

Technical Note

16/03/2026

1. Introduction

1.1 Scope

1.1.1 Arthian Ltd (Arthian) has been commissioned by Assystem Energy and Infrastructure Ltd (Assystem) on behalf of Equans Services Ltd (Equans) to undertake contaminated land assessments to support in the discharge of Requirement 11: Contaminated Land and Groundwater of the North London Reinforcement Project Development Consent Order (DCO)¹. The proposed scope of works is presented in Arthian proposal Ref: 318957/JD/CT/JR/270825/6.0.

1.2 Project Overview

1.2.1 The works to be undertaken as specified in the DCO are outlined in Schedule 1 'Authorised Development'. The delineated area within which works to be undertaken lie is presented in Appendix A 'Work Plans'.

1.2.2 The DCO was made by the Secretary of State for Energy and Climate Change for the Project on 16 April 2014 and came into force on 7 May 2014. The DCO provides powers to National Grid to carry out the Project, which comprises of the replacement of the existing 275kV overhead line (OHL) with a 400kV OHL from Waltham Cross substation in Epping Forest, through Enfield, and then to Tottenham substation in Haringey. The DCO also contains powers to carry out associated works to the substations at Waltham Cross, Brimsdown and Tottenham.

1.2.3 The Project falls within the administrative boundaries of, Epping Forest District Council, Enfield Council, the London Borough of Waltham Forest, and the London Borough of Haringey. The Project is also within the administrative boundaries of the Greater London Authority and Essex County Council, though these are not relevant planning authorities in relation to the Project.

1.2.4 The Project includes the following elements:

- Existing 275kV route upgrading to 400kV for 14km from the Waltham Cross substation to Tottenham substation. This would comprise of:
- The existing 275kV conductor cables (wires) to be removed and replaced (i.e. reconducted) with 400kV wires. This would use the existing pylons.
- An extension to the Waltham Cross substation to provide a new 400kV Gas Insulated Switchgear (GIS) substation and associated OHL entry modifications.
- The replacement of two 275/132 kV Super Grid Transformers (SGTs) at Brimsdown with two new

¹ The National Grid (North London Reinforcement Project) Order 2014/No. 1052.

400/132kV SGTs, located both inside and partially outside the existing Brimsdown substation boundary, with underground cable connections between these new SGTs and the existing substation.

- Works to bypass Tottenham substation, including the construction of a new pylon (VC1R) and cable sealing end (CSE) compound south of the Tottenham substation, and the removal of the existing VC1 pylon.
- Associated works, for example, temporary access roads, highway works temporary construction compounds, scaffolds, work sites and ancillary works.

1.2.5 This Technical Note applies to Tower ZBC 43 only.

1.3 Proposed Development (Pylon ZBC 43)

- 1.3.1 The portion of the works to which this Technical Note applies is described in Section 1.2.1 above and specifically relates to Pylon ZBC 43 (herein referred to as 'Site 43'). Figure 1 overleaf presents the delineated boundary of Site 43 utilised for the purposes of this assessment in green.
- 1.3.2 The works proposed to be undertaken to facilitate the reconductoring of ZBC 43 include the emplacement of track matting to facilitate vehicle movement and preparatory site clearance/levelling along the proposed trackway route, if required. However, as track matting is proposed to be located on existing hardstanding, no such clearance or levelling works are considered likely to be required. The proposed works as detailed on Drawing 'ZBC 043: C4 EPZ' included in Appendix A.
- 1.3.3 While considered unlikely, the requirement for imported materials as part of any levelling works is unknown at this time. If required, any such works are considered likely to be limited in extent.
- 1.3.4 Following completion of the works the Site will be restored to its original condition. Site 43 is situated within a largely commercial area, surfaced in a combination of hardstanding and gravel/hardcore. It is assumed that the Site is centrally managed. Once the necessary works have been completed and all equipment and materials have been removed, the site will be reinstated to its previous condition.





Figure 1: Delineated boundary of Site 43 (Green)

1.4 Legislative Context

1.4.1 DCOs grant legal approval and comprehensive permissions for Nationally Significant Infrastructure Projects (NSIPs). This includes planning consents and environmental conditions covering construction and use. Further information, including the specific conditions of the DCO which are applicable herein, is presented in Appendix B 'Legislative Context'.

1.5 Aims and Objectives

1.5.1 This Technical Note has the following overall aim:

- To inform on whether, following completion of the specified works, the site is likely to be considered suitable for use, or has the potential to be determined as contaminated land in the context of Part 2A of the Environmental Protection Act 1990 (Part 2A).

Note 1: This Technical Note is not intended to provide a full Tier 1 Preliminary Risk Assessment as defined by the Environment Agency's (EA) Land Contamination Risk Management² (LCRM) guidance however the methods presented therein have been broadly applied in the current assessment. Should potential for contamination be identified, further assessment and investigation may be warranted.

² Environment Agency, Land Contamination Risk Management, 12 June 2025.

1.6 Proposed Assessment Methodology

- 1.6.1 Arthian proposes to undertake a review of publicly available data sources in order to develop an outline Conceptual Site Model (CSM) and assess the potential for contamination and associated risk. the adopted methodology is drawn from EA LCRM guidance, relevant British Standards for the Investigation of contaminated land³ and recognised industry authoritative guidance.

2. Previous Contaminated Land Reporting

2.1 AtkinsRéalis 2025

Morrison Energy Group (MGroup) has provided Arthian with the following contaminated land reporting undertaken for National Grid Electricity Transmission (NGET) by AtkinsRéalis (formerly Atkins):

- Atkins, NGET Arriva Bus Depot, Tottenham (8021), factual Site Investigation Report, Reference: 5221420, Revision 2.0, 21 December 2023
- AtkinsRéalis, Tottenham Former Bus Depot, CWDQRA Update and NAPL Assessment, Reference: 5230876, 11 July 2025

The reporting available covers the central and western areas of Site 43 (i.e. from the fenceline to the west of tower ZBC 43 to the western extent of Site 43) as part of a wider investigation area. An exhaustive technical review of the previous reporting was not undertaken as this was not considered to be within the Arthian scope of works. Relevant technical information from the previous reporting made available to Arthian will be utilised to inform this risk assessment.

It is noted that the Site area described in the provided Atkins/AtkinsRéalis reports does not cover tower ZBC 43 itself where the reconductoring works are to take place but cover the western part of Site 43 where track matting etc will be emplaced during the works.

3. Site Description

3.1 Site Details

- 3.1.1 The following details relating to Site 43 have been obtained via research of readily available sources. Sources consulted are referenced within the corresponding sections.

Table 1: Current Site Setting

Site Name	Tower ZBC 43
Local Planning Authority	London Borough of Haringey
Site Area (hectares, ha)	Approximately 0.305
Topography Data Sources:	A review of Google Earth ⁴ indicates that Site 43 is generally flat lying, with ground elevations ranging between approximately 10 metres Above Ordnance Datum (AOD) to 11 mAOD.
National Grid Reference	535411 (E), 191410 (N)
6-Figure Grid Reference	TQ 35411 91410

³ British Standard (BS) 10175:2011+A2:2017, Investigation of potentially contaminated sites - code of practice.

⁴ Google Earth, 2025 [Accessed 21st November 2025]

Address	Leeside Road, London Borough of Haringey, London, Greater London, England, N17 0SG, United Kingdom
Current Site Use	Site 43 is situated within area of commercial/industrial properties. The Site is located between a series of commercial warehouse-style units with associated hardstanding lay-down areas and the Pymmes Brook. It is understood that the building to the immediate north of the Site was demolished in 2024. The eastern Site area immediately surrounding the tower and associated access road/infrastructure appears to be fenced off from the western Site area which comprises an area of hardstanding associated with the commercial properties.
Adjacent Land Use (within 250 m ⁵) Data Sources: Google Earth 2025 ⁴	North: Tower ZBD 42 lies approximately 40 m north of the Site, adjacent to a large warehouse-style building. Leeside Road is located approximately 105 m north of the Site, with the Leeside Road Gasholder and an area of derelict land comprising reworked soils just beyond.
	East: The Pymmes Brook is located approximately 5 m to the east of the Site, flowing in a southerly direction. A woodland corridor is noted on the eastern bank of the water course beyond which lies an area known as Wild Marsh West, an area of semi-natural wetlands which forms part of the Tottenham Marshes. This area is bound to the east by the River Lea Navigation Canal which is located approximately 225 m east of the site, with the River Lea also noted approximately 250 m east. The surface water channels are noted to be split by an area of land comprising a tow path and vegetation.
	South: The commercial area in which tower ZBC 43 is located extends to the south of the Site. Tottenham Marsh Electricity Transformer Station is located approximately 125 m south of the Site, extending to 250 m from the Site. The Pymmes Brook bounds the Transformer Station to the east.
	West: West of Site 43 lies a well-established industrial zone comprising large commercial units including Stratstone Land Rover Service Centre, Travis Perkins and Celtic Bakers. The area is structured with internal access including Watermead Way (A1055).
Site History Data Sources: Google Earth (2025) ⁴ National Library of Scotland ⁶	Historical mapping from the National Library of Scotland side by side map viewer indicates that the Site comprised undeveloped land adjacent to the Pymmes Brook between the 1830s – 1940s. The 1949-1974 mapping notes the Site to have been developed to accommodate the existing tower ZBC 43 and associated infrastructure including roadways, which remains in place to the present day. A ‘works’ is noted to the immediate west of the tower within the current area of commercial properties. Aerial imagery from Google Earth dated 1999, shows the Site layout to comprise a long rectangular building to the immediate north of the Site boundary. It is understood the Site operated as a bus depot during this time. Available historical map extracts are included in Appendix C.

⁵ A default radius of 250 m from the site has been selected. This is based on recommendations set by the National House Building Council (NHBC) ‘Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D66: 2008 Volume 1’. In line with these recommendations, features at greater distance will only be described if they are particularly large or have the potential to affect the land quality at the site or the wider environmental quality of the site.

⁶ [Side by side georeferenced maps viewer - Map images - National Library of Scotland](#) [accessed 22nd October 2025]



	The AtkinsRéalis⁷ reporting notes that the built features within their assessment area (which includes Site 43) were demolished in August 2024 leaving only open hardstanding. The features demolished are noted to include storage tanks which are understood to have been located within Site 43. The report notes that historical mapping dated 2003⁸ indicated the presence of a tank to the south of the main building. AtkinsRéalis reference previous reporting which states that an underground tank was located in this area of the Site; however, they were unable to establish if the tank was underground or above ground.
Surrounding Area History Data Sources: Google Earth (2025) National Library of Scotland	• 1830s – 1890s: The surrounding area is noted to mainly comprise of undeveloped fields within the ‘Wild Marsh’ area of ‘Tottenham Marsh’. A surface water course (assumed to be the Pymmes Brook) is located immediately east of the Site in its current orientation. Beyond the water course a rifle range is noted which extends to the north and south and is bound by the River Lea Navigation Canal to the east. Electric telegraph lines are noted along the western bank of the canal. Wild Marsh is noted to the south of the Site. Tottenham and Edmonton Gas Works is noted to the northwest of the Site adjacent to a north to south orientated railway line (both >250 m). • 1880s–1920s: The surface water course to the east of the Site is labelled as Pymmes Brook. A path or track is noted in the location of the current Leaside Road to the north of the Site. • 1940s–1970s: The 1944-1974 mapping notes a pond to the south of the Site adjacent to Pymmes Brook. The Rifle Range to the east is now labelled as a ‘Recreation Ground’. A roadway is noted in the location of the current Leaside Road with the Gothic Works (Gas meters and Stoves) north of the roadway, including a large circular structure, presumed to comprise a gas holder. Two (2) tanks are noted to the south of the road to the east of Leaside Depot (Civil Engineering). A number of works are noted to the southwest including a ‘paper and Stationary Works’, ‘Blouse and Lingerie Works’ and Engineering Works. • 1940s–1970s: The 1949-1974 mapping notes several ‘works’ and ‘depots’ to the immediate west of the Site and unlabelled buildings to the south of the Site with associated infrastructure/roadways. Adjacent to the railway, which has been expanded to include several sidings, conveyor belts and a travelling crane are both noted. • 1980s–2000s: Aerial imagery from 1999 shows the Tottenham and Edmonton Gas Works and Gothic Works to the north of the Site to no longer be present, with much of that area comprising derelict/vacant land. The Leaside Road Gasholder remains in place, however. Areas of which have been redeveloped for commercial properties. The commercial properties to the west of the Site and Tottenham Marsh Electricity Transformer Station are noted as per more recent aerial imagery. By 2006 much of the vacant land to the north has been redeveloped with commercial/industrial properties noted. • No further notable changes observed.

⁷ AtkinsRéalis, Tottenham Former Bus Depot, CWDQRA Update and NAPL Assessment, Reference: 5230876, 11 July 2025

⁸ Mapping not replicated within the available report

Available historical map extracts are included in Appendix C.

4. Environmental Setting

4.1 Public Register Information

4.1.1 In undertaking this assessment Arthian has utilised readily available public register information only, no site-specific third-party data has been obtained as part of this exercise.

Table 2: Environmental Setting Summary

Published Geology: Data Sources: Geological Society GeoIndex⁹	<u>Artificial/Made Ground Deposits</u> The BGS GeoIndex does not indicate the presence of Artificial Ground within or within 250 m of Site 43. However, given the past and current development of the Site made Ground is considered likely to be present. These materials are considered likely to comprise construction materials such as concrete and hardcore/aggregate. The presence of made ground deposits associated with the former industrial land uses (e.g. gas works) are also considered highly likely to the north and northwest of the Site. The following boreholes were noted within 250 m of Site 43: Borehole Id: TQ39SE838 (130 m north of Site 43) - Made Ground: Brown sandy clayey gravel. Gravel consists of flint and some concrete and tarmac. Strong hydrocarbon odour and medium flint (0.00 m – 2.70 m) - Made Ground: Brown sandy slightly sandy clay. Gravel consists of subangular black medium flint. Strong hydrocarbon odour (2.70 m – 3.00 m) Borehole Id: TQ39SE842 (120 m north of Site 43) - Made Ground: Brown sandy gravel (0.00 m – 0.20 m) - Made Ground: Black gravelly sand with some brick (one observation of green material attached to brick). Sand consists of ash (0.20 m – 0.70 m) - Made Ground: Mottled brown grey orange clay/silt (0.70 m – 2.0 m) - Made Ground: Soft brown brownish grey gravelly clay/silt. From 2.20 m grey (hydrocarbon odour) (2.00 m – 0.250 m). - Made Ground: Black clayey gravelly sand with sands of ash some rope and bricks (hydrocarbon odour) (2.50 m – 2.70 m) Borehole Id: TQ39SE196 (180 m northeast of Site 43) - Made Ground (0.00 m – 2.44 m) Borehole Id: TQ39SE68 (234 m northeast of Site 43) - Made Ground: topsoil, sandy clay and stones (0.0 m - 2.74 m)
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⁹ [GeoIndex - British Geological Survey](#) [accessed 22nd November 2025]



It is noted that several available historic borehole records including TQ39SE838 and TQ39SE838 summarised above are located in the vicinity of the Leaside Road Gasholder which formed part of the wider former gasworks. As such, ground conditions recorded in available borehole records are unlikely to be fully representative of those within Site 43.

The AtkinsRéalis^{7 10} reporting notes that multiple phases of site investigation undertaken across the wider assessment area between 2013 and 2024 recorded made ground in all exploratory locations to a maximum depth of 6.0 mbgl. These soils were generally described as gravelly or clayey sand with extraneous materials including brick, concrete, clinker, ash, wood and other debris. The 2013 investigation recorded tar staining, hydrocarbon odours and possible asbestos containing materials (ACMs). Frequent records of hydrocarbon odours were also noted within the 2024 exploratory locations.

Superficial Deposits

Review of the British Geological Survey (BGS) Geo Index Map indicates Site 43 is underlain by Holocene alluvial deposits, comprising silts, clays, sands, and gravels. These soils are underlain by the Kempton Park Gravel Member, comprising sand and gravels, in the eastern Site area.

The following boreholes were noted within 250 m of Site 43:

Borehole Id: TQ39SE838 (130 m north of Site 43)

- Superficial Deposits:
 - Stiff dark grey clay, slightly sandy and slightly gravelly clay (3.00 m – 4.00 m)
 - Soft dark grey peaty clay (4.00 m – 4.50 m)
 - Dark brown peat (4.50 m – 4.60 m)
 - Brown peaty gravel with mild hydrocarbon odour (4.60 m – 5.10 m)
 - Firm to stiff gravelly sandy clay, mixed brownish grey and dark grey with angular to rounded flint; mild hydrocarbon odour (5.10 – 5.30 m)
 - Loose grey slightly silty sand and gravel, fine to coarse flint; hydrocarbon odour present (5.30 m – 8.00 m)
 - Stiff brownish grey clay (8.00 m – 8.40 m)

Borehole Id: TQ39SE842 (120 m north of Site 43)

- Superficial Deposits:
 - Firm greyish green mottled black clay (2.70m – 3.20 m)
 - Firm greyish green mottled orange brown peaty clay (3.20 m – 3.60 m)
 - Soft grey green mottled black peaty slightly gravelly clay/silt (mild hydrocarbon odour) (3.60 m – 3.80 m)
 - Dark brown clayey gravelly fine sand. Gravel consists of molluscs (hydrocarbon odour) (3.80 m – 4.0 m).

Borehole Id: TQ39SE196 (180 m northeast of Site 43)

- Superficial Deposits:
 - Gravel (2.44 – 5.79 m)

¹⁰ Atkins, NGET Arriva Bus Depot, Tottenham (8021), factual Site Investigation Report, Reference: 5221420, Revision 2.0, 21 December 2023

	Borehole Id: TQ39SE68 (234 m northeast of Site 43) • Superficial Deposits: ○ Peat (2.74 – 3.65 m) ○ Black organic sandy clay and small gravel (3.65 – 4.45 m) ○ Black sandy clay and small gravel with strong smell of creosote (4.45 – 5.37 m) ○ Gravel (Black) (5.37 – 6.10 m) The AtkinsRéalis^{7 10} reporting notes the superficial soils to comprise alluvium (clay, silt, sand and gravel) underlain by the Kempton Park Gravel Member (sand and gravel). Alluvium generally recorded to comprise silts and clay horizons with some sand and gravel with occasional bands of peat was recorded in all exploratory locations to a maximum depth of 5.85 mbgl. Frequent observations of hydrocarbon and/or organic odours, peat and black staining are noted by AtkinsRéalis. The Kempton Park Gravel Member was recorded in all exploratory locations to a maximum depth of 7.80 mbgl and was noted to generally comprise sandy gravel with layers of silt and occasional silty clay. AtkinsRéalis note frequent observations of hydrocarbon odour and staining within these deposits also. <u>Solid Deposits</u> Site 43 is identified to be underlain by the Eocene London Clay formation, a stiff, low-permeability marine deposit, with deeper strata comprising the Lambeth Group, Thanet Sands, and White Chalk at depth. The following boreholes encountering solid strata were noted within 250 m of Site 43: Borehole Id: TQ39SE196 (180 m northeast of Site 43) • Bedrock: ○ Blue Clay (5.79 m – 15.24 m) ○ Woolwich & Reading Beds (15.24 m – 21.95 m) ○ Sandy Clay & Pebbles (21.95 m – 30.48 m) ○ Thanet Sand (30.48 – 39.01 m) ○ Chalk with Flints (39.01 m – 117.35 m) ○ Hard Grey Chalk (117.35 m – 152.40 m) The AtkinsRéalis^{Error! Bookmark not defined.} reporting notes the London Clay to underlie the Site from depths of 5.80 mbgl and it was generally described as soft to stiff, fissured, grey and brown clay. The full depth of the London Clay was not proven on-Site however, AtkinsRéalis note that a borehole sunk >100 m to the south of the Site encountered the base of the horizon at 19.0 mbgl.
Designated Local Ecology Data sources: MAGIC MAPS ¹¹	There are no designated ecological receptors (SPA, SAC, or SSSI) located within 250 m of Site 43.
Coal Mining Data sources:	Review of the Mining Remediation Authority Map Viewer indicates Site 43 does not reside within a Coal Mining Reporting Area.

¹¹ <https://magic.defra.gov.uk/MagicMap.html> [accessed 22nd November 2025]

Mining Remediation Authority ¹²	
Radon Data sources: UK Health Security Agency Radon Maps ¹³	Site 43 lies within an area where radon is reported to be less than 1%.
Surface Waters Data sources: Catchment Data Explorer ¹⁴	The following surface water features have been identified within 250 m of Site 43: • Pymmes Brook (Waterbody ID: GB106038027910): Major River which is located approximately 5 m to the east of Site 43. EA Catchment Data Explorer maps the water body as in “moderate” condition. • River Lea Navigation Enfield (Waterbody ID: GB106038027950): Major River which is located approximately 225 m to the east of Site 43. EA Catchment Data Explorer maps the water body as in “poor” condition.
Groundwater Data sources: MAGIC Maps RBMP ¹⁵ DEFRA Catchment Data Explorer	<u>Superficial Aquifer</u> According to the Catchment Data Explorer, there is no designated superficial groundwater body present beneath Site 43. However, MAGIC Maps indicates that Site 43 is underlain by a Secondary A superficial aquifer (the Kempton Park Gravels) comprising permeable layers capable of supporting local water supplies and base flow to surface waters. The hydraulic gradient of the superficial deposits is likely influenced by local water courses. AtkinsRéalis^{Error! Bookmark not defined.} reporting considers there to be two (2) groundwater bodies beneath the Site and immediately surrounding area, one (1) within the made ground and one (1) within the Kempton park Gravels. They also note that the alluvium (where present) appears to hydraulically separate the two (2) groundwater bodies and is considered to limit vertical migration of contamination from the made ground to the deeper Kempton Park Gravel Member. Where alluvium is not present these waterbodies are considered to be hydraulically connected. AtkinsRéalis also notes that due to the historical industrial nature of the surrounding area, the water quality within the Kempton Park Gravel Member is expected to be poor. <u>Bedrock Aquifer</u> According to the Catchment Data Explorer, there is no designated bedrock groundwater body present beneath Site 43. However, MAGIC Maps indicates the London Clay bedrock is not considered an aquifer. The deeper bedrock strata of the Lambeth Group and Thanet Formation are classified as secondary A aquifers, with the underlying chalk classed as a principal aquifer. The AtkinsRéalis reporting considers that the thickness of London Clay present acts

¹² <https://datamine-cauk.hub.arcgis.com/> [accessed 22nd November 2025]

¹³ <https://www.ukradon.org/information/ukmaps> [accessed 22nd November 2025]

¹⁴ [England | Catchment Data Explorer](https://experience.arcgis.com/experience/73ed24b6d30441648f24f043e75ebd2/page/Introduction) [accessed 22nd November 2025]

¹⁵ <https://experience.arcgis.com/experience/73ed24b6d30441648f24f043e75ebd2/page/Introduction> [accessed 22nd November 2025]



	to isolate the underlying aquifers and they were not considered as controlled water receptors. <u>Anticipated Hydrogeological Gradient</u> Regionally it is likely that the bedrock groundwater is flowing in a southerly direction towards the River Thames. Locally within the vicinity of the Site it is considered likely that groundwater within superficial aquifers will flow in an easterly or southeasterly direction towards the Pymmes Brook. This is somewhat confirmed by the AtkinsRéalis^{Error! Bookmark not defined.} reporting which infers groundwater flow direction within the superficial soils to be generally towards the Pymmes Brook. However, they note that due to variability in ground conditions clear groundwater contours could not be developed. <u>Source Protection Zones (SPZ)</u> MAGIC Maps indicates the Site to lie within a SPZ2 or Outer SPZ. No SPZ1 or Inner SPZ's are noted within 250 m of the Site.
Known Contamination – Controlled Waters and NAPL	The 2023 Atkins reporting¹⁰ includes records of known pollution incidents at the time of reporting. Records note five (5) pollution incidents to controlled waters within 250 m of the larger Site area considered, with four (4) recorded on Site. The reporting lists the following incidents: • A release of diesel fuel oil on 19 March 2002 (Water Impact: Category 4 – No Impact). Arthian notes this to be within or immediately adjacent to Site 43; • A release of asbestos on 7 May 2002 (Water Impact: Category 4 – No Impact). Arthian notes this incident to be located north of Site 43; and • Two (2) recorded incidents of the release of inert construction and demolition wastes on 7 May 2002 (Water Impact: Category 4 – No Impact). Arthian notes these incidents to be located north of Site 43 The fifth pollution incident occurred on 20 August 2010 approximately 56 m east of site and involved the release of gas and fuel oils (Water Impact: Category 2 – Significant). Arthian notes this incident to be located north of Site 43, rather than to the east. The 2025 AtkinsRéalis reporting⁷ focusses on the risks posed to controlled waters and the presence of non-aqueous phase liquid (NAPL). The below is a summary of information pertinent to this risk assessment. NAPL was recorded within the wider assessment area (of which Site 43 comprises the central section of) across various phases of investigation between 2013 and 2024. The reporting notes that the measurement of on-Site NAPL was difficult due to its degraded and emulsified nature. However, six (6) samples collected across the multiple investigations all identified the product as coal tar. NAPL and particularly dense NAPL (DNAPL) was noted at variable thicknesses across the monitoring undertaken, with the majority of locations recording NAPL present in the south of the wider Site (in the vicinity of the infilled pond) and to the south of Site 43. The report notes that DNAPL pooling was coincident with deeper surface elevations of the London Clay Formation. NAPL was



	recorded in three (3) exploratory locations within Site 43 at thicknesses of between 0.22 m and 1.64 m, however, the report acknowledges that two (2) of these locations may have been acting as DNAPL sumps as the response zones extended into the impermeable London Clay. AtkinsRéalis considered the risk from light NAPL (LNAPL) impact was residual only and LNAPL present was immobile and unlikely to migrate off-Site. The risk of DNAPL migrating off-Site was considered to be moderate, although no evidence of DNAPL impact on the Pymmes Brook was noted. Following the derivation of site-specific acceptance criteria (SSAC) for dissolved phase contaminants within groundwater, AtkinsRéalis noted exceedances of organic contaminants benzene, PAHs (such as naphthalene, anthracene and fluoranthene) and 1,2 dichloroethane. The locations of these exceedances were noted to coincide to locations where DNAPL had been identified. The dissolved phase exceedances identified were noted to potentially pose an unacceptable risk to controlled waters receptors. The available reporting notes that Phase 1 remediation works in line with the prepared Remediation Strategy (not provided to Arthian) will involve the excavation and removal of soils to a depth of 1.70 mbgl which will remove/chase out any DNAPL identified up to 1.70 mbgl and beyond where its presence remains. Furthermore, a number of exploratory locations are to be considered further in a Phase 2 Remediation Options Appraisal (ROA).
Unexploded Ordnance (UXO) Data Source: Zetica UXO Ltd¹⁶ CIRIA C785¹⁶	Arthian has consulted the Unexploded Ordnance (UXO) Risk Map from Zetica UXO Ltd (Zetica)¹⁷. The risk map provides a guide with respect to WWII bombing targets, military Sites, finds, and indicates bombing density to infer generalised risk. In the absence of identified relevant historical features within the locale (e.g. military land) it is possible to ‘screen out’ a site and conclude that no further risk assessment is necessary. This review of UXO does not constitute a Preliminary UXO Risk Assessment. Review of the UXO risk map indicates Site 43 lies within a moderate bombing risk area. A Luftwaffe target was identified 775 m east of the Site and UXO finds were also identified 350 m southeast, and 615 m southwest of the Site. Proposed works do not include for the breaking of ground as the track matting is to be placed on existing hardstanding and the reconductoring works themselves are above ground. As such the risk posed by UXO is considered to be low. However, should any work be undertaken that involve the breaking of ground, appropriate UXO Risk Assessments are recommended to further evaluate potential UXO risks at the Site prior to works commencing.

¹⁶ CIRIA, Unexploded ordnance (UXO) risk management guide for land-based projects (C785), August 2019.

¹⁷ <https://zeticauxo.com/guidance/risk-maps/> [accessed 22nd November 2025]



5. Contamination Risk Assessment

5.1 Risk Assessment Approach/Overview

- 5.1.1 The potential for Site 43 to pose a risk from potential contamination to relevant receptors, following the development outlined in Section 1.2.2, has been assessed in broad alignment with Environment Agency (EA) Land Contamination Risk Management (LCRM) guidance. This has been undertaken via the development of an outline Conceptual Site Model (CSM)¹⁸ and simplified risk assessment¹⁹. Should a potential risk exceeding a 'low' classification be derived, further work may be recommended.
- 5.1.2 Construction workers are not considered under the LCRM framework as risks to be considered post development of the Site. Health and safety on contaminated sites are covered under other regulations such as the Construction (Design and Management) Regulations (CDM) 2015.

5.2 Outline CSM and Initial Risk Assessment

- 5.2.1 Following a review of the information presented in Sections 1 – 3 above, the following assessment of the potential for contamination to exist at Site 43 following the proposed development has been identified.

Table 3: Outline CSM

Source(s)	Pathway(s)	Receptor(s)	Risk
Human Health Risk			
Made Ground NAPL (on-site)	Dermal contact/Dust migration and deposition	Current/Future site users	Low From available Site-specific information made ground will be present within the Site associated with the construction of the existing pylon/infrastructure and the past commercial/industrial use of the Site. The presence of Made Ground may pose a moderate to high risk should shallow soils be exposed; however, it is understood that no breaking of ground is proposed and following reconductoring works the Site will be restored to its prior condition. The Site is understood to be surfaced in a combination of hardstanding and gravel/hardcore within an assumed centrally managed area which is considered likely to provide a physical separation between Site users and contaminated soils. The potential for future or current Site users to interact with the underlying soils is considered to be low. Furthermore, following completion of the proposed works a low risk is anticipated.
		Construction Workers	Moderate to High Shallow groundworks are not anticipated, however, should any be undertaken, they may expose construction workers to impacted soils/groundwater or NAPL. Appropriate health and safety measures should be implemented as required.

¹⁸ British Standards Institution (BSI), Soil Quality – Conceptual site models for potentially contaminated sites, BSI EN ISO 21365:2020.

¹⁹ CIRIA, Contaminated land risk assessment. A guide to good practice (C552), January 2001.



Made Ground NAPL (on-site)	Soil gas/vapour inhalation	Future site users	Low On-Site potential vapour sources have been identified, however, no enclosed spaces are proposed as part of the reconductoring works. As such, the risk of exposure via this pathway is considered to be low.
		Construction Workers	Moderate to High Shallow groundworks are not anticipated, however, should any be undertaken, they may expose construction workers to impacted soils/groundwater or NAPL. Appropriate health and safety measures should be implemented as required.
		Off-site users	Low On-Site potential vapour sources have been identified, however, no enclosed spaces are noted down gradient (i.e. to the east) of the Site. As such, the risk of exposure via this pathway is considered to be low.
	Inhalation/Dust migration and deposition	Future site users	Low From available Site-specific information made ground will be present within the Site associated with the construction of the existing pylon/infrastructure and the past commercial/industrial use of the Site. The Site is understood to be surfaced in a combination of hardstanding and gravel/hardcore within an assumed centrally managed area which is considered likely to provide a physical separation between Site users and contaminated soils. The presence of Made Ground may pose a moderate to high risk should shallow soils be exposed; however, it is understood that no breaking of ground is proposed and following reconductoring works the Site will be restored to its prior condition. As such, following completion of the proposed works a low risk is anticipated.
		Construction Workers	Moderate Shallow groundworks are not anticipated, however, should any be undertaken, they may expose construction workers to impacted soils. Appropriate health and safety measures should be implemented as required.
		Off-site users	Low From available Site-specific information made ground will be present within the Site associated with the construction of the existing pylon/infrastructure and the past commercial/industrial use of the Site. The presence of Made Ground may pose a moderate to high risk should shallow soils be exposed; however, it is understood that no breaking of ground is proposed and following reconductoring works the Site will be restored to its prior condition. As such, following completion of the proposed works a low risk is anticipated.
Controlled Waters Risk			



Made Ground NAPL Groundwater (on-site)	Leaching to groundwater Migration in groundwater	Localised groundwater in the artificial made ground and superficial deposits	Low following remedial actions Site 43 is identified as being underlain by a Secondary A aquifer, which consists of permeable layers capable of supporting local water supplies. Although no groundwater body is mapped directly beneath Site 43, the presence of low permeability clay is also expected to limit vertical migration to underlying mapped aquifers. AtkinsRéalis reporting sets out a correlation between DNAPL presence and dissolved phase hydrocarbon contamination within shallow groundwater which potentially poses a risk to controlled waters. It is also understood that Phase 1 remedial works have been set out by AtkinsRéalis in current reporting and Phase 2 remedial works are proposed in due course to address potentially unacceptable risks to controlled waters receptors. The risk to groundwater is considered to be high, however, following implementation of regular approved remediation works the risk is likely to be low.
	Overland flow	Pymmes Brook (5 m east) River Lea Navigation Canal (225 m east)	Low Presence of hardstanding across the west and centre of the Site will act to limit infiltration. Therefore, the lack of exposed soil or permeable surfaces will likely the interaction between precipitation and subsurface strata, which is indicted to comprise generally cohesive soils. The presence of a vegetated strip between the Site and Pymmes Brook may act to limit overland flow reaching the surface water. However, given the close proximity to the Pymmes Brook, appropriate surface water management may be required during the proposed works.
Historical industrial activity (off-site)	Leaching to groundwater Migration in groundwater	Localised groundwater in the artificial made ground and superficial deposits	Moderate Historic BGS borehole records to the north and northeast of the Site note hydrocarbon odours throughout made ground and underlying natural soils. As such potential exists for contaminated soils to impact any shallow groundwater present. No groundwater body is mapped directly beneath Site 43 and the surrounding area, and the presence of low permeability clay is expected to limit migration. The Site is conjectured to be situated down hydraulic gradient from the historic BGS boreholes and as such potential exists for contaminant migration within shallow groundwater. Hydrocarbon contaminated soils and NAPL sources were identified within Site 43 and the surrounding area by previous site investigations. Arthian assumes that the remediation works proposed by AtkinsRéalis with regards to the Tottenham Bus Station Site (of which Site 43 is a part of) will. The risk to controlled waters from this off-Site source is considered to be moderate.



Property Risk			
Made Ground NAPL (on-site)	Direct contact with aggressive ground conditions	Property (On-Site)	Low Aggressive ground conditions could pose a risk to the integrity of Site 43; however, it is understood that proposal only include for the reconductoring works with no new below ground structures proposed. It is assumed that all existing infrastructure has been designed to consider known ground conditions. The potential for impact via this pathway is currently considered low.
	Gas/Vapour Migration and Accumulation		
	Dust Migration and Deposition		
Historical industrial activity (off-site)	Gas/Vapour Migration and Accumulation	Property (On-Site)	Low Potential sources of soil gas may be present associated with the historical industrial activity to the north and west of the Site, which are conjectured to lie up-hydraulic gradient from the Site. As such the potential exists for the potential migration of ground gases/vapours. No enclosed spaces are located within the Site or proposed as part of the reconductoring works. Therefore, exposure to on-site properties via this pathway is considered low.
	Dust Migration and Deposition		Low Contaminants within the dust producing zone have the potential to disperse surrounding off site properties. Dust generation off-Site is anticipated to be limited, however, the potential for contaminants to be present in the dust producing zone (within the upper 0.10 m) is considered low. Therefore, risks from exposure via this pathway is considered low.

5.3 Assumptions, Limitations and Noted Omissions

5.3.1 The following assumptions have been made in the preparation of this Technical Note:

- The development is as described within the DCO, and this Technical Note applies to that which is occurring within the boundary presented in Figure 1.
- The site which is the subject of this Technical Note will be restored to its previous condition and returned to its former use following the completion of the development works.
- The terms ‘contamination’ and ‘significant’ as used within the DCO are assumed to be as defined by Part 2A of the Environmental Protection Act 1990 (Part 2A) and the accompanying Statutory Guidance (SG)²⁰.
- Arthian has assumed that Site 43 (as part of the wider Site area considered by AtkinsRéalis) will be remediated to a standard deemed acceptable by the regulator.

5.3.2 The following limitations are noted in the preparation of this Technical Note:

- This Technical Note is not considered to represent a Tier 1 Preliminary Risk Assessment (PRA) as defined by the EA LCRM guidance; however, it is considered proportionate in scope when considered in the context of the development. It is also noted that should potential risks be identified then a recommendation for further works will be made where appropriate.

²⁰ Department for Environment Food & Rural Affairs, Environmental Protection Act 1990: Part 2A, Contaminated Land Statutory Guidance, April 2012.



- The impact of climate change with regards to contaminated land has not been assessed within this Technical Note as this is not considered proportionate in scope when considered in the context of the development.

5.3.3 The following noted omissions are made as these are considered to be out with the current scope of works as required by Assystem:

- There has been no consultation with local authority or other regulatory body to determine whether they hold information of relevance to the site.

6. Conclusions and Recommendations

6.1 Conclusions

6.1.1 This Technical Note has concluded the following:

A review of the Site's historical land use indicates that it has been developed since the 1940s when pylon ZBC 43 and associated roadway infrastructure were constructed in the east of the Site and 'works' were also noted within the central and western portions of the Site area. AtkinsRéalis notes that storage tanks were also recorded within the Site area, but that all built features within Site 43 (with exception of pylon ZBC 43) were demolished in August 2024.

Pylon ZBC 43 and the surrounding infrastructure has been located within the Site for some decades which is likely to have resulted in the emplacement of made ground deposits during construction, however, these are assumed to comprise generally inert construction materials such as hardcore and concrete. Previous site investigation data presented in the AtkinsRéalis reporting provided notes that made ground is present across the areas of Site 43 within their assessment area. Within the wider area made ground was recorded to extend to a maximum depth of 6.0 mbgl with frequent records of visual and olfactory contamination noted.

Based on the above findings, the potential for contamination within shallow soils is considered to be moderate to high. However, excavations as part of the reconductoring works at Site 43 are not anticipated and following completion of the works the Site will be restored to its prior condition, i.e. areas surfaced by hardstanding/hardcore within secure and centrally managed areas. As such, there is a low likelihood of current or end users coming into contact with the soils given the nature of the Site and proposed works. It is recommended that appropriate health and safety measures be implemented as required during the works.

Historic BGS borehole records to the north of the Site, conjectured to be located up-hydraulic gradient of the Site within the vicinity of the Leaside Road Gasholder, record observations of hydrocarbon contamination within made ground and underlying natural soils. As such these hydrocarbons impacted soils are considered a potential off-Site source which may impact controlled waters.

Site investigation data from AtkinsRéalis records the presence of hydrocarbon impacted soils, DNAPL, LNAPL and dissolved phase hydrocarbon contamination within the shallow groundwater beneath the Site and immediately surrounding area. This reporting identified unacceptable risks to controlled waters receptors and notes that Phase 1 remediation works in line with the prepared Remediation Strategy (not provided to Arthian) will involve the excavation and removal of soils to a depth of 1.70 mbgl which will remove/chase out any DNAPL identified up to 1.70 mbgl and beyond where its presence remains. Furthermore, a number of exploratory locations are to be considered further in a Phase 2 Remediation Options Appraisal (ROA). Arthian assumes that following completion of these Phase 1 and 2 remedial works that no unacceptable risks to controlled waters will remain within the Site area.



As proposals do not include for a change to the current Site condition, it is considered that further characterisation of the shallow groundwater within the Site to assess for potential impact from an off-Site source may not be proportionate in the context of the DCO works proposed.

Given these factors, the potential for contaminated land from on-Site sources to pose a risk to human health and property (on-site) is assessed to be low. Risks posed to controlled waters are considered to be high, however, following implementation and regulatory approval of the remedial works proposed by AtkinsRéalis this risk is assumed to reduce. Risks to property (off-site) is assessed to be negligible. Risks to construction workers from contaminated land is assessed to be moderate to high should ground be broken, however, Arthian understands that proposals do not include for the breaking of ground as part of the reconductoring works.

Significant on-Site pollutant linkages have been identified with regards to controlled waters receptors, however, Arthian understands that these are to be addressed by remedial actions as set out within AtkinsRéalis reporting. Post construction and post-remediation, the Site is not considered to present a constraint to development from a contaminated land perspective at this stage.

Potential off-Site sources have been identified which may impact controlled waters, however, characterisation of the shallow groundwater beneath the Site may not be proportionate in the context of the DCO works proposed and as such no works to investigate this risk are recommended at this time.

6.2 Recommendations

6.2.1 The following recommendations are made:

- This technical note should be submitted to the Local Planning Authority (LPA) for review. This gives the opportunity to the LPA to provide comment to accept or reject the conclusions of this report prior to undertaking further works.
- Other constraints may be present onsite which require consideration such as ecology, archaeology, UXO, and flooding. These constraints may or may not be conditioned as part of the DCO, but it should be noted that certain constraints are likely to still apply (e.g. ecology) irrespective of planning conditions due to legal obligations.
- Review of the UXO risk map indicates that Site 43 lies within a moderate bombing risk area, with a strategic bombing target and a UXO find located within 1 km of the Site. Proposed works do not include for the breaking of ground as the track matting is to be placed on existing hardstanding and the reconductoring works themselves are above ground. As such the risk posed by UXO is considered to be low. However, should any work be undertaken that involves the breaking of ground, appropriate UXO Risk Assessments are recommended to further evaluate potential UXO risks at the Site prior to works commencing.
- The potential for waste to be generated during development activities has not been considered within this technical note. If material is generated during the course of construction that is intended to be removed from site discarded, then an appropriate assessment of waste should be considered.
- Should there be a material change to the proposed construction, the risks identified within this technical note should be reconsidered to ensure the conclusions remain suitable and that risks remain equivalent to those considered previously.
- Should further information regarding Site 43 become known, including the discovery of unexpected ground conditions indicative of unexpected contamination, then a review of the information contained herein, and further assessment may be required.



- The Outline CSM and risk assessment presented herein has identified a potential low risk that contamination from on-Site sources posing a risk to identified receptors is likely to be present. Therefore, further work to investigate this risk has been ruled out.
- Potential off-Site sources have been identified which may impact controlled waters, however, characterisation of the shallow groundwater beneath the Site may not be proportionate in the context of the DCO works proposed and as such no works to investigate this risk are recommended at this time.



Appendix A Work Plans



Appendix B

Legislative Context



Condition 11 of the DCO specifies the following:

Contaminated land and groundwater

- (1) No stage of the authorised development shall commence until a written scheme applicable to that stage, to deal with the contamination of any land, including groundwater, within the Order limits which is likely to cause significant harm to persons or pollution of controlled waters or the environment has, after consultation with the Environment Agency, been submitted to and approved by the relevant planning authority.
- (2) Each scheme submitted under requirement 11(1) shall include an investigation and assessment plan and relevant reports, prepared by a specialist consultant approved by the relevant planning authority in consultation with the Environment Agency, to identify the extent of any contamination and the remedial measures to be taken to render the land fit for its intended purpose, together with a management plan which sets out immediate and long-term remedial measures with respect to any contaminants found to be remaining on the site. The plan shall include a scheme of post-remedial monitoring, as necessary to demonstrate that the remediation works have been carried out appropriately and site remediation criteria have been met.
- (3) Remedial measures must be carried out in general accordance with the scheme approved in accordance with requirement 11(1) unless otherwise agreed with the relevant planning authority. Where provided for in the scheme, post-remedial monitoring must be carried out to demonstrate that the remediation works have been carried out appropriately and the site remediation criteria have been met.

The National Planning Policy Framework²¹ (NPPF) notes that it does not contain specific policies for NSIPs which are determined in accordance with the decision-making framework presented in the Planning Act 2008. However, it is noted that the decision-making framework may include ‘other matters that are relevant’ such as the NPPF. Arthian therefore considers the approach outlined within the NPPF for considering the effects of land contamination to be relevant herein. This is outlined in paragraph 196 of the NPPF as follows:

Ground conditions and pollution 196.

‘Planning policies and decisions should ensure that:

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

²¹ Ministry of Housing, Communities & Local Government, National Planning Policy Framework, December 2024.



Appendix C

Historical Map Extracts

