permanent loss of a very high sensitivity receptor (i.e. >20ha Grade 1 and 2 agricultural land). This results in an overall very large adverse effect, which is significant.

CUMULATIVE AND IN-COMBINATION EFFECTS

15.153 With consideration to Chapter 20: Cumulative, In-Combination and Transboundary Effects, there are 240 developments within the initial Zone of Influence of the DCO Site although only four falling within the Study Area for this chapter, which are considered to have potential to result in cumulative impacts. The four sites in considerations are outlined in Table 15.5:

Table 15.5 Cumulative and In-Combination Sites within the Study Area

Application Reference and (Distance from project (m))	Application Description	Applicant for 'other development'	Status
P/2023/0341 /RES (86m)	Scheme comprises reserved matters application seeking approval for access, appearance, landscaping, layout and scale for the three employment units (B8 with ancillary B1(a)) at plots a, b and c, landscaping works, associated servicing and infrastructure, noise mitigation, car parking, vehicle and pedestrian circulation space, including means off access from the plr, pursuant to outline planning permission ref P/2018/0048/OUP.	Parkside Regeneration LLP	Reserved Matters Granted

Application Reference and (Distance from project (m))	Application Description	Applicant for 'other development'	Status
P/2024/0419 /HYEIA (174m)	Scheme comprises hybrid application for former parkside colliery Phase 2 comprising employment floorspace (use class (B8) and B2 / e(g) (ii) / e(g)(iii) with ancillary (e(g)(i)) and associated servicing and infrastructure, including sub-station, car parking, vehicle and pedestrian circulation space (outline application) and detailed enabling and infrastructure works, to facilitate employment development comprising site wide earthworks to create development platforms, details of strategic landscaping, planting, ecological and noise mitigation, drainage and ground works and details of the means access served from the parkside link road (plr) (full application).	Parkside Regeneration LLP	Outline Plans Submitted
P/2018/0249 /FUL (208m)	Scheme comprises full planning (major) - single carriageway link road between A49 Winwick Road (WA12 8EF) and A573 Parkside Road, at each location a signalised junction will be formed. The road then utilises the A573 Parkside Road to cross the m6 (via overbridge) before realigning Parkside Road to a new roundabout before heading east to A579 Winwick Lane to a newly formed roundabout. The section of carriageway from the new Winwick Lane roundabout and the m6 junction 22 will be a dual carriageway. The A573 and A579 will be realigned to the new roundabouts.	St Helens Metropolitan Borough Council	Detail Plans Granted
P/2023/0619 /FUL (325m)	Scheme comprises resubmission of full planning application p/2022/0575/ful for the residential development for 99 residential units (including 30 affordable units) including access, associated works and landscaping.	Wainhomes (North West) Limited	Refused but subject of an appeal

15.154 All of the above developments will be subject to similar requirements of national planning policy and best practice as the Proposed Development, to limit contamination impact of sensitive receptors, most notably the Principal Aquifer in the Chester Formation. As such, there are predicted to be no cumulative effects with other committed development with regards to geology and contamination. The Parkside development is on former mining land and so regeneration and remediation requirements will have a cumulative benefit in groundwater quality improvement in reducing contaminant load across the study area.

15.155 Any emerging proposals will also adhere to the same principles. Therefore, it can be considered likely that there would be no cumulative adverse effect from other developments which are not yet constructed or operational. Therefore, the cumulative impact will be negligible.

15.156 Other developments may also lead to loss of BMV land.

IMPLICATIONS OF CLIMATE CHANGE

15.157 Careful control and monitoring of earthworks will ensure that the engineered soils are placed in accordance with the earthworks specification. Climate change has the potential to increase the likelihood for extreme weather events such as precipitation and/or drought which may increase environmental effects such as increase runoff, dust generation and/or geotechnical impact from waterlogged or desiccated soils. However, the impacts will be negligible and the mitigation measures outlined are appropriate for dealing with such eventualities.

SUMMARY AND CONCLUSIONS

15.158 This PEIR chapter assesses the potential effects of the Proposed Development on geology, soils and contaminated land. It describes the methods used to assess the effects, the baseline conditions currently existing at the Main Site and the Western Rail Chord of the DCO Site, the potential effects of the Proposed Development including construction activities and the mitigation measures required to prevent, reduce or offset the potential effects and the residual effects.

15.159 This PEIR chapter is supported by a Phase 1 Preliminary Risk Assessment (Appendix 15.1), GI and Phase 2 Reports (Appendix 15.2 and 15.3)), a Minerals Resource Assessment (Appendix 15.4), and an ALC Report (Appendix 15.5), which are provided as technical appendices.

15.160 The Main Site has predominantly remained undeveloped agricultural land with several farm buildings, and small ponds (former marl pits) in the northeast of the Main Site. Highfield Moss SSSI is situated immediately north of the Main Site.

15.161 GI across the Main Site and Western Rail Chord of the DCO Site has established that below an average thickness of 0.35m of Topsoil, the Main Site is indicated to be often underlain by Till, which is generally thicker in the northeast and often absent in the west of the Main Site and Western Rail Chord. Localised Lacustrine deposits have also been encountered in the northeast of the Main Site at one location. Made Ground is largely absent, and where present,

is generally small quantities of anthropogenic materials such as brick, plastic and concrete mixed in with natural materials. The bedrock present across the Main Site is sandstone of the Chester Formation which is highly to completely weathered near the surface. Monitoring has identified that the is no shallow groundwater at the Main Site and Western Rail Chord representing a continuous body of groundwater and there is no shallow groundwater connectivity between the Main Site and Highfield Moss SSSI. The deeper Chester Formation Principal Aquifer is a Drinking Water safeguarded Zone and Source Protection Zone. Monitoring has identified it to be present at depths of between circa 6m in the north west of the Main Site and 18m in the south east of the Main Site.

15.162 No significant sources of soil or groundwater contamination or ground gases have been identified or are expected at the Main Site and Western Rail Chord.

15.163 Although parts of the Main Site are within a MSA for sand and gravel, the GI has identified no viable resources of any value at the Main Site that will be sterilised by the Proposed Development.

15.164 The ALC survey completed has identified that 111.7Ha of BMV agricultural land at the DCO Site which will be lost as a result of the Proposed Development of a total area of 176.9ha surveyed at the Main Site.

15.165 Potential effects associated with the development of the DCO Site have been identified during construction associated with mobilisation of dust and particulates, damage to excavated topsoil and from foundation works creating pathways. The oCEMP provides embedded mitigation which sets the procedures to ensure that mobilisation of soils during the construction phase is minimised and outlines detailed methodologies to prevent adverse effects on or from ground conditions.

15.166 For the DCO Site a cut and fill operation will be undertaken to create the development platform, with an approximate subsoil cut and fill balance to retain as much material as possible. Re-use of soils will be completed under an earthworks specification and a MMP in accordance with the DoW:CoP to be prepared prior to the start of works.

15.167 If deep foundation solutions are required, which may only be needed in Phase 3 development areas northeast of the Rail Terminal, then a FWRA will be prepared (where required) to inform appropriate methodologies and monitoring during installation to prevent contamination migration. This will be secured by planning conditions for the DCO Site.

15.168 A remediation strategy will be prepared and is required to accompany the MMP and to inform remediation treatment and contingency measures should previously unforeseen contamination be encountered during the Proposed Development. CL:AIRE confirmation shall be received including a timestamp before excavations are commenced.

15.169 The Proposed Development includes fuel tanks and an energy centre incorporating BESS. Leaks and spills that could occur during the DCO Site's operation will be prevented from impacting the very high sensitivity Principal Aquifer beneath the DCO Site by implemented appropriate design including appropriate drainage systems, secondary containment and measures in case of fire.

15.170 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 effects requiring mitigation.

15.171 Overall, based on the assessment and investigations undertaken to date, it is considered that potential effects from the construction and operational phases of the development will be slight adverse or negligible. The exception is ALC which has a very large adverse effect as a result of the loss of BMV agricultural land.

Table 15.6 Summary of effects

Receptor	Receptor sensitivity	Magnitude of effect	Description of potential impact	Proposed mitigation	Residual effect	Significant / not significant
Main Site and Western Rail Chord						
Construction Phase						
Principal Aquifer of the Chester Formation	Very High	Minor	Use of deep foundation solutions such as vibro stone columns or piles for building in phase 3 in the north east of the Main Site could create preferential pathways for shallow contamination to impact the underlying sensitive aquifer.	Installation of deeper solutions in accordance with a FWRA.	Slight adverse	Not significant
Buildings, pavements and earth structures	Moderate	Moderate	Instability of soil and ground as a result of earthworks and construction activities	Geotechnical assessment and preparation of appropriate specifications including BS EN 1997 "(Eurocode 7), BS 8004:2015+A1:2020, and CD 622 to ensure that the ground and soil structures maintain global stability and settlement is limited to acceptable	Slight adverse	Not significant

Receptor	Receptor sensitivity	Magnitude of effect	Description of potential impact	Proposed mitigation	Residual effect	Significant / not significant
				tolerances.		
Over compaction of soils and loss of soils including Topsoil	Low	Minor	The construction could lead to soils be lost as waste and shallow deposits being over compacted as a result of construction activity	Implementation of a SWMMP and declaration of a CL:AIRE MMP	Neutral	Not significant
BMV agricultural land	Very High	Major	Loss of BMV agricultural land as a result of the development	Implementation of a SWMMP to maximise reuse of soils for agricultural purposes from BMV agricultural land.	Very large adverse	Significant
Operation Phase						
Ground workers and commercial end users	Low	Moderate	Exposure to shallow soil contamination	Implementation of a remediation strategy and adherence to PPE guidance	Slight adverse	Not significant
Geology, Buildings and Structures	Medium	Moderate	Instability	Implementing appropriate geotechnical design in accordance with industrial standards including BS EN 1997 and BS 8004:2015+A1:2020	Slight adverse	Not significant

Receptor	Receptor sensitivity	Magnitude of effect	Description of potential impact	Proposed mitigation	Residual effect	Significant / not significant
Principal Aquifer of the Chester Formation	Very High	Moderate	Spills and leaks from the fuel storage tanks and BESS could lead to vertical migration of contaminants.	Tanks will be designed, constructed, maintained and decommissioned in accordance with APEA/EI Blue Book. The BESS will be designed in accordance with any imminent UK guidance. It will include secondary containment, shut off values, and appropriate drainage.	large adverse	Significant
Principal Aquifer of the Chester Formation	Very High	Negligible	Reduction in infiltration and aquifer recharge as a result of hard cover and positive drainage system.	Attenuation basins proposed will be largely unlined and so will make best use of infiltration to ground.	slight adverse	Not significant
Loss of mineral resource	Low	Minor	Sterilisation of a MSA which has limited resource of economic value	n/a	Slight adverse	Not significant