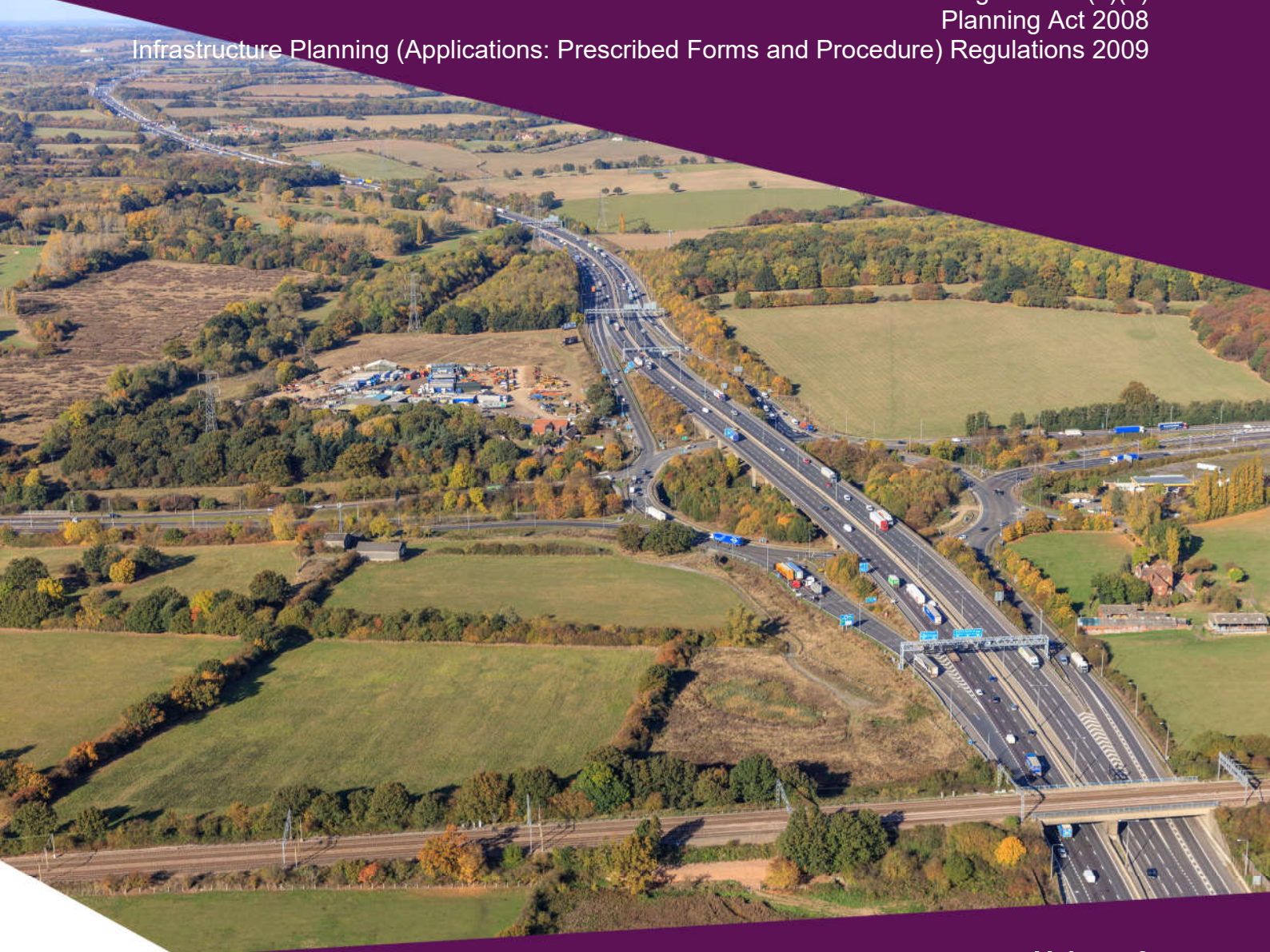


**M25 junction 28 improvement scheme
TR010029
6.3 Environmental Statement
Appendix 10.7: Risk assessment and impact
assessment**

APFP Regulation 5(2)(a)
Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

M25 junction 28 scheme Development Consent Order 202[x]

6.3 ENVIRONMENTAL STATEMENT APPENDIX 10.7: RISK ASSESSMENT AND IMPACT ASSESSMENT

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference:	TR010029
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Author:	M25 junction 28 improvement scheme project team, Highways England

Version	Date	Status of Version
1	May 2020	Application issue

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Appendix 10.7

Risk assessment and impact assessment

10. Risk and impact assessment

Table 10.1: Land contamination risk assessment

Source	Receptor	Pathway	Baseline			Construction without mitigation			Mitigation measures	Construction with mitigation			Operation			
			Consequence of risk	Probability of risk	Classification of risk (assuming reasonable worst case)	Consequence of risk	Probability of risk	Classification of risk		Consequence of risk	Probability of risk	Classification of risk	Consequence of risk	Probability of risk	Classification of risk	
<p>Potentially impacted soil/groundwater and gases/vapours associated with the following on site sources:</p> <ul style="list-style-type: none"> •Area of historical Brook Street landfill and recently deposited material (minor exceedence of beryllium public open space GAC (park), asbestos and a number of EQS-f exceedences from soil-derived leachate); •Made Ground/infill of unknown material expected beneath areas of existing development (i.e. along the M25, A12, watercourses, embankments and Great Eastern Main Line railway) and potentially infilled water features/pits; •On-site vehicle emissions, unrecorded spills and leaks (including from drainage) from the long-term use of the roads; •Four recorded pollution incidents; •Land uses including electricity substations, former aerodrome, railway line, agricultural activities; and •Possible leakage from BPA sub-surface pipeline. <p>Potential chemical parameters of concern including heavy metals, metalloids, PAH, TPH, unleaded kerosene/naphthalene (associated with former aerodrome), solvents, asbestos, PCBs, herbicides and pesticides and ground gases.</p>	On-site members of the public in public spaces within the Scheme boundary	Inhalation, ingestion and/or dermal contact with chemical parameters in soil, soil-derived dust and ACM fibres*	Medium	Unlikely (Low likelihood)	Low (Moderate/Low) Risk	Medium	Likely (high likelihood)	Moderate (High) Risk	Ground investigation and risk assessments as necessary to define risk. Remediation / removal of existing contamination if risk assessments deem necessary. Use of ventilated temporary structures during construction if risk assessments deem necessary. Use of appropriate hazard signage and / or ground gas protection measures within below ground chambers and ducts if risk assessments deem necessary. Implementation of measures in the EMP such as good management of stockpiles in accordance with Environment Agency Pollution Prevention Guidelines (PPG), implementation of pollution incident control e.g. plant drip trays and spill kits. Implementation of dust management systems. Risk	Medium	Unlikely (low likelihood)	Low (Moderate/Low) Risk	Medium	Unlikely (Unlikely)	Low (Low) Risk	
		Inhalation, ingestion and/or dermal contact with chemical parameters within perched water and shallow groundwater	Medium	Unlikely	Low Risk	Medium	Low likelihood	Moderate/Low Risk		Medium	unlikely	Low Risk	Medium	Unlikely	Low Risk	
		Migration and accumulation of ground gases and/or vapours followed by inhalation and/or ignition causing asphyxiation and/or explosion	Severe	Low likelihood	Moderate Risk	Severe	Low likelihood	Moderate Risk		Severe	Low likelihood	Moderate Risk	Severe	Unlikely	Moderate/Low Risk	
		Inhalation, ingestion and/or dermal contact with chemical parameters within surface water	Medium	Low likelihood	Moderate/Low Risk	Medium	Low likelihood	Moderate/Low Risk		Medium	Low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk	
	On-site future construction workers and site maintenance workers associated with the Scheme	Inhalation, ingestion and/or dermal contact with chemical parameters in soil, soil-derived dust and ACM fibres*	Receptor not present at baseline	Medium	Low likelihood (likely)	Moderate/Low (Moderate) Risk	Medium	Low likelihood (likely)		Moderate/Low (Moderate) Risk	Medium	Unlikely (low likelihood)	Low (Moderate/Low) Risk	Medium	Unlikely (Low)	Low (Moderate/Low) Risk
				Medium	likely	Moderate Risk	Medium	likely		Moderate Risk	Medium	low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk
		Inhalation, ingestion and/or dermal contact with chemical parameters within perched water and shallow groundwater	Receptor not present at baseline	Medium	likely	Moderate Risk	Medium	likely		Moderate Risk	Medium	low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk
				Medium	likely	Moderate Risk	Medium	likely		Moderate Risk	Medium	low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk

Source	Receptor	Pathway	Baseline			Construction without mitigation			Mitigation measures	Construction with mitigation			Operation		
			Consequence of risk	Probability of risk	Classification of risk (assuming reasonable worst case)	Consequence of risk	Probability of risk	Classification of risk		Consequence of risk	Probability of risk	Classification of risk	Consequence of risk	Probability of risk	Classification of risk
		Migration and accumulation of ground gases and/or vapours followed by inhalation and/or ignition causing asphyxiation and/or explosion				Severe	Unlikely	Moderate/Low Risk	Assessment and Method Statements (RAMS) to be completed prior to construction and risk management with appropriate Personal Protective Equipment (PPE). See section 10.9 for further details.	Severe	Unlikely	Moderate/Low Risk	Severe	Unlikely	Moderate/Low Risk
		Inhalation, ingestion and/or dermal contact with chemical parameters within surface water				Medium	likely	Moderate Risk		Medium	low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk
	Off-site workers/visitors/users at industrial, agricultural and commercial premises and recreational facilities including those at Grove Farm (garden centre, RJ Waste Management Recycling, skip hire and rubbish clearance), agricultural land workers and residents including those at property on Grove Farm	Inhalation, ingestion and dermal contact with chemical parameters in windblown soil-derived dust and ACM fibres*	Medium	Unlikely (Low likelihood)	Low (Moderate/Low) Risk	Medium	Low likelihood (likely)	Moderate/Low (Moderate) Risk		Medium	Unlikely (low likelihood)	Low (Moderate/Low) Risk	Medium	Unlikely (Unlikely)	Low (Low) Risk
		Inhalation, ingestion and dermal contact with chemical parameters within perched water and shallow groundwater	Medium	Unlikely	Low Risk	Medium	Unlikely	Low Risk		Medium	Unlikely	Low Risk	Medium	Unlikely	Low Risk
		Migration and accumulation of ground gases and/or vapours followed by inhalation or ignition causing asphyxiation and/or explosion	Severe	Unlikely	Moderate/Low Risk	Severe	Unlikely	Moderate/Low Risk		Severe	Unlikely	Moderate/Low Risk	Severe	Unlikely	Moderate/Low Risk
		Inhalation, ingestion and dermal contact with chemical parameters within surface water	Medium	Unlikely	Low Risk	Medium	Low likelihood	Moderate/Low Risk		Medium	Unlikely	Low Risk	Medium	Unlikely	Low Risk
		Leaching/vertical migration of chemical parameters in soils to underlying groundwater	Medium	low likelihood	Moderate/Low Risk	Medium	Likely	Moderate Risk		Medium	low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk
On-site groundwater (superficial Secondary A aquifer and Secondary Undifferentiated aquifer). Surface water features (Ingrebourne River								GI and risk assessment as necessary to define risk. Remediation / removal of existing contamination	Medium	low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk	

Source	Receptor	Pathway	Baseline			Construction without mitigation			Mitigation measures	Construction with mitigation			Operation			
			Consequence of risk	Probability of risk	Classification of risk (assuming reasonable worst case)	Consequence of risk	Probability of risk	Classification of risk		Consequence of risk	Probability of risk	Classification of risk	Consequence of risk	Probability of risk	Classification of risk	
and Weald Brook). Potential new surface water features including attenuation ponds and drainage features	Lateral migration of chemical parameters in groundwater	Migration of chemical parameters entrained in surface water / run-off	Medium	low likelihood	Moderate/Low Risk	Medium	Likely	Moderate Risk	if risk assessments deem necessary. Controlled Waters PRA and use of appropriate piling methods. Implementation of measures in the EMP such as good management of stockpiles in accordance with Environment Agency PPG, implementation of pollution incident control e.g. plant drip trays and spill kits. Control of run off and implementation of dust management systems. See section 10.9 for further details.	Medium	low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk	
		Lateral migration of chemical parameters in shallow groundwater / perched water to surface waters	Medium	Low likelihood	Moderate/Low Risk	Medium	Likely	Moderate Risk		Medium	Low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk	
		Migration of perched / shallow groundwater and / or surface water via preferential pathways e.g. attenuation ponds (if unlined) and pond outfalls	Pathway not present at baseline			Medium	Likely	Moderate Risk		Medium	Low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk	
		Leaching/ vertical migration of chemical parameters in soils to underlying groundwater	Medium	low likelihood	Moderate/Low Risk	Medium	Likely	Moderate Risk		Medium	low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk	
	Off-site groundwater (superficial Secondary A aquifer and Secondary Undifferentiated aquifer) and surface water features (Ingrebourne River and Weald Brook)	Lateral migration of chemical parameters in groundwater	Medium	Unlikely	Low Risk	Medium	low likelihood	Moderate/Low Risk		Medium	Unlikely	Low Risk	Medium	Unlikely	Low Risk	
		Migration of chemical parameters entrained in surface water / run-off	Medium	Low likelihood	Moderate/Low Risk	Medium	Likely	Moderate Risk		Medium	Low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk	
		Lateral migration of chemical parameters in shallow groundwater to surface waters	Medium	unlikely	Low Risk	Medium	low likelihood	Moderate/Low Risk		Medium	unlikely	Low Risk	Medium	Unlikely	Low Risk	
		On-site underground services including the NG high pressure gas main and BPA pipeline, existing structures, piles and foundations associated with residential, industrial,	Chemical attack of buried structures in contact with chemical parameters in soil or groundwater	Medium	Low likelihood	Moderate/Low Risk	Medium	Low likelihood		Moderate/Low Risk	GI and risk assessment as necessary to define risk. Remediation / removal of existing contamination if risk	Medium	Low likelihood	Moderate/Low Risk	Medium	Unlikely

Source	Receptor	Pathway	Baseline			Construction without mitigation			Mitigation measures	Construction with mitigation			Operation			
			Consequence of risk	Probability of risk	Classification of risk (assuming reasonable worst case)	Consequence of risk	Probability of risk	Classification of risk		Consequence of risk	Probability of risk	Classification of risk	Consequence of risk	Probability of risk	Classification of risk	
	agricultural and commercial properties and future structures, services, piles and foundations	Migration of ground gases and/or vapours along preferential pathways including permeable ground, services trenches and service entry points and accumulation in enclosed spaces such as services ducts or access points	Medium	Low likelihood	Moderate/Low Risk	Medium	Low likelihood	Moderate/Low Risk	assessments deem necessary. Implementation of measures in the EMP such as good management of stockpiles in accordance with Environment Agency PPG, implementation of pollution incident control e.g. plant drip trays and spill kits. Control of run off and implementation of dust management systems. See section 10.9 for further details.	Medium	Low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk	
	Off-site existing structures, services piles and foundations associated with residential, industrial, agricultural and commercial properties. Other property including agricultural crops and livestock	Chemical attack of buried structures in contact with chemical parameters in soil or groundwater	Medium	low likelihood	Moderate/Low Risk	Medium	low likelihood	Moderate/Low Risk		GI and risk assessment as necessary to define risks. Remediation / removal of existing contamination if risk assessments deem necessary.	Medium	Low	Moderate / Low Risk	Medium	Unlikely	Low Risk
		Migration of ground gases and/or vapours along preferential pathways including permeable ground, services trenches and service entry points and accumulation in enclosed spaces such as services ducts or access points	Medium	unlikely	Low Risk	Medium	unlikely	Low Risk		Appropriate assessment and design of services resistant to chemical attack if risk assessments deem necessary. Use of appropriate hazard signage and / or ground gas protection measures within below ground chambers and ducts if risk assessments deem necessary.	Medium	Unlikely	Low Risk	Medium	Unlikely	Low Risk
		Migration of contamination in shallow groundwater and uptake by crops	Mild	unlikely	Very Low Risk	Mild	unlikely	Very Low Risk		Mild	unlikely	Very Low Risk	Mild	unlikely	Very Low Risk	

Source	Receptor	Pathway	Baseline			Construction without mitigation			Mitigation measures	Construction with mitigation			Operation		
			Consequence of risk	Probability of risk	Classification of risk (assuming reasonable worst case)	Consequence of risk	Probability of risk	Classification of risk		Consequence of risk	Probability of risk	Classification of risk	Consequence of risk	Probability of risk	Classification of risk
		Inhalation, ingestion and dermal contact with contaminants in soil and windblown soil-derived dust by livestock	Mild	unlikely	Very Low Risk	Mild	unlikely	Very Low Risk	See section 10.9 for further details.	Mild	unlikely	Very Low Risk	Mild	unlikely	Very Low Risk
Potentially impacted soil/groundwater and gases/vapours associated with the following off site sources: •Made Ground/infill of unknown provenance associated with existing roads, off site development infilled pits/ponds/watercourses; •Activities and land uses associated with Grove Farm, including a garden centre and RJ Waste Management Recycling, skip hire and rubbish clearance; •Other land uses including fuel stations (former and active); electricity substations, sewage treatment works, former aerodrome (wider area from the Scheme boundary), vehicle service garages, garden centre, farms and associated agricultural activities, vehicle cleaning services; and •Eight recorded pollution incidents. Potential chemical parameters of concern include a range of organics and inorganics-heavy metals, metalloids, PAH, TPH, unleaded kerosene/naphthalene (associated with former aerodrome), solvents, asbestos, PCBs, herbicides and pesticides.	On-site members of the public in public spaces within the Scheme boundary	Inhalation, ingestion and dermal contact with chemical parameters in soil, soil-derived dust and ACM fibres	Medium	low likelihood	Moderate/Low Risk	Medium	likely	Moderate Risk	GI and risk assessment as necessary to define risks. Use of ventilated temporary structures during construction if risk assessments deem necessary. Use of appropriate hazard signage and / or ground gas protection measures within below ground chambers and ducts if risk assessments deem necessary. RAMS to be completed prior to construction and risk management with appropriate PPE. See section 10.9 for further details.	Medium	low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk
		Inhalation, ingestion and dermal contact with chemical parameters within perched water and shallow groundwater	Medium	low likelihood	Moderate/Low Risk	Medium	likely	Moderate Risk		Medium	Low likelihood	Moderate/Low Risk	Medium	unlikely	Low Risk
		Migration and accumulation of ground gases and/or vapours followed by inhalation or ignition causing asphyxiation and/or explosion	Severe	unlikely	Moderate/Low Risk	Severe	Unlikely	Moderate/Low Risk		Severe	Unlikely	Moderate/Low Risk	Severe	Unlikely	Moderate/Low Risk
		Inhalation, ingestion and dermal contact with chemical parameters within surface water	Medium	Low likelihood	Moderate/Low Risk	Medium	likely	Moderate Risk		Medium	Low likelihood	Moderate/Low Risk	Medium	unlikely	Low Risk
	On-site future construction workers and site maintenance workers associated with the Scheme	Receptor not present at baseline	Inhalation, ingestion and dermal contact with chemical parameters in soil, soil-derived dust and ACM fibres				Medium	low likelihood		Moderate/Low Risk	Medium	low likelihood	Moderate/Low Risk	Medium	Unlikely
Inhalation, ingestion and dermal contact with chemical parameters within perched water and						Medium	low likelihood	Moderate/Low Risk	Medium	Unlikely	Low Risk	Medium	Unlikely	Low Risk	

Source	Receptor	Pathway	Baseline			Construction without mitigation			Mitigation measures	Construction with mitigation			Operation											
			Consequence of risk	Probability of risk	Classification of risk (assuming reasonable worst case)	Consequence of risk	Probability of risk	Classification of risk		Consequence of risk	Probability of risk	Classification of risk	Consequence of risk	Probability of risk	Classification of risk									
		shallow groundwater																						
		Migration and accumulation of ground gases and/or vapours followed by inhalation or ignition causing asphyxiation and/or explosion														Severe	Unlikely	Moderate/Low Risk	Severe	Unlikely	Moderate/Low Risk	Severe	Unlikely	Moderate/Low Risk
		Inhalation, ingestion and dermal contact with chemical parameters within surface water														Medium	low likelihood	Moderate/Low Risk	Medium	low likelihood	Moderate/Low Risk	Medium	unlikely	Low Risk
	On-site groundwater (superficial Secondary A aquifer and Secondary Undifferentiated aquifer). Surface water features (Ingrebourne River and Weald Brook). Potential new surface water features including attenuation ponds and drainage features		Leaching/ vertical migration of chemical parameters in soils to underlying groundwater	Medium	Low likelihood	Moderate/Low Risk	Medium	Low likelihood	Moderate/Low Risk	GI and controlled water risk assessment (including PRA) as necessary to define risks.	Medium	Low likelihood	Moderate/Low Risk	Medium	Low likelihood	Moderate/Low Risk								
			Lateral migration of chemical parameters in groundwater	Medium	Unlikely	Low Risk	Medium	Unlikely	Low Risk		Medium	Unlikely	Low Risk	Medium	Unlikely	Low Risk								
			Migration of chemical parameters entrained in surface water / run-off	Medium	Low likelihood	Moderate/Low Risk	Medium	Low likelihood	Moderate/Low Risk		Medium	Low likelihood	Moderate/Low Risk	Medium	Low likelihood	Moderate/Low Risk								
			Lateral migration of chemical parameters in shallow groundwater / perched water to surface waters	Medium	Low likelihood	Moderate/Low Risk	Medium	Low likelihood	Moderate/Low Risk		Medium	Low likelihood	Moderate/Low Risk	Medium	Low likelihood	Moderate/Low Risk								
			Migration of perched / shallow groundwater and / or surface water via preferential pathways e.g. via piling	Pathway not present at baseline			Medium	Low likelihood	Moderate/Low Risk		Medium	Unlikely	Low Risk	Medium	Unlikely	Low Risk								
	On-site underground services including the NG high pressure gas main and BPA pipeline, existing structures, piles and foundations associated with residential, industrial,		Chemical attack of buried structures in contact with chemical parameters in soil or groundwater	Medium	Low likelihood	Moderate/Low Risk	Medium	Low likelihood	Moderate/Low Risk	GI and risk assessment as necessary to define risks. Appropriate assessment and design of services resistant to	Medium	Low likelihood	Moderate/Low Risk	Medium	Low likelihood	Moderate/Low Risk								

Source	Receptor	Pathway	Baseline			Construction without mitigation			Mitigation measures	Construction with mitigation			Operation		
			Consequence of risk	Probability of risk	Classification of risk (assuming reasonable worst case)	Consequence of risk	Probability of risk	Classification of risk		Consequence of risk	Probability of risk	Classification of risk	Consequence of risk	Probability of risk	Classification of risk
	agricultural and commercial properties and future structures, services, piles and foundations	Migration of ground gases and/or vapours along preferential pathways including permeable ground, services trenches and service entry points and accumulation in enclosed spaces such as services ducts or access points	Medium	Unlikely	Low Risk	Medium	Unlikely	Low Risk	chemical attack if risk assessments deem necessary. Use of appropriate hazard signage and / or ground gas protection measures within below ground chambers and ducts if risk assessments deem necessary. See section 10.9 for further details.	Medium	Unlikely	Low Risk	Medium	Unlikely	Low Risk

* Risk from ACM (on-site) in brackets

Table 10.2: Land contamination assessment of effects

Source	Receptor	Pathway	Classification of risk (baseline)	Classification of risk (construction without mitigation)	Impact (construction without mitigation)	Classification of risk (construction with mitigation)	Impact (construction with mitigation)	Classification of risk (operation)	Impact (during operation phase assuming mitigation was implemented)	
<p>Potentially impacted soil/groundwater and gases/vapours associated with the following on site sources:</p> <ul style="list-style-type: none"> •Area of historical Brook Street landfill and recently deposited material (minor exceedence of beryllium public open space GAC (park), asbestos and a number of EQS-f exceedences from soil-derived leachate); •Made Ground/infill of unknown material expected beneath areas of existing development (i.e. along the M25, A12, watercourses, embankments and Great Eastern Main Line railway) and potentially infilled water features/pits; •On-site vehicle emissions, unrecorded spills and leaks (including from drainage) from the long-term use of the roads; •Four recorded pollution incidents; •Land uses including electricity substations, former aerodrome, railway line, agricultural activities; and •Possible leakage from BPA sub-surface pipeline. <p>Potential chemical parameters of concern including heavy metals, metalloids, PAH, TPH,</p>	On-site members of the public in public spaces within the Scheme boundary	Inhalation, ingestion and/or dermal contact with chemical parameters in soil, soil-derived dust and ACM fibres*	Low (Moderate/Low Risk)	Moderate (High) Risk	Moderate Adverse	Low (Moderate/Low Risk)	Negligible	(Low) Low Risk	Negligible (Minor Beneficial)	
		Inhalation, ingestion and/or dermal contact with chemical parameters within perched water and shallow groundwater	Low Risk	Moderate/Low Risk	Minor Adverse	Low Risk	Negligible	Low Risk	Negligible	
		Migration and accumulation of ground gases and/or vapours followed by inhalation and/or ignition causing asphyxiation and/or explosion	Moderate Risk	Moderate Risk	Negligible	Moderate Risk	Negligible	Moderate/Low Risk	Minor Beneficial	
		Inhalation, ingestion and/or dermal contact with chemical parameters within surface water	Moderate/Low Risk	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible	Low Risk	Minor Beneficial	
	On-site future construction workers and site maintenance workers associated with the Scheme	Receptor not present at baseline	Inhalation, ingestion and/or dermal contact with chemical parameters in soil, soil-derived dust and ACM fibres*	Receptor not present at baseline	Moderate/Low (Moderate) Risk	(Impact predicted to be moderate adverse given sensitivity of receptor)	Low (Moderate/Low) Risk	(Impact predicted to be negligible given reduced likelihood of pathway being realised)	Low (Moderate/Low) Risk	(Impact predicted to be negligible given reduced likelihood of pathway being realised)
			Inhalation, ingestion and/or dermal contact with chemical parameters within perched water and shallow groundwater		Moderate Risk		Moderate/Low Risk		Low Risk	
			Migration and accumulation of ground gases and/or vapours followed by inhalation and/or ignition causing asphyxiation and/or explosion		Moderate/Low Risk		Moderate/Low Risk		Moderate/Low Risk	
			Inhalation, ingestion and/or dermal contact with chemical parameters within surface water		Moderate Risk		Moderate/Low Risk		Low Risk	
	Off-site workers/visitors/users at industrial, agricultural and commercial premises and recreational facilities including those at Grove Farm (garden centre, RJ Waste Management Recycling, skip hire and rubbish clearance), agricultural land workers and residents including those at property on Grove Farm		Inhalation, ingestion and dermal contact with chemical parameters in windblown soil-derived dust and ACM fibres*	Low (Moderate/Low) Risk	Moderate/Low (Moderate) Risk	Minor Adverse	Low (Moderate/Low) Risk	Negligible	Low (Low) Risk	Negligible (Minor Beneficial)
			Inhalation, ingestion and dermal contact with chemical parameters within perched water and shallow groundwater	Low Risk	Low Risk	Negligible	Low Risk	Negligible	Low Risk	Negligible
			Migration and accumulation of ground gases and/or vapours followed by inhalation or ignition causing asphyxiation and/or explosion	Moderate/Low Risk	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible
			Inhalation, ingestion and dermal contact with chemical parameters within surface water	Low Risk	Moderate/Low Risk	Minor Adverse	Low Risk	Negligible	Low Risk	Negligible
	On-site groundwater (superficial Secondary A aquifer and Secondary Undifferentiated aquifer). Surface water features (Ingrebourne River and Weald		Leaching/ vertical migration of chemical parameters in soils to underlying groundwater	Moderate/Low Risk	Moderate Risk	Minor Adverse	Moderate/Low Risk	Negligible	Low Risk	Minor Beneficial
			Lateral migration of chemical parameters in groundwater	Moderate/Low Risk	Moderate Risk	Minor Adverse	Moderate/Low Risk	Negligible	Low Risk	Minor Beneficial

Source	Receptor	Pathway	Classification of risk (baseline)	Classification of risk (construction without mitigation)	Impact (construction without mitigation)	Classification of risk (construction with mitigation)	Impact (construction with mitigation)	Classification of risk (operation)	Impact (during operation phase assuming mitigation was implemented)	
unleaded kerosene/naphthalene (associated with former aerodrome), solvents, asbestos, PCBs, herbicides and pesticides and ground gases.	Brook). Potential new surface water features including attenuation ponds and drainage features	Migration of chemical parameters entrained in surface water / run-off	Moderate/Low Risk	Moderate Risk	Minor Adverse	Moderate/Low Risk	Negligible	Low Risk	Minor Beneficial	
		Lateral migration of chemical parameters in shallow groundwater / perched water to surface waters	Moderate/Low Risk	Moderate Risk	Minor Adverse	Moderate/Low Risk	Negligible	Low Risk	Minor Beneficial	
		Migration of perched / shallow groundwater and / or surface water via preferential pathways e.g. attenuation ponds (if unlined) and pond outfalls	Pathway not present at baseline		(Impact predicted to be minor adverse given sensitivity of receptor)	Moderate/Low Risk	(Impact predicted to be negligible given reduced likelihood of pathway being realised)	Low Risk	(Impact predicted to be negligible given reduced likelihood of pathway being realised)	
	Off-site groundwater (superficial Secondary A aquifer and Secondary Undifferentiated aquifer) and surface water features (Ingrebourne River and Weald Brook)	Leaching/ vertical migration of chemical parameters in soils to underlying groundwater	Moderate/Low Risk	Moderate Risk	Minor Adverse	Moderate/Low Risk	Negligible	Low Risk	Minor Beneficial	
		Lateral migration of chemical parameters in groundwater	Low Risk	Moderate/Low Risk	Minor Adverse	Low Risk	Negligible	Low Risk	Negligible	
		Migration of chemical parameters entrained in surface water / run-off	Moderate/Low Risk	Moderate Risk	Minor Adverse	Moderate/Low Risk	Negligible	Low Risk	Minor Beneficial	
		Lateral migration of chemical parameters in shallow groundwater to surface waters	Low Risk	Moderate/Low Risk	Minor Adverse	Low Risk	Negligible	Low Risk	Negligible	
	On-site underground services including the NG high pressure gas main and BPA pipeline, existing structures, piles and foundations associated with residential, industrial, agricultural and commercial properties and future structures, services, piles and foundations	Chemical attack of buried structures in contact with chemical parameters in soil or groundwater	Moderate/Low Risk	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible	Low Risk	Minor Beneficial	
		Migration of ground gases and/or vapours along preferential pathways including permeable ground, services trenches and service entry points and accumulation in enclosed spaces such as services ducts or access points	Moderate/Low Risk	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible	Low Risk	Minor Beneficial	
	Off-site existing structures, services piles and foundations associated with residential, industrial, agricultural and commercial properties	Chemical attack of buried structures in contact with chemical parameters in soil or groundwater	Moderate/Low Risk	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible	Low Risk	Minor Beneficial	
		Migration of ground gases and/or vapours along preferential pathways including permeable ground, services trenches and service entry points and accumulation in enclosed spaces such as services ducts or access points	Low Risk	Low Risk	Negligible	Low Risk	Negligible	Low Risk	Negligible	
		Migration of contamination in shallow groundwater and uptake by crops	Very Low Risk	Very Low Risk	Negligible	Very Low Risk	Negligible	Very Low Risk	Negligible	
Inhalation, ingestion and dermal contact with contaminants in soil and windblown soil-derived dust by livestock		Very Low Risk	Very Low Risk	Negligible	Very Low Risk	Negligible	Very Low Risk	Negligible		
Potentially impacted soil/groundwater and gases/vapours associated with the following off site sources: •Made Ground/infill of unknown provenance associated with existing roads, off site development infilled pits/ponds/watercourses; •Activities and land uses associated with Grove Farm, including a garden centre and RJ Waste Management Recycling, skip hire and rubbish clearance; •Other land uses including fuel stations (former and active); electricity substations, sewage treatment works, former aerodrome (wider area from the Scheme boundary), vehicle	On-site members of the public in public spaces within the Scheme boundary	Inhalation, ingestion and dermal contact with chemical parameters in soil, soil-derived dust and ACM fibres	Moderate/Low Risk	Moderate Risk	Minor Adverse	Moderate/Low Risk	Negligible	Low Risk	Minor Beneficial	
		Inhalation, ingestion and dermal contact with chemical parameters within perched water and shallow groundwater	Moderate/Low Risk	Moderate Risk	Minor Adverse	Moderate/Low Risk	Negligible	Low Risk	Minor Beneficial	
		Migration and accumulation of ground gases and/or vapours followed by inhalation or ignition causing asphyxiation and/or explosion	Moderate/Low Risk	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible	
		Inhalation, ingestion and dermal contact with chemical parameters within surface water	Moderate/Low Risk	Moderate Risk	Minor Adverse	Moderate/Low Risk	Negligible	Low Risk	Minor Beneficial	
	On-site future construction workers and site maintenance workers associated with the Scheme	Inhalation, ingestion and dermal contact with chemical parameters in soil, soil-derived dust and ACM fibres	Receptor not present at baseline	Moderate/Low Risk	Moderate/Low Risk	(Impact predicted to be moderate adverse given sensitivity of receptor)	Moderate/Low Risk	Impact predicted to be minor adverse given the mitigation measures	Low Risk	(Impact predicted to be negligible given reduced likelihood of pathway being realised)
		Inhalation, ingestion and dermal contact with chemical parameters within perched water and shallow groundwater		Moderate/Low Risk	Low Risk					
		Migration and accumulation of ground gases and/or vapours followed by inhalation or ignition causing asphyxiation and/or explosion		Moderate/Low Risk	Moderate/Low Risk					
		Inhalation, ingestion and dermal contact with chemical parameters within surface water		Moderate/Low Risk	Moderate/Low Risk					
	On-site groundwater (superficial Secondary A aquifer and Secondary	Leaching/ vertical migration of chemical parameters in soils to underlying groundwater	Moderate/Low Risk	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible	

Source	Receptor	Pathway	Classification of risk (baseline)	Classification of risk (construction without mitigation)	Impact (construction without mitigation)	Classification of risk (construction with mitigation)	Impact (construction with mitigation)	Classification of risk (operation)	Impact (during operation phase assuming mitigation was implemented)
service garages, garden centre, farms and associated agricultural activities, vehicle cleaning services; and •Eight recorded pollution incidents. Potential chemical parameters of concern include a range of organics and inorganics- heavy metals, metalloids, PAH, TPH, unleaded kerosene/naphthalene (associated with former aerodrome), solvents, asbestos, PCBs, herbicides and pesticides.	Undifferentiated aquifer). Surface water features (Ingrebourne River and Weald Brook). Potential new surface water features including attenuation ponds and drainage features	Lateral migration of chemical parameters in groundwater	Low Risk	Low Risk	Negligible	Low Risk	Negligible	Low Risk	Negligible
		Migration of chemical parameters entrained in surface water / run-off	Moderate/Low Risk	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible
		Lateral migration of chemical parameters in shallow groundwater / perched water to surface waters	Moderate/Low Risk	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible
		Migration of perched / shallow groundwater and / or surface water via preferential pathways e.g. via piling	Receptor not present at baseline		Impact predicted to be moderate adverse given sensitivity of receptor)	Low Risk	Impact predicted to be minor adverse given the mitigation measures	Low Risk	(Impact predicted to be negligible given reduced likelihood of pathway being realised)
	On-site underground services including the NG high pressure gas main and BPA pipeline, existing structures, piles and foundations associated with residential, industrial, agricultural and commercial properties and future structures, services, piles and foundations	Chemical attack of buried structures in contact with chemical parameters in soil or groundwater	Moderate/Low Risk	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible	Moderate/Low Risk	Negligible
		Migration of ground gases and/or vapours along preferential pathways including permeable ground, services trenches and service entry points and accumulation in enclosed spaces such as services ducts or access points	Low Risk	Low Risk	Negligible	Low Risk	Negligible	Low Risk	Negligible

* Risk from ACM (on-site) in brackets

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