

High Speed Rail (Crewe – Manchester) Environmental Statement

Volume 5: Appendix LQ-001-0MA03

Land quality

MA03: Pickmere to Agden and Hulseheath
Land quality report

High Speed Rail (Crewe – Manchester) Environmental Statement

Volume 5: Appendix LQ-001-0MA03

Land quality

MA03: Pickmere to Agden and Hulseheath

Land quality report



Department for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

High Speed Two (HS2) Limited,
Two Snowhill
Snow Hill Queensway
Birmingham B4 6GA

Telephone: 08081 434 434

General email enquiries: HS2enquiries@hs2.org.uk

Website: www.hs2.org.uk

A report prepared for High Speed Two (HS2) Limited:

ARUP+ ERM | FOSTER + PARTNERS | JACOBS
RAMBOLL | TYPISA | COSTAIN

MWJV

Mott MacDonald | WSP

High Speed Two (HS2) Limited has actively considered the needs of blind and partially sighted people in accessing this document. The text will be made available in full on the HS2 website. The text may be freely downloaded and translated by individuals or organisations for conversion into other accessible formats. If you have other needs in this regard please contact High Speed Two (HS2) Limited.

© High Speed Two (HS2) Limited, 2022, except where otherwise stated.

Copyright in the typographical arrangement rests with High Speed Two (HS2) Limited.

This information is licensed under the Open Government Licence v3.0. To view this licence, visit www.nationalarchives.gov.uk/doc/open-government-licence/version/3 **OGL** or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or e-mail: psi@nationalarchives.gsi.gov.uk. Where we have identified any third-party copyright information you will need to obtain permission from the copyright holders concerned.



Printed in Great Britain on paper containing at least 75% recycled fibre.

Contents

1	Introduction	3
2	Engagement	4
3	Risk assessment	7
3.2	Baseline risk assessment	9
3.3	Construction risk assessment	16
3.4	Post-construction risk assessment	24
3.5	Assessment of temporary (construction) and permanent (post-construction) effects	31

Tables

Table 1:	Engagement on land quality issues undertaken for the Pickmere to Agden and Hulseheath area	4
Table 2:	Sites included in the risk assessment within the Pickmere to Agden and Hulseheath area	8
Table 3:	Baseline CSM and qualitative risk assessment for farms (on-site)	9
Table 4:	Baseline CSM and qualitative risk assessment for historical landfill (on-site)	10
Table 5:	Baseline CSM and qualitative risk assessment for historical infilled brickworks/marl pit (on-site)	12
Table 6:	Baseline CSM and qualitative risk assessment for farms (off-site)	13
Table 7:	Baseline CSM and qualitative risk assessment for current and former tanks, likely for fuel storage (off-site)	14
Table 8:	Construction CSM and qualitative risk assessment for farms (on-site)	16
Table 9:	Construction CSM and qualitative risk assessment for historical landfill (on-site)	18
Table 10:	Construction CSM and qualitative risk assessment for historical infilled brickworks/marl pit (on-site)	19
Table 11:	Construction CSM and qualitative risk assessment for farms (off-site)	21
Table 12:	Construction CSM and qualitative risk assessment for current and former tanks, likely for fuel storage (off-site)	23
Table 13:	Post-construction CSM and qualitative risk assessment for farms (on-site)	24
Table 14:	Post-construction CSM and qualitative risk assessment for historical landfill (on-site)	26
Table 15:	Post-construction CSM and qualitative risk assessment for historical infilled brickworks/marl pit (on-site)	27
Table 16:	Post-construction CSM and qualitative risk assessment for farms (off-site)	29

Environmental Statement

Volume 5: Appendix LQ-001-0MA03

Land quality

MA03: Pickmere to Agden and Hulseheath

Land quality report

Table 17: Post-construction CSM and qualitative risk assessment for current and former tanks, likely for fuel storage (off-site)	30
Table 18: Farms (on-site) - significance of effect assessment	32
Table 19: Historical landfill (on-site) - significance of effect assessment	33
Table 20: Historical infilled brickworks/marl pit (on-site) - significance of effect assessment	34
Table 21: Farms (off-site) - significance of effect assessment	35
Table 22: Current and former tanks, likely for fuel storage (off-site) - significance of effect assessment	36

1 Introduction

- 1.1.1 This report is an appendix to the land quality assessment for the Pickmere to Agden and Hulseheath area, it comprises:
- a summary of engagement undertaken;
 - details on committed developments relevant to land quality that form part of the future baseline; and
 - detailed risk assessments associated with land contamination.
- 1.1.2 This appendix should be read in conjunction with:
- Volume 2, Community area reports;
 - Volume 3, Route-wide effects;
 - Volume 4, Off-route effects; and
 - Background Information and Data (BID) (BID LQ-002)¹.
- 1.1.3 Maps referred to throughout this report are contained in the Volume 5: Land quality Map Book (Maps LQ-01-309b to LQ-01-312a-R1).
- 1.1.4 Further information regarding receptors in relation to each site or group of sites is set out in the BID.
- 1.1.5 Information about Local Geological Sites and geological Sites of Special Scientific Interest (SSSI) and site visit records are set out in the BID document.
- 1.1.6 The Environmental Impact Assessment (EIA) Scope and Methodology Report (SMR) (see Volume 5, Appendix CT-001-00001) should be referred to for details of the Land quality assessment.

¹ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background and Information Data, Land quality baseline data*. BID LQ-002-0MA03. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

2 Engagement

2.1.1 Table 1 sets out the organisations that have been engaged with during the preparation of the land quality section of the Environmental Statement (ES) for the Pickmere to Agden and Hulseheath area, the types of information that have been provided to the assessment team and any specific concerns raised.

Table 1: Engagement on land quality issues undertaken for the Pickmere to Agden and Hulseheath area

Organisation	Method/dates of contact	Information provided and/or specific concerns
Cheshire East Council (CEC)	Meeting (15 May 2018)	Initial presentation on land quality assessment approach.
	Telephone call to CEC Contaminated Land Officer (7 August 2018)	Discussion on the scope of requirements for land quality engagement.
	Email to CEC (8 August 2018)	Provision of example data and confirm scope of request.
	Email from CEC (14 September 2018)	Cheshire East sent requested data as shapefiles and excel document.
	Meeting (5 June 2019)	Presentation on land quality progress, scope of assessment in relation to salt working and Working Draft Environmental Statement (WDES) consultation responses.
	Email to CEC (15 October 2020)	Confirm scope of data request with larger study area.
	Meeting (22 October 2020)	Presentation and update on land quality progress following the scheme update.
	Email from CEC (11 November 2020)	CEC supplied land contamination data.
Cheshire West and Chester (CWCC)	Meeting (15 May 2018)	Presentation and workshop on land quality assessment approach.
	Email to CWCC (18 September 2018)	Outline the scope of requirements for land quality engagement.
	Email from CWCC (27 September 2018)	Contact details for minerals planners given by CWCC.
	Telephone call (24 September 2018)	Discussion on scope of study area and best way of obtaining required data in consideration that much of the data was provided during previous consultation for Appraisal of Sustainability in 2015.
	Email from CWCC (3 October 2018)	Provision of study area extents.
	Meeting (5 June 2019)	Presentation on land quality progress, scope of assessment in relation to salt working and WDES consultation responses.
	Email from CWCC (5 July 2019)	Data provided in relation to foot and mouth burial sites and public water supplies.

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Organisation	Method/dates of contact	Information provided and/or specific concerns
	Email to CWCC (15 October 2020)	Confirm scope of data request with larger study area.
	Meeting (22 October)	Presentation on land quality progress and assessment findings to date.
	Emails to CWCC (16 November and 8 December 2020)	Follow up emails to obtain data.
	Meeting (8 December 2020)	Discussion on scope of data request and timelines for delivery of data.
Trafford Metropolitan Borough Council (TMBC)	Meeting (15 May 2018)	Presentation and workshop on land quality approach. No specific concerns raised. TMBC representative offered access to their land quality geographic information system (GIS) database information.
	Telephone call to TMBC (18 July 2018)	Call to discuss the scope of land quality engagement.
	Email to TMBC (9 August 2018)	Provision of study area extents to confirm scope of request.
	Emails to TMBC (13 August 2018)	Email exchange to confirm timescales.
	Email from TMBC (12 September 2018)	TMBC sent through an example of proposed data.
	Email to TMBC (17 September 2018)	Confirmation of data transmittal requirements and reconfirm the need for site investigation reports.
	Email from TMBC (26 September 2018)	TMBC sent requested data.
	Meeting (5 June 2019)	Presentation on land quality progress, scope of assessment in relation to salt working and WDES consultation responses.
	Email to TMBC (15 October 2020)	Confirm scope of data request with larger study area.
	Meetings (both 22 October 2020)	Discussion on changes to Proposed Scheme since previous consultation and scope of new information required. Followed by presentation on land quality progress and assessment findings to date.
Environment Agency	Meeting (15 May 2018)	Presentation and workshop on land quality approach. No specific concerns raised but introductions made to Environment Agency HS2 team.
	Meeting (14 September 2018)	Meeting to discuss acquiring Environment Agency landfill data. Agreed procedure for acquiring detailed, site specific data and contacts with local area officers. Priority landfills along the route discussed and general information provided. Detailed information to be provided by local area officers at subsequent meeting.

Environmental Statement

Volume 5: Appendix LQ-001-0MA03

Land quality

MA03: Pickmere to Agden and Hulseheath

Land quality report

Organisation	Method/dates of contact	Information provided and/or specific concerns
Cheshire Regionally Important Geological Sites (RIGS)	Email to Cheshire RIGS (15 October 2018)	Initial contact outlining proposed engagement.
	Telephone call (1 November 2018)	Discussion on local and regional geological sites in the land quality study area.
	Email from Cheshire RIGS (1 November 2018)	Transmittal of documents relating to geo-conservation in the study area.
Animal and Plant Health Agency (APHA)	Email to APHA (24 April 2019)	Request for data on animal burials in the study area.
	Email from APHA (29 April 2019)	APHA detailed that they have no register of animal burials in the study area.

3 Risk assessment

- 3.1.1 A four-stage process, comprising stages A to D, has been carried out in accordance with the methodology set out in the SMR. At each stage, professional judgement has been used to check that the screening and assessment process is highlighting significant sites.
- 3.1.2 Stage A highlights potentially contaminative sites based on their potential impact. Sites with a moderate to high potential impact move through to stage B where they are assessed based on receptor proximity.
- 3.1.3 Sites with a high potential impact pass through stage B to detailed assessment irrespective of receptor proximity. Sites with a moderate potential impact and moderate to high receptor proximity also go through to detailed assessment.
- 3.1.4 For those sites which pass through stage B, a further detailed risk assessment (stages C and D) has been carried out.
- 3.1.5 The results of stage C are presented in three conceptual site models (CSM) as qualitative risk assessments covering baseline, construction and post-construction scenarios. Stage D then compares the risk of impact at construction and post-construction stages with the baseline to determine the change in risk and hence the potential for a significant effect.
- 3.1.6 Sections 3.2 to 3.5 present assessments for potentially contaminated sites which have passed through the screening process within the study area. For each site the following data are presented:
- baseline risk assessment;
 - construction risk assessment;
 - post-construction risk assessment;
 - assessment of temporary (construction) effects; and
 - assessment of permanent (post-construction) effects.
- 3.1.7 The construction and post-construction risk assessments assume that appropriate mitigation has been undertaken and that the operation of the railway is in accordance with environmental legislation.
- 3.1.8 Where nearby sites present a similar contamination risk, they have been grouped and considered together. For example, in rural areas, small historical backfilled ponds and pits have been grouped together for assessment purposes.
- 3.1.9 Where sites have been grouped together, only one CSM has been prepared for those sites. The sites in the Pickmere to Agden and Hulseheath area have been listed as follows in Table 2.
- 3.1.10 For clarity, 'on-site' in this document means 'within the land required for the construction of the Proposed Scheme' and 'off-site' refers to 'land beyond this boundary, but within the study area'.

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Table 2: Sites included in the risk assessment within the Pickmere to Agden and Hulseheath area

Site group	Site title (site ID) and land use class ²
On-site	
Farms	Current Heyrose Farm (MA03-48), Class 1 Current Holly House Farm (MA03-115), Class 1
Historical landfill	Booth Bank Farm Landfill (MA03-172), Class 3
Historical infilled brickworks/marl pit	Historical infilled brick field and brick kiln (MA03-123), Class 2
Off-site	
Farms	Current Hulme Barns Farm (MA03-110), Class 1 Current Yew Tree Farm (MA03-117), Class 1 Current Little Moss Farm (MA03-136), Class 1 Current Middle Moss Farm (MA03-144), Class 1 Current Agden Lane Farm (MA03-152), Class 1 Current Agden Hall Farm (MA03-169), Class 1
Current and former tanks, likely for fuel storage	Current tanks (MA03-104), Class 3 Former tank (MA03-112), Class 3

- 3.1.11 Contaminant types included within the risk assessments are based on the Department of the Environment, Farming and Rural Affairs (DEFRA) and Environment Agency (2002); Priority Contaminants Report CLR 8³. Although this report has been withdrawn by the Environment Agency, it remains technically valid and there has been no subsequent authoritative replacement.
- 3.1.12 The remainder of this section presents the risk assessment for the sites going through to stages C and D of the assessment. These sites are shown on Volume 5, Land Quality Map Book, Maps LQ-01-309b to LQ-01-312a-R1.
- 3.1.13 The following abbreviations are used in these tables:
- CoCP – Code of Construction Practice;
 - PAH – polycyclic aromatic hydrocarbons;
 - PCB – polychlorinated biphenyls;
 - PEDL – Petroleum Exploration Development Licence;
 - TPH – total petroleum hydrocarbons; and
 - VOC – volatile organic compounds.

² As defined by the SMR.

³ Department for Environment, Food and Rural Affairs and Environment Agency (2002), *Potential Contaminants for the Assessment of Land*. R&D Publication CLR8.

Environmental Statement
Volume 5: Appendix LQ-001-0MA03
Land quality
MA03: Pickmere to Agden and Hulseheath
Land quality report

3.2 Baseline risk assessment

Table 3: Baseline CSM and qualitative risk assessment for farms (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination from former and current activities including potential tanks: contaminants primarily compromising petroleum and diesel range hydrocarbons, pesticides, asbestos, pathogens, aggressive ground conditions for concrete (sulphate/pH). Potential for low concentrations/flow rates of ground gases/vapours	Existing site users – residents and farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils, water and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Low likelihood	Medium	Moderate/low
	Adjacent site users – walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils, water and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Medium	Low
	Controlled waters – groundwater Secondary A aquifers of the glaciofluvial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – groundwater Secondary B aquifer of the Bollin Mudstone Member Secondary Undifferentiated aquifers of the glacial till	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
	Controlled waters – surface water Tributary of Tabley Brook	Lateral migration through groundwater Direct runoff from site	Low likelihood	Minor	Low
	Property receptors – farm and residential buildings, foundations and services (existing)	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Medium	Low

Notes/assumptions:

- sites assessed without construction of the Proposed Scheme;
- see BID document Section 2 Table 1 for details of receptors relevant to groups of sites;
- for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors;
- existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;
- MA03-115 is underlain by Secondary A and Secondary B aquifers; and
- MA03-48 is underlain by Secondary Undifferentiated aquifers.

Table 4: Baseline CSM and qualitative risk assessment for historical landfill (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination in infilled ground, industrial landfill waste, contaminated groundwater / leachate plume: metals, asbestos, hydrocarbons; potentially high levels of ground gas and landfill gas (methane, carbon dioxide, ammonia,	Existing site users – Farm workers and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils, water and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Adjacent site users – farm workers and walkers	Direct contact, ingestion, inhalation of dusts and vapours from	Low likelihood	Medium	Moderate/low

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
VOC and hydrogen sulphide)		contaminated soils, water and waters			
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Controlled waters – groundwater Principal aquifer of the Helsby Sandstone Formation Secondary A aquifer of the Shirdley Hill Sand Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – groundwater Secondary Undifferentiated aquifers of the glacial till	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Negligible	Low
	Controlled waters – surface water Agden Brook	Lateral migration through groundwater Direct runoff from site	Low likelihood	Medium	Moderate/low

Notes/assumptions:

- site assessed without construction of the Proposed Scheme;
- see BID document Section 2 Table 2 for details of receptors relevant to the site;
- existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;
- site recorded as Booth Bank Farm landfill - no information is available from the Environment Agency dataset regarding the type of waste deposited, however, anecdotal evidence suggests that the site was used to store cutting spoil produced by the M56 cutting to the south of the site, and that works were completed by 1975; and
- existing and adjacent structures comprise electricity pylons only, therefore, property receptors are not considered a receptor as part of this assessment.

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Table 5: Baseline CSM and qualitative risk assessment for historical infilled brickworks/marl pit (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination from possible infilling activities. Composition of infill (if any) is unknown. Depending upon the source of the infill this could comprise inert materials or those that could include a range of organic and inorganic contaminants including: petroleum and diesel range hydrocarbons, PAH, metals and asbestos. Potentially low levels of ground gas (methane and carbon dioxide) if bio-degradable infill used	Existing site users – residents	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Low likelihood	Medium	Moderate/low
	Adjacent site users – Residents and farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Medium	Low
	Controlled waters – groundwater Secondary B aquifers of the Bollin Mudstone Member Secondary Undifferentiated aquifers of the glacial till	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
		Controlled waters – surface water Tributary of Millington Clough (adjacent) Spring at Wrenshot House (adjacent)	Lateral migration through groundwater	Low likelihood	Minor

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
	Property receptors – buildings, foundations and services (adjacent)	Direct contact with contaminated soils and waters	Unlikely	Minor	Very low
		Exposure to explosive gases	Low likelihood	Medium	Moderate/low

Notes/assumptions:

- site assessed without construction of the Proposed Scheme;
- see BID document Section 2 Table 3 for details of receptors relevant to the site;
- existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed; and
- property receptors exist only adjacent to MA03-123 and therefore only adjacent properties are considered as part of this assessment.

Table 6: Baseline CSM and qualitative risk assessment for farms (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination from former and current activities including potential tanks: contaminants primarily compromising petroleum and diesel range hydrocarbons, pesticides, asbestos, pathogens, aggressive ground conditions for concrete (sulphate/pH). Potential for low concentrations/flow rates of ground gases/vapours. Potentially	Existing site users – residents and farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Low likelihood	Medium	Moderate/low
	Adjacent site users – Walkers, farm workers and residents (including hotel guests)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Medium	Low
	Controlled waters – groundwater Secondary A aquifer of the glaciofluvial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Medium	Moderate/low

Environmental Statement
Volume 5: Appendix LQ-001-0MA03
Land quality
MA03: Pickmere to Agden and Hulseheath
Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
low levels of ground gas (methane and carbon dioxide)	Controlled waters – groundwater Secondary B aquifer of the Bollin Mudstone Member and the Tarporley Sand Formation Secondary Undifferentiated aquifer of the glacial till	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	Controlled waters – surface water Tributary of Millington Clough Spring at Dobb Lane, and spring 200m south of Middlemoss Farm	Lateral migration through groundwater	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (existing and adjacent)	Direct contact with contaminated soils and waters	Unlikely	Minor	Very low
		Exposure to explosive gases	Unlikely	Medium	Low

Notes/assumptions:

- sites assessed without construction of the Proposed Scheme;
- see BID document Section 2 Table 4 for details of receptors relevant to groups of sites;
- existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;
- MA03-110 and MA03-117 are underlain by a Secondary A aquifer;
- MA03-110, MA03-117, MA03-136, MA03-144, MA03-152, and MA03-169 are underlain by a Secondary B aquifer; and
- MA03-117, MA03-136, MA03-144, MA03-152, and MA03-169 are underlain by a Secondary Undifferentiated aquifer.

Table 7: Baseline CSM and qualitative risk assessment for current and former tanks, likely for fuel storage (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination from former and current activities: contaminants	Existing site users – fuel storage compound workers, and car park users,	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
primarily comprising petroleum and diesel range hydrocarbons	Adjacent site users – residents, visitors to public house, farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – groundwater Secondary A aquifer of the glaciofluvial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – groundwater Secondary B aquifer of the Bollin Mudstone Member Secondary Undifferentiated aquifer of the glacial till	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (existing and adjacent)	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Low likelihood	Medium	Moderate/low

Notes/assumptions:

- sites assessed without construction of the Proposed Scheme;
- see BID document Section 2 Table 5 for details of receptors relevant to groups of sites;
- existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;
- tanks thought to be for domestic fuel storage currently present at MA03-104;
- MA03-112 is underlain by a Secondary A aquifer and Secondary B aquifer; and
- MA03-104 is underlain by a Secondary Undifferentiated aquifer and Secondary B aquifer.

3.3 Construction risk assessment

Table 8: Construction CSM and qualitative risk assessment for farms (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination from former and current activities including potential tanks: contaminants primarily compromising petroleum and diesel range hydrocarbons, pesticides, asbestos, pathogens, aggressive ground conditions for concrete (sulphate/pH). Potential for low concentrations/flow rates of ground gases/vapours	Existing site users – residents and farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Adjacent site users – walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Medium	Low
	Controlled waters – groundwater Secondary A aquifers of the glaciofluvial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – groundwater Secondary B aquifer of the Bollin Mudstone Member Secondary Undifferentiated aquifers of the glacial till	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
	Controlled waters – surface water Tributary of Tabley Brook	Lateral migration through groundwater Direct runoff from site	Low likelihood	Minor	Low
	Property receptors – farm and residential buildings, foundations and services (existing)	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases/vapours	Unlikely	Medium	Low

Notes/assumptions:

- *site investigation will be required prior to construction of the Proposed Scheme;*
- *sites which lie within the land required for construction of the Proposed Scheme may require remediation;*
- *sites located on the land required for the construction of the Proposed Scheme are assumed to be unoccupied during construction, therefore on-site construction risks to human health receptors are labelled as not applicable (N/A);*
- *it is assumed that existing on-site properties on MA03-115 will be demolished during the construction stage and so risks to them have not been assessed;*
- *MA03-48 is located on the boundary of the construction area. Those buildings present within the construction area will be demolished. Those outside of the construction area will be retained and are therefore assessed;*
- *remediation will be restricted to mitigation of land quality effects arising from the Proposed Scheme;*
- *existing site users and adjacent site users in the receptor column refer to users at or near to the potentially contaminated area;*
- *during construction, standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP (Volume 5, Appendix CT-002-00000). Construction workers have been excluded from assessment due to the use of PPE/risk management protocols and in accordance with the SMR; and*
- *while the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline.*

Environmental Statement
Volume 5: Appendix LQ-001-0MA03
Land quality
MA03: Pickmere to Agden and Hulseheath
Land quality report

Table 9: Construction CSM and qualitative risk assessment for historical landfill (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination in infilled ground, industrial landfill waste, contaminated groundwater / leachate plume: metals, asbestos, hydrocarbons; potentially high levels of ground gas and landfill gas (methane, carbon dioxide, ammonia, VOC and hydrogen sulphide)	Existing site users – Farm workers and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Adjacent site users – farm workers and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Controlled waters – groundwater Principal aquifer of the Helsby Sandstone Formation Secondary A aquifer of the Shirdley Hill Sand Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Negligible	Low

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
	Controlled waters – surface water Agden Brook	Lateral migration through groundwater Direct runoff from site	Low likelihood	Medium	Moderate/low

Notes/assumptions:

- site investigation will be required prior to construction of the Proposed Scheme;
- sites which lie within the land required for construction of the Proposed Scheme may require remediation;
- sites located on the land required for the construction of the Proposed Scheme are assumed to be unoccupied during construction, therefore on-site construction risks to human health receptors are labelled as not applicable (N/A);
- remediation will be restricted to mitigation of land quality effects arising from the Proposed Scheme;
- existing site users and adjacent site users in the receptor column refer to users at or near to the potentially contaminated area;
- during construction, standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE/risk management protocols and in accordance with the SMR; and
- while the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline.

Table 10: Construction CSM and qualitative risk assessment for historical infilled brickworks/marl pit (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination from possible infilling activities. Composition of infill (if any) is unknown. Depending upon the source of the infill this could comprise inert materials or those that	Existing site users – residents	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Low likelihood	Medium	Moderate/low

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
could include a range of organic and inorganic contaminants including: petroleum and diesel range hydrocarbons, PAH, metals and asbestos. Potentially low levels of ground gas (methane and carbon dioxide) if bio-degradable infill used	Adjacent site users – Residents and farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Medium	Low
	Controlled waters – groundwater Secondary B aquifers of the Bollin Mudstone Member Secondary Undifferentiated aquifers of the glacial till	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
		Controlled waters – surface water Tributary of Millington Clough(adjacent) Spring at Wrenshot House (adjacent)	Lateral migration through groundwater Direct runoff from site	Low likelihood	Minor
	Property receptors – buildings, foundations and services (adjacent)	Direct contact with contaminated soils and waters	Unlikely	Minor	Very low
		Exposure to explosive gases	Low likelihood	Medium	Moderate/low

Notes/assumptions:

- site investigation will be required prior to construction of the Proposed Scheme;
- sites which lie within the land required for construction of the Proposed Scheme may require remediation;

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

- site is located only partially within the land required for the construction of the Proposed Scheme and as such some areas will still be occupied during construction, therefore on-site construction risks to human health receptors remain during construction;
- remediation will be restricted to mitigation of land quality effects arising from the Proposed Scheme;
- existing site users and adjacent site users in the receptor column refer to users at or near to the potentially contaminated area;
- during construction, standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE/risk management protocols and in accordance with the SMR; and
- while the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline.

Table 11: Construction CSM and qualitative risk assessment for farms (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination from former and current activities including potential tanks: contaminants primarily compromising petroleum and diesel range hydrocarbons, pesticides, asbestos, pathogens, aggressive ground conditions for concrete (sulphate/pH). Potential for low concentrations/flow rates of ground gases/vapours	Existing site users – residents and farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Low likelihood	Medium	Moderate/low
	Adjacent site users – Walkers, farm workers and residents (including hotel guests)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Medium	Low
	Controlled waters – groundwater	Leaching, vertical and lateral migration from	Low likelihood	Medium	Moderate/low

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
	Secondary A aquifer of the glaciofluvial deposits	contaminated soils and waters			
	Controlled waters – groundwater Secondary B aquifer of the Bollin Mudstone Member and the Tarporley Sand Formation Secondary Undifferentiated of the glacial till	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	Controlled waters – surface water Tributary of Millington Clough Spring at Dobb Lane, and spring 200m south of Middlemoss Farm	Lateral migration through groundwater Direct runoff from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (existing and adjacent)	Direct contact with contaminated soils and waters	Low likelihood	Minor	Very low
		Exposure to explosive gases	Unlikely	Medium	Low

Notes/assumptions:

- site investigation may be required prior to construction of the Proposed Scheme;
- existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;
- during construction, standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE/risk management protocols and in accordance with the SMR; and
- while the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline.

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Table 12: Construction CSM and qualitative risk assessment for current and former tanks, likely for fuel storage (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination from former and current activities: contaminants primarily comprising petroleum and diesel range hydrocarbons	Existing site users – fuel storage compound workers, and car park users	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Adjacent site users – residents, visitors to public house, farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – groundwater Secondary A aquifer of the glaciofluvial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – groundwater Secondary B aquifer of the Bollin Mudstone Member Secondary Undifferentiated aquifer of the glacial till	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (existing and adjacent)	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Low likelihood	Medium	Moderate/low

Notes/assumptions:

- site investigation may be required prior to construction of the Proposed Scheme;

Environmental Statement
Volume 5: Appendix LQ-001-0MA03
Land quality
MA03: Pickmere to Agden and Hulseheath
Land quality report

- existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;
- during construction, standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE/risk management protocols and in accordance with the SMR; and
- while the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline.

3.4 Post-construction risk assessment

Table 13: Post-construction CSM and qualitative risk assessment for farms (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination from former and current activities including potential tanks: contaminants primarily compromising petroleum and diesel range hydrocarbons, pesticides, asbestos, pathogens, aggressive ground conditions for concrete (sulphate/pH). Potential for low concentrations/flow rates of ground gases/vapours	Existing site users – residents and farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Adjacent site users – walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Medium	Low
	Controlled waters – groundwater	Leaching, vertical and lateral migration from	Unlikely	Medium	Low

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
	Secondary A aquifers of the glaciofluvial deposits	contaminated soils and waters			
	Controlled waters – groundwater Secondary B aquifer of the Bollin Mudstone Member Secondary Undifferentiated aquifers of the glacial till	Leaching, vertical and lateral migration from contaminated soils and waters	Unlikely	Minor	Low
	Controlled waters – surface water Tributary of Tabley Brook	Lateral migration through groundwater	Low likelihood	Minor	Low
	Property receptors – buildings, foundations and services (existing)	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases/vapours	Unlikely	Medium	Low

Notes/assumptions:

- assumes construction works are complete and remediation has been carried out where necessary. No pathways are left open;
- as human health receptors are no longer present at the post-construction stage the risks are labelled as not applicable (N/A);
- existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;
- excludes rail passengers (as whilst within trains, will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction; and
- it is assumed that buildings on are MA03-115 to be fully demolished and buildings on MA03-48 are to be partially demolished but will remain unoccupied following construction. Risks to property (existing) at MA03-48 only have been assessed as the farm falls both within land required for the construction of the Proposed Scheme, and land adjacent required for the construction of the Proposed Scheme.

Environmental Statement
Volume 5: Appendix LQ-001-0MA03
Land quality
MA03: Pickmere to Agden and Hulseheath
Land quality report

Table 14: Post-construction CSM and qualitative risk assessment for historical landfill (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination in infilled ground, industrial landfill waste, contaminated groundwater / leachate plume: metals, asbestos, hydrocarbons; ground gas and landfill gas (methane, carbon dioxide, ammonia, VOC and hydrogen sulphide)	Existing site users – farm workers and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Adjacent site users – farm workers and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters – groundwater Secondary A aquifer of the Shirdley Hill Sand Formation Principal aquifer of the Helsby Sandstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Unlikely	Medium	Low
		Leaching, vertical and lateral migration from contaminated soils and waters	Unlikely	Negligible	Very low

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
	Controlled waters – surface water Agden Brook	Lateral migration through groundwater Direct runoff from site	Unlikely	Medium	Low

Notes/assumptions:

- assumes construction works are complete and remediation has been carried out where necessary. No pathways are left open;
- existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed; and
- excludes rail passengers (as whilst within trains, will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.

Table 15: Post-construction CSM and qualitative risk assessment for historical infilled brickworks/marl pit (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination from possible infilling activities. Composition of infill (if any) is unknown. Depending upon the source of the infill this could comprise inert materials or those that could include a range of organic and inorganic contaminants including: petroleum and diesel range hydrocarbons, PAH, metals and asbestos. Potentially low levels of ground gas (methane and	Existing site users – residents	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Low likelihood	Medium	Moderate/low
	Adjacent site users – Residents and farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Medium	Low

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
carbon dioxide) if bio-degradable infill used	Controlled waters – groundwater Secondary B aquifers of the Bollin Mudstone Member Secondary Undifferentiated aquifers of the glacial till	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	Controlled waters – surface water Tributary of Millington Clough (adjacent) Spring at Wrenshot House (adjacent)	Lateral migration through groundwater Direct runoff from site	Low likelihood	Minor	Low
	Property receptors – buildings, foundations and services (adjacent)	Direct contact with contaminated soils and waters	Unlikely	Minor	Very low
		Exposure to explosive gases	Low likelihood	Medium	Moderate/low

Notes/assumptions:

- assumes construction works are complete and remediation has been carried out where necessary. No pathways are left open;
- existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;
- excludes rail passengers (as whilst within trains, will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction; and
- it is assumed that the residential property adjacent to MA03-123, will remain following construction, along with the garden for the property, existing on MA03-123. Risks have therefore been assessed for existing and adjacent human health and adjacent property receptors at the post-construction phase.

Environmental Statement
Volume 5: Appendix LQ-001-0MA03
Land quality
MA03: Pickmere to Agden and Hulseheath
Land quality report

Table 16: Post-construction CSM and qualitative risk assessment for farms (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination from former and current activities including potential tanks: contaminants primarily compromising petroleum and diesel range hydrocarbons, pesticides, asbestos, pathogens, aggressive ground conditions for concrete (sulphate/pH). Potential for low concentrations/flow rates of ground gases/vapours	Existing site users – residents and farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Low likelihood	Medium	Moderate/low
	Adjacent site users – Walkers, farm workers and residents (including hotel guests)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Medium	Low
	Controlled waters – groundwater Secondary A aquifer of the glaciofluvial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – groundwater Secondary B aquifer of the Bollin Mudstone Member and the Tarporley Sand Formation Secondary Undifferentiated aquifer of the glacial till	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	Controlled waters – surface water Tributary of Millington Clough	Lateral migration through groundwater Direct runoff from site	Low likelihood	Minor	Low

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
	Spring at Dobb Lane, and spring 200m south of Middlemoss Farm				
	Property receptors – buildings, foundations and services (existing and adjacent)	Direct contact with contaminated soils and waters	Unlikely	Minor	Very low
		Exposure to explosive gases	Unlikely	Medium	Low

Notes/assumptions:

- assumes construction works are complete and remediation has been carried out where necessary. No pathways are open;
- assumes baseline conditions will not change at post-construction; and
- existing site users and adjacent site users in the receptor column refer to users within/near to the areas assessed.

Table 17: Post-construction CSM and qualitative risk assessment for current and former tanks, likely for fuel storage (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination from former and current activities: contaminants primarily comprising petroleum and diesel range hydrocarbons	Existing site users – fuel storage compound workers, and car park users	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Adjacent site users – residents, visitors to public house, farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – groundwater Secondary A aquifer of the glaciofluvial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Medium	Moderate/low

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
	Controlled waters – groundwater Secondary B aquifer of the Bollin Mudstone Member Secondary Undifferentiated aquifer of the glacial till	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (existing and adjacent)	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Low likelihood	Medium	Moderate/low

Notes/assumptions:

- assumes construction works are complete and remediation has been carried out where necessary. No pathways are open;
- assumes baseline conditions will not change at post-construction; and
- existing site users and adjacent site users in the receptor column refer to users within/near to the areas assessed.

3.5 Assessment of temporary (construction) and permanent (post-construction) effects

3.5.1 The significance of the effects of land contamination is assessed by comparing the difference in risk of each contaminant linkage at baseline to those at construction and at post-construction stages. This provides a way of assessing both the adverse and beneficial effects during construction and the post-construction period.

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Table 18: Farms (on-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination through direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	N/A	N/A	N/A	N/A
Exposure of existing site users through inhalation of ground gases	Moderate/low	N/A	N/A	N/A	N/A
Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters impacting adjacent site users	Low	Low	Low	Neutral effect	Neutral effect
Exposure of adjacent off-site land users through inhalation of ground gases	Low	Low	Low	Neutral effect	Neutral effect
Lateral and vertical migration of mobile contamination to groundwater (Secondary A aquifer)	Moderate/low	Moderate/low	Low	Neutral effect	Minor beneficial
Lateral and vertical migration of mobile contamination to groundwater (Secondary B and Secondary (undifferentiated) aquifers)	Low	Low	Low	Neutral effect	Neutral effect
Lateral and vertical migration of mobile contamination and/or direct runoff from site to surface waters (Tributary of Tabley Brook)	Low	Low	Low	Neutral effect	Neutral effect
Exposure of property via direct contact to contaminated soils and waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of property and underground structures/services to explosive gases	Low	Low	Low	Neutral effect	Neutral effect
Overall significance				Neutral effect	Neutral to minor beneficial effect

Notes/assumptions:

- the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area.
- as human health receptors are no longer present during the construction and post-construction stages the risks are labelled as not applicable (N/A); and
- it is assumed that existing properties are demolished during the construction and post-construction stages and so risks to them have not been assessed.

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Table 19: Historical landfill (on-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination through direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	N/A	Low	N/A	Minor beneficial
Exposure of existing site users through inhalation of ground gases	Moderate	N/A	Moderate	N/A	Neutral effect
Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters impacting adjacent site users	Moderate/low	Moderate/low	Low	Neutral effect	Minor beneficial
Exposure of adjacent off-site land users through inhalation of ground gases	Moderate	Moderate	Moderate/low	Neutral effect	Minor beneficial
Lateral and vertical migration of mobile contamination to groundwater (Secondary A and Principal aquifers)	Moderate/low	Moderate/low	Low	Neutral effect	Minor beneficial
Lateral and vertical migration of mobile contamination to groundwater (Secondary Undifferentiated aquifer)	Low	Low	Very low	Neutral effect	Minor beneficial
Lateral and vertical migration of mobile contamination and/or direct runoff from site to surface waters (Agden Brook)	Moderate/low	Moderate/low	Low	Neutral effect	Minor beneficial
Overall significance				Neutral effect	Neutral to minor beneficial effect

Notes/assumptions:

- the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area; and
- as human health receptors are no longer present during the construction stage the risks are labelled as not applicable (N/A).

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Table 20: Historical infilled brickworks/marl pit (on-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination through direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of existing site users through inhalation of ground gases	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters impacting adjacent site users	Low	Low	Low	Neutral effect	Neutral effect
Exposure of adjacent land users through inhalation of ground gases	Low	Low	Low	Neutral effect	Neutral effect
Lateral and vertical migration of mobile contamination to groundwater (Secondary B aquifer and Secondary Undifferentiated aquifer)	Low	Low	Low	Neutral effect	Neutral effect
Lateral and vertical migration of mobile contamination and/or direct runoff from site to surface waters (Tributary of Millington Clough, Spring at Wrenshot House)	Low	Low	Low	Neutral effect	Neutral effect
Exposure of property via direct contact to contaminated soils and waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of property and underground structures/services to explosive gases	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Overall significance				Neutral effect	Neutral effect

Notes/assumptions:

- the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area.

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Table 21: Farms (off-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination through direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of existing site users through inhalation of ground gases	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters impacting adjacent site users	Low	Low	Low	Neutral effect	Neutral effect
Exposure of adjacent off-site land users through inhalation of ground gases	Low	Low	Low	Neutral effect	Neutral effect
Lateral and vertical migration of mobile contamination to groundwater (Secondary A aquifer)	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Lateral and vertical migration of mobile contamination to groundwater (Secondary B and Secondary Undifferentiated aquifers)	Low	Low	Low	Neutral effect	Neutral effect
Lateral and vertical migration of mobile contamination and/or direct runoff from site to surface waters (Tributary of Millington Clough, spring at Dobb Lane, and spring 200m south of Middlemoss Farm)	Low	Low	Low	Neutral effect	Neutral effect
Exposure of property via direct contact to contaminated soils and waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of property and underground structures/services to explosive gases	Low	Low	Low	Neutral effect	Neutral effect
Overall significance				Neutral effect	Neutral effect

Notes/assumptions:

- The significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area.

Environmental Statement
 Volume 5: Appendix LQ-001-0MA03
 Land quality
 MA03: Pickmere to Agden and Hulseheath
 Land quality report

Table 22: Current and former tanks, likely for fuel storage (off-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination through direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters impacting adjacent site users	Low	Low	Low	Neutral effect	Neutral effect
Lateral and vertical migration of mobile contamination to groundwater (Secondary A aquifer)	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Lateral and vertical migration of mobile contamination to groundwater (Secondary B and Secondary Undifferentiated aquifers)	Low	Low	Low	Neutral effect	Neutral effect
Exposure of property via direct contact to contaminated soils and waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of property and underground structures/services to explosive gases	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Overall significance				Neutral effect	Neutral effect

Notes/assumptions:

• The significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area.

High Speed Two (HS2) Limited

Two Snowhill

Snow Hill Queensway

Birmingham B4 6GA

Freephone: 08081 434 434

Minicom: 08081 456 472

Email: HS2enquiries@hs2.org.uk
