EMR NON-FERROUS YARD, UNIT 7, TRANSPORT AVENUE, BRENTFORD TW8 9HF

Phase I Desk Study Report

Report Reference: R-129-818-001

July 2021

Report for:

Report & Version Control

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Revision	Type	Section Changed	Comment
NA			

CONTENTS

EXECUTIVE SUMMARY

Section	Summary Comments (only)
Site Location	EMR Non-Ferrous Depot, Transport Avenue, Brentford. TW8 9HF
Purpose & Scope	Mayer Environmental Ltd (MEL) was commissioned by EMR to conduct a Phase I Desk Study. The Phase I Desk Study is required to assist with the Site Condition Report to produce a Preliminary Risk Assessment (PRA) for the site based upon a Conceptual Site Model (CSM) derived from a review of available information.
Site Description	The site is located on Transport Avenue, adjacent to the Grand Union Canal. The depot is circa 1ha in size.
Historical Summary	The site has a relatively simple history of industrial land use. This has included proximity to the railway and rail sidings, use as a coal depot, and according to some sources, landfilling.
Geo-Environmental Setting	
Geology:	Alluvium may partially underlie the site on the north boundary area, otherwise the site is underlain by the London Clay (solid),
Hydrogeology:	Alluvium is classified as a secondary A aquifer and the London Clay a non aquifer. The subject site is not located within a source protection zone (SPZ).
Hydrology	The Grand Union Canal to the north may be clay lined. There is risk of flooding from rivers (1:30 yr event) and rising groundwater. No records of flooding though.
Environmental Sensitive Areas	The GroundSure report indicates One Designated Environmentally Sensitive Site (DESS) - Syon Park located 1.7km NE.
Conceptual Site Model	An outline Conceptual Site Model (CSM) has been developed based on the relevant findings of this Phase I assessment. The following assessment of the Relevant Pollutant Linkages has been produced: • Potential **Low to Moderate** risks to human health (site users / groundworkers) from direct dermal contact, ingestion and inhalation of the on-site soils due to the presence of concrete across the site. • Potential **Low to Moderate** risks to groundwater along with buried infrastructure from vertical / lateral migration of potential contaminants in the shallow soils. The hardstanding and impermeable London Clay will reduce mobilisation of potential contaminants within groundwater. These risks would be similar to those of neighbouring sites. • Potential **Low to Moderate** risks to human health and **Low** risk to controlled water from off site historical and current activities. Records and maps of historical and current data have identified a number of potentially contaminative features and activities on or nearby the subject site. The variability and age of these past and present activities result in the likeliness of ground contamination as being Low to Moderate.
Recommendations	A ground investigation is considered pertinent to further inform any potential contaminants present for baseline conditions on permitting.
The Executive Summary is based on the information presented in the full report and does not form a full assessment of the available data. This summary is to be read in conjunction with the full report.	

1 INTRODUCTIONBackground

Mayer Environmental Ltd (MEL) was commissioned by European Metal Recycling Ltd (EMR) to conduct a Phase I Desk Study Report their non-ferrous depot located at Transport Avenue, Brentford, TW8 9HF.

We understand that that the Phase I Desk Study is required as part of the Site Condition Report for a new permit application (the depot previously operated under exemptions).

1.2 Purpose & Scope

The purpose of the work is to research information on the site's current and previous uses and identify potential contamination sources.

The Phase I Desk Study Report is based on requirements as set out within the Land Contamination: Risk Management (LCRM) guidance and includes:

- A site reconnaissance visit.
- A review of readily available information and an environmental data search, with:
  - The Site Environmental settings (geology, hydrogeology, hydrology, sensitive environmental land designations, environmental permits, incidents and registers).
  - Current and historic land uses on and surrounding the site, including potential contaminants associated with those uses.
- An outline Conceptual Site Model (CSM), using the information gathered and interpreted, formulated to assess potential pollutant linkages that may exist on site.
- A qualitative risk assessment of any potentially unacceptable risks arising from the identified pollution linkages to human health, controlled waters and the wider environment.

1.3 Information Sources

A Groundsure environmental data search has been obtained in the preparation of this report (Appendix B). The Groundsure Group reference information from sources including the Environment Agency, local authorities, Public Health England, The Coal Authority and the British Geological Society (BGS). MEL undertook a site walkover survey on 12th May 2021.

The following reports have been previously undertaken on the site, by Mayer for EMR:

- Environmental Summary Review, T Holloway & Sons (Metals) Ltd, Transport Avenue, Brentford, TW8 9HF, May 2008 (no doc ref).
- Phase 1 Desk Study Report, EMR Non-Ferrous Yard, Unit 7, Transport Avenue, Brentford, TW8 9HF, ref 72053, Extension Site, August 2011.

2 SITE DESCRIPTION Site Location

The site is located on Transport Avenue, adjacent to the Grand Union Canal. The location of the site and the approximate outline of the site area are provided in Appendix A.

2.2 Site Walkover

A site visit was undertaken during sunny weather on 12th May 2020 to view general site conditions and geo-environmental factors relevant to this report. The following table provides a summary of the conditions and observations from the visit, please refer to Appendix A for the Site Plan and photographs from the site visit.

TABLE 2.1 SUMMARY SITE CONDITIONS

Feature	Brief Description	
National Grid Reference	516446 178239	
Site Area	1.02ha (as recorded in the Groundsure Report)	
Geometry	Irregular in shape.	
Topography	The site is almost completely flat at the same elevation.	
Access	The site is accessible on the southern boundary from Transport Avenue.	
Land Use	The site comprises of an operational Non-Ferrous metal recycling facility. A large warehouse covers over half of the site's footprint which houses the office and welfare facilities as well as storage for non-ferrous metals. A shear is located in the north-east corner and a baler in the west of the site. An undercover storage area adjacent to the west of the warehouse is used for battery storage. The entire site surface is covered by concrete. A high fence borders the site on the north creating a barrier between the Grand union Canal and adjacent towpath and the subject site	
Site Boundary	North	Grand Union Canal Walk.
	East	Industrial Units, labelled Space Station Chiswick,
	South	Day Aggregates
	West	Trees and vegetation to the Grand Union Canal Walk

2.3 Unexploded Ordnance (UXO) Assessment

A preliminary UXO search of freely available information has been undertaken. A UXO risk map available on the ZeticaUXO website has deemed the site and surrounding area as a low WWII UXO risk, refer to Appendix B. .

UXO RISK LEVEL
LOW

2.4 Review of Previous Reports

2.4.1 Environmental Summary Review, T Holloway & Sons (Metals) Ltd, May 2008

The report provides an overview of likely geo-environmental conditions and potential liabilities for the purchase of the site and the business T Holloway & Sons (THS).

In summary, the report concluded the site may be contaminated and recommended a ground investigation to confirm the below ground site conditions.

2.4.2 Desk Study Report, EMR Non-Ferrous Yard, Unit 7, Extension Site, August 2011, ref 72053

The report reviewed geo-environmental conditions for a narrow section of land between the operational non-ferrous EMR site on Transport Avenue and the towing path along the River Brent/Union Canal tow path. The extension site is roughly rectangular in shape and is approximately 0.12 hectares in area. EMR planned to extend the operational site onto this additional section of land for the storing of scrap metals.

In summary, the report concluded that due to the long Industrial use and railway line surrounding the site, as well as the scrap yard adjacent to the southern boundary; a ground investigation was recommended to confirm ground conditions, the presence or absence of fill materials and examine the extent of a canal wall for site boundary development. Consultation with the neighbours British Waterways, now the Canal & River Trust, was also suggested.

3 ENVIRONMENTAL SETTING

This section summarises information from the GroundSure report and associated summary maps, for further details please refer to Appendix B.

3.1 Geological Setting

3.1.1 Geology

Geological records (British Geological Survey Sheet TQ17NE 1:10,000) indicate that the site is on the boundary of Alluvium (superficial deposits) with the London Clay (rockhead). It is likely the site is underlain by the London Clay only though thin Alluvium maybe present on the north area of the site, bounding with the River Brent.

Boreholes are indicated to have been undertaken over 125m south of the site, in circa 1974. General borehole details pertinent to the site, indicate clays with some clay bound gravels and some water strikes at 0.5m though typically between 4m bgl and 6m bgl; however for the EMR depot with the River Brent circa 15m to the north the groundwater may be found at shallow depth.

3.1.2 Estimated Background Soil Chemistry

There is no data available for on-site estimated background soil chemistry.

3.2 Geo-Hazards

3.2.1 Ground Stability

The following table summarises the ground hazards within a 50m buffer of the subject site. The table has been generated from information found in the Geo Insight report produced by Groundsure.

TABLE 3.1 GROUND HAZARDS

Hazard	Risk
Shrink Swell	Moderate
Landslides	Very Low
Soluble Rock	Negligible
Compressible Ground	Negligible
Collapsible Rocks	Low
Running Sand	Very Low

3.2.2 Ground Dissolution Hazards

Whilst not a geotechnical assessment there is a negligible potential risk from dissolution.

3.2.3 Mining & Quarrying

From information provided by the Coal Authority, the GroundSure report indicates the subject site is located in an area that is not affected by coal or non-coal mining activities. The search was undertaken to a distance of 1000m from the site boundary.

3.2.4 Natural Cavities

The Geo Insight Report produced by Groundsure indicates no presence of natural cavities within 1000m of the site.

3.2.5 Radon Gas

The GroundSure report indicates that the property is not in a Radon Affected Area, as less than 1% of homes are estimated to be above the Action Level. Therefore, radon protective measures are not considered necessary.

3.3 Hydrogeology

The alluvium has been classified as a Secondary A aquifer. These aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. Information within the Enviro Insight report produced by GroundSure indicates that the soils underlying the site can be classified as a minor aquifer with a high leaching potential. This classification is taken from soil information for urban areas and an assumption is made that they are highly permeable, and can possibly transmit a wide range of pollutants, in the absence of site specific information.

The underlying London Clay, bedrock, has been classified as Unproductive Strata. These are rock layers with low permeability that have negligible significance for water supply or river base flow.

The site is not located in a source protection zone (SPZ).

3.3.1 Licensed Abstraction Points from Groundwater

The Enviro Insight report produced by GroundSure indicates there are no licensed abstraction points from groundwater within a 1000m radius of the subject site. There are two horticultural abstractions located circa 1.8km north of the site.

3.3.2 Hydrogeological Risk Assessment

In the assessment of groundwater vulnerability, a number of factors need to be taken into account. These include geology, hydrogeology and soil type.

In summary, the subject site in underlain by an unproductive aquifer that is composed of the London Clay Formation, the clay bed rock has low permeability. On the boundary of the site the superficial Alluvium is a secondary A aquifer, making it highly vulnerable to leaching (underlain by the London Clay Formation). The Secondary A Aquifer appears to be of low sensitivity with no SPZ's or licensed abstraction points from the groundwater noted within 1000m of the site.

RISK RATING	
Groundwater Vulnerability	***LOW***

The risk rating is based on the site sensitivity assessment for the water environment as set out in Annex 2 of R&D 66 (NHBC). A summary of this assessment is included in Appendix D.

3.3.3 Discharge Consents to Land

Using a 500m search radius the GroundSure report identified no discharge consents to land.

3.4 Hydrology

3.4.1 Surface Water Features

Information provided from the GroundSure report and Ordnance Survey MasterMap Water Network (OS Water Network) indicates that adjacent to the north of the site is the Grand Union Canal, situated at ground level. The River Brent separates from the Grand Union Canal just north of the site and the River flow presumably to the east / north-east of the site, the River Brent is not tidally influenced and is apparently narrower than 5 m in width.

The River Brent has a 'good' Chemical Rating and 'moderate' Ecological Rating with the overall rating 'moderate', circa 17m north of the site, dated 2016. There is no record of the Grand Union Canal, adjacent to the northern boundary of the site, having a rating.

3.4.2 Flooding

Assessing Environmental Agency RoFRaS database the risk of river flooding is considered High, with a risk of 1 in 30 year event of flooding between 0.3m to 1m. The site is not located within an area of extreme flooding from rivers. There is moderate-high risk for flooding from rising groundwater according to the GroundSure Report.

3.4.3 Discharge Consents to Surface Water

The GroundSure report indicates no surface water discharge consents within a 500m search radius of the subject site.

3.4.4 Licensed Abstraction Points from Surface Water

The GroundSure report identified no active surface water abstraction licenses within a 2000m search radius of the subject site.

3.4.5 Surface Water Risk Assessment

The Grand Union Canal and River Brent separate adjacent / in the vicinity of the north boundary of the site, with the tow path immediately beside the site. Although the River Brent and groundwater are at risk of flooding the site, the Grand Union Canal has Clitheroe's Lock circa 200m south east of the site which will control the flow and is very likely to be lined in this locality, so protecting it. There appears to be no record of flooding on the site, this may be due to levels that may have been raised (although records are not entirely clear) on balance the surface water risk is considered low to medium.

RISK RATING	
Surface Water Vulnerability	***Low to Medium***

Furthermore, the EMR Non Ferrous Depot is located within the Transport Avenue Industrial Estate where there are a number of potential risks to surface waters lowering the sensitivity and quality of these controlled waters. The risk rating is based on site sensitivity assessment for the water environment as set out in Annex 2 of R&D 66 (NHBC). A summary of this assessment is included in Appendix D.

3.5 Environmentally Sensitive Areas

3.5.1 Designated Environmentally Sensitive Sites

The Enviro Insight report produced by GroundSure, using Natural England data, has identified one Designated Environmentally Sensitive Site (DESS) within a 2000m search radius of the subject site. The named site is Syon Park located 1.7km to the north east.

3.5.2 Nitrate Vulnerable Zones

The Enviro Insight report produced by GroundSure, using DEFRA data, indicates that the subject site is not located in a Nitrate Vulnerable Zone.

4 INDUSTRIAL SETTING

4.1 Historical Land Use

The information provided in this section of the report has been summarised from the previous Mayer Environmental Summary Review, 2008, including Section5 which summarised the history well; for further details please refer to Appendix C including the historical maps provided by GroundSure.

Please note that due to the gaps between publication dates, potentially contaminative developments may have appeared and disappeared without appearing on any map edition. All dates provided refer to the map edition where the activity was illustrated. All distances are approximate and are to the closest point of that feature.

4.1.1 Site History

In summary, site historical information is contradictory. Some sources suggest the site has been land filled other sources suggest this occurred further to the south. However, there is little on the site plans to suggest the area experienced quarrying to produce a void for backfill (geology suggests little significant sands or gravels present) and on site observations did not suggest a significant land raise had taken place.

Regarding the indications of infilling / landfill, it is pertinent to note the EMR Ferrous Brentford depot, circa 50m to the south, is located upon a significantly higher area of land than the Days Aggregate site and sites to the north (refer to section 4.3). This would also suggest that if land filling had occurred is was away from the site, and actually lies south of the EMR Ferrous Brentford depot and local area.

The site has a relatively simple history of industrial land use. This has included proximity to the railway and rail sidings, use as a coal depot, and according to some sources, landfilling.

The earliest mapping from the 1850s indicates the site to be open farm land with the canal, Gallows Bridge and no rail line. It is not until 1934-35 that the sidings are marked on to the area of the site and an area of reeds/ marshy land is indicated to the north. The map issues from the war years show the site's use is removed as is common during this period. The strategic nature of coal importation would also suggest this is why it was left unmarked. Nearby factories include rubber, boat and biscuit manufacture.

The 1949 map issues tally with aerial photographs showing that the area of Transport Avenue as railway sidings and what appears to be a coal depot. Along Transport Avenue the concrete loading hoppers are still in place today.

Up to 1966 the coal yard and an area of scrub land is marked. The 1988 map edition displays the site in its current format, with the large warehouse at the centre. The M4 motorway was built over this period.

There is no significant change reported until 2008 and since. During this time up to 2008 the site was taken over and occupied by T Holloway & Sons (who EMR brought the site off).

There is little in the site's history to suggest that significant ground contamination will have occurred. However, the use of the site as a scrap metals yard since 1994 and the potential for the site to have been in filled, suggest that ground contamination may be present on site.

There is no historical site investigation information for the site.

The following table details the most significant historical activities and land use changes on site, within 250m and between 250m and 500m of the site boundary.

4.1.2 Potentially Contaminative Historical Land Uses

The GroundSure report indicates the presence of approximately 28 potentially contaminative past land uses located within 250m of the site. The potentially contaminative land uses are summarised in the following table.

TABLE 4.1 POTENTIALLY CONTAMINATIVE HISTORICAL LAND USES

Distance (m)	Direction	Use	Dates
0	On site	Unspecified Warehouse	1974 - 1987
30	SW	Coal Yard	1966
54 - 67	SW	Railway Sidings	1966 – 1974, 1987
200	S	Railway Buildings	
80 - 111	SW	Railway Sidings/Buildings	1961, 1974
120	NE	Unspecified Heap	1938, 1961 - 1966
202	S	Folding Boats Factory	1938-1948
202-210	SW	Factory/unspecified commercial use	1938 - 1948 1961 - 1974
250	S	Unspecified Factory	1961 - 1966

4.1.2.1 Historical Tank Database

The Enviro Insight report produced by GroundSure, using a 250m search radius, indicates that five unspecified tanks were located 100 – 154 m south of site between the dates of 1967-1990.

4.1.2.2 Historical Energy Features and Motor Vehicle Repairs Database

The GroundSure report indicates 7 historical energy features located within 250m of the site. The features are electricity substations. These are detailed in the following table.

TABLE 4.2 ELECTRICITY SUBSTATIONS WITHIN 250M

Distance (m)	Direction	Use	Dates
On Site	mid-east boundary	Electricity Substation	1982 - 1990
10	SW	Electricity Substation	1982 - 1990
20	SW	Electricity Substation	1982 - 1990
65	S	Electricity Substation	1982
66	S	Electricity Substation	1990
131	S	Electricity Substation	1990
132	S	Electricity Substation	1982

Distance (m)	Direction	Use	Dates
242	SE	Electricity Substation	1983 - 1994

4.1.2.3 Historical Petrol and Fuel Site Database

The Enviro Insight Report produced by GroundSure indicates no records of historical fuel sites located within a 250m boundary of the site.

4.1.2.4 Potentially Infilled Land

The GroundSure report indicates one record of potentially infilled land within 250m of the site; it is recorded as a pond 106 m east in 1865 mapping.

4.2 Current Industrial Land Uses

A large number of potentially contaminative current land uses are identified within a 250m radius of the subject site. The following table summarises the current land uses within a 250m search radius of the subject site. The table has been generated from information provided in the Enviro Insight report produced by Groundsure. Please refer to the GroundSure report in Appendix B for a more detailed current land use summary with a 250m search boundary from the site.

TABLE 4.3 CURRENT LAND USES

Distance (m)	Direction	Activity	Category
On Site	-	Container and storage (EMR Depot)	Transport, Storage and Delivery
16	SE	Container and storage	Transport, Storage and Delivery
20	SE	Container and storage	Transport, Storage and Delivery
28	SW	Unspecified Works or Factories	Industrial Features
29	SW	Hoppers and Silos	Farming
41	SW	Concrete Products	Industrial Products
64	SW	Conveyors	Industrial Features
75	SW	Electrical Features	Infrastructure and Facilities
99	S	Tanks	Industrial Features
100	SE	Vehicle Components	Industrial products
104	SW	Scrap Metal Merchants	Recycling Services

Distance (m)	Direction	Activity	Category
133	NE	Telecommunications	Infrastructure and Facilities
140	S	Electrical Features	Infrastructure and Facilities
160	S	Tanks	Industrial Features
180	SE	Container and storage	Transport, Storage and Delivery
203	SE	Vehicle Repair, Testing and Servicing	Repair and Servicing
246	SW	Electrical Features	Infrastructure and Facilities

4.2.1 Petrol and Fuel Station

The Enviro Insight Report produced by GroundSure indicates there are no records of petrol or fuel stations located within a 250m boundary of the site.

4.2.2 National Grid Utilities

The GroundSure report indicates that no national grid high voltage underground electricity transmission cables or high-pressure gas transmission pipelines are present within 200m of the site.

4.3 Waste Sites

The GroundSure report has identified two waste exemptions on the site, both reference EPR/SE575YN/AOO1 for the recovery of scrap metal as a treatment of waste exemption and storing in a secure place waste exemption material. No current waste exemption is recorded within 100m of the site.

Licensed waste sites most pertinent to the site comprise the Day Group Aggregate Depot circa 60m south of the site for aggregate recycling; which also has a mobile plant treatment with Environmental Permitting and Waste Management Licence(s) circa 110m south east of the site.

Also, the EMR Ferrous Depot circa 70m south west of the site for metal recycling has Environmental Permitting and Waste Management Licence(s) issued in 1998 and modified 2009 (recorded under the name Mayer Parry).

Suez Recycling & Recovery, circa 180m south of the site have a Waste Management Licence for their Transfer Station

Otherwise, licensed waste sites are over 400m from the site and unlikely to have a significant affect the site, given the proximity of the other facilities and no record of any pollution incidents.

4.3.1 Landfill Sites

The GroundSure report, using Environment Agency/ Natural Resources Wales data, did not identify any active or recent landfills within 1000m of the subject site.

4.3.2 Historical Waste / Landfill Sites

The GroundSure report indicates a historical waste sites on the site, which as explained in the historical summary maybe an error in mapping records; in any case it was last recorded in 1938 with commercial / household waste, which at the time was mostly construction and ash and a relatively low risk. Otherwise, there are no historical landfill site recorded within 300m of the subject site.

Historical waste sites include the EMR Ferrous Depot, circa 80m south west of the site with various records of different types of licences from 1981 to 2013.

Other historical waste records include Refuse Transfer Station, circa 130m south west of the site from 1983 onwards.

4.4 Historic IPC Authorizations

The GroundSure report indicates no records of historical IPC authorisations within 500m of the subject site.

4.5 List 2 Dangerous Substance Inventory Sites

The GroundSure report indicates no records of sites with authorised list 2 dangerous substances inventory records.

4.6 Part A (1) and Part B Activities and Enforcements

The GroundSure Report records three companies with licensed Part A activities within 500m of the site and a number of part B activities within 500m of the site, but no enforcements recorded. The details have been summarised in the following table.

TABLE 4.4 PART A (2) AND PART B ACTIVITIES AND ENFORCEMENTS

Distance (m)	Direction	Activity	Status	Enforcement
61 &114	SE / S	Day Group Ltd, Transport Ave, Aggregate Recycling	Effective & Superceded	-
204 & 447	SW	BSKYB Ltd, Osterley Campus, Incineration & Combustion Sky, Osterley Campus, Incineration	Effective & Superceded Determination	-
27* & 113	NE* & SE	Day Aggregates, Transport Ave, Bulk Cement (*note 27m NE of the site is in the River Brent)	Historic	-
30 & 108	SW& SE	London Concrete, Transport Ave, Use of Bulk Cement & Quarry Processes	Historic	-
108	SE	Bardon (prev London) Roadstone, Transport Ave, for Roadstone Coating	Historic	-
108	SE	Rmc Brentford Goods Yd, Transport Ave, for Quarry Processes	Historic	-
108	SE	Tarmac Asphalt, Transport Ave, for Roadstone Coating	Historic	-

Distance (m)	Direction	Activity	Status	Enforcement
114	SE	Warwick Wright Motors, Clitheroes Lock, Transport Ave for respraying road vehicles	Historic	-
126	S	Aggregate Industries, Transport Ave, for Quarry Processes	Historic	-
126	S	Cemex, Transport Ave, Use of Bulk Cement	Current	-

4.7 Hazardous Substance Consents

GroundSure reported no records of hazardous substance consents within a 500m search radius of the subject site.

4.8 Registered Radioactive Substances

There are no records of registered radioactive substances licences within 500m of the site.

4.9 Pollution Incidents

The GroundSure report, using Environment Agency data, identifies a number of reported pollution incidents within 500m, most are minor / no impact and previous to 2016. Consequently, these are considered not to impact the current site soil and groundwater conditions. One incident is recorded worth noting, dated June 2018, some three years ago, causing a significant (category 2) water impact of contaminated water from firefighting run-off 145m south of the site.

5 INITIAL CONCEPTUAL SITE MODEL

5.1 Introduction

The risk assessment process is one that develops as more information becomes available to the risk assessor. At this stage, the preliminary risk assessment draws together information gathered during the Phase 1 Desk Study. Potential sources of contamination, exposure pathways and sensitive receptors are identified and placed in to the context of a conceptual site model.

At this stage of the risk assessment, the aim is to:

- Determine possible sources of potential contamination and to identify specific potential contaminants of concern.
- Identify where these potential contaminants may reside – soils, ground or surface waters, ground gases etc.
- Identify possible target receptors and their relative sensitivity to these potential contaminants if exposed.
- Identify and characterise potential contaminant migration pathways to determine whether a possible linkage exists.
- Create a conceptual model for the site displaying the potential sources – pathways – targets identified placing them in to context to demonstrate how the site may present a risk.

The conceptual site model is a dynamic representation of the site, to be refined and developed at each stage of the site investigation process. It is also to be used to direct and inform future investigation by highlighting areas requiring further investigation or eliminating those considered to be of insignificance or acceptable risk.

The conceptual site model contains the three elements, comprising the:

- **source** - probable or actual contaminants, their nature and location;
- **pathway –** means by which the source and the receptor may come in to contact;
- **receptor** – existing and, within reason, foreseeable targets upon which the source may impact. These may be either on or off site.

Where a **source – pathway – receptor** pollutant linkage is envisaged, an estimation of the risk posed by this linkage can be made. Should any one of the three elements be absent, then there is no risk.

The classification for risk of each linkage identified is based on guidance as set out in Annex 4 of R&D 66 (NHBC). A summary of this is included in Appendix E.

5.2 Potential Sources of Contamination

The main potential contamination sources are summarised in the following table, based upon the previous and current land uses outlined in the previous sections.

TABLE 5.1 MAIN POTENTIAL SOURCES OF CONTAMINATION

Potential Source	Associated Contaminants	Probability of risk assessment
ON-SITE		
Current– Non Ferrous Scrap Yard	Metals, acids & alkalis, asbestos in soils, polyaromatic hydrocarbons (PAHs), petroleum hydrocarbons, polychlorinated biphenyls (PCBs).	**Moderate to High**
Historic– Electricity substation, indicated in 1982 & 1990 on mid-east boundary	As well as the above, polychlorinated biphenyls (PCBs).	**Moderate to High** – due to age of feature.
Historic– railway and rail sidings, use as a coal depot	As well as the above, polychlorinated biphenyls (PCBs).	**Moderate to Low** – due to age of feature.
OFF-SITE		
Current– Industrial Uses around site – concrete production, aggregate / quarry processes involved with these and associated waste transfer, reference to tarmac / asphalt	Metals, asbestos in soils, petroleum hydrocarbons, PAHs, solvents,	**Moderate to High** – all around site and long use as part of Transport Avenue Industrial Estate within 500m of site.
Current – Ferrous Scrap Metal Yard circa 104m SW of the site	Metals, acids & alkalis, asbestos in soils, polyaromatic hydrocarbons (PAHs), petroleum hydrocarbons,	**Moderate –** Due to proximity of features.
Historic– Electricity substations, indicated in 1982 & 1990, 10m to 104m S & SW of site	As well as the above, polychlorinated biphenyls (PCBs).	**Moderate to High** – due to age of feature.
Historic – Vehicle respraying 114m SE	Hydrocarbons, solvents	**Low** - Due to distance from site and age of feature
Historical - Industrial Uses, including coal yard / shed, railway sidings, rubber tyre factory, engineering works, biscuit factory.	Metals, asbestos, PAHs, solvents, Petroleum hydrocarbons, PCBs	**Low** - Due to ages of features / distances. Comprises surrounding area within 500m of the site
Historical – In-filled Land	Liquors from waste materials & ground gas migration	**Low** - Due to type of materials (not recorded as industrial / chemical) age, last recorded in 1938, some 83 years ago. At the time these materials for landfill did not generate large

		amounts of ground gas and any putrescible material will have long degraded.
Historical – Pollution Incidents around site	Chemical odour – minor air pollution June 2018, significant (category 2) water impact of contaminated water from firefighting run-off 145m south of the site	**Low –** due to age and distance pollutant

5.3 Potential Exposure Pathways

TABLE 5.2 POTENTIAL EXPOSURE PATHWAYS

Exposure Pathway	Qualifying Comments
Direct contact - Contact with exposed skin or eyes with soil, dusts (in or outdoors) or water (in or out doors).	Direct contact to skin and eyes is not considered to be a significant potential pathway as the site surface is covered by concrete.
Ingestion - Consumption of soils, dust (in or outdoors) water (in or outdoors)	Ingestion is not considered to be a significant potential pathway as the site surface is covered by concrete.
Inhalation - Inhalation of soil dust, fibres or vapours, gases (in and outdoors)	Inhalation is not considered to be a significant potential pathway as the site surface is covered by concrete.
Soil leaching - Water soluble contaminants leaching through soil to impact on ground and surface waters and potentially contacting human receptors (lateral/ vertical migration via the saturated/unsaturated zone)	Soil Leaching and migration to ground or surface water is considered a potential pathway due to infiltration of contaminants through the soil and into the underlying geology. Soil leaching and migration from historical or current off site contaminative sources is likely. The site overlies soils with high leaching potential, permeable superficial deposits and a clay bed rock with low permeability. However, the site surface is covered by concrete and soil leaching from the site is likely to be kept to a minimum.
Structures/Services - Degradation caused by aggressive soil or water based contaminants, migration of ground gases along service runs.	Degradation of structures and services is considered possible as there is potential for contaminants to mobilise through the permeable superficial deposits.

5.4 Potential Receptors

TABLE 5.3 POTENTIAL RECEPTORS

Receptor	Qualifying Comments
Site users – current and future	Risk considered low as majority of the site covered by hardstanding.
Ground workers	During any development of the site, the risk would be considered moderate as the soil would be exposed and construction H&S Practices employed, e.g. CDM.
Site neighbours – industrial estate	Risk considered moderate for possible migration of contaminants via dust or groundwater.
Controlled waters – Grand Union Canal / River Brent Groundwater – Secondary A aquifer overlying an unproductive aquifer.	Potential risk to Grand Union Canal, though no grading data available for the Canal. Hardstanding across the site is likely to protect the groundwater. The underlying geology is considered to be permeable, leaching and migration of contaminants is possible.
Buried services - water mains, power or other below ground services	Potential risk to existing services in direct contact with soils and leachates.
Local ecological systems	One Designated Environmentally Sensitive Site (DESS) - Syon Park located 1.7km NE. Unlikley to be affected by the site within the Transport Avenue Industrial Estate.

5.5 Initial Conceptual Site Model

The following table details the potential sources, pathways and receptors present and determines if a contaminant linkage is potentially present. Only sources with a probability of risk assessment of low-moderate, moderate – high or high have been included within the conceptual site model (refer to Table 6.1 for probability of risk assessment). Note that the Conceptual Site Model is based on the site's current use with the concrete in place across the site. Should this change, or concrete be removed, the conceptual site model and associated risks would need to be reassessed.

TABLE 5.4 CONCEPTUAL SITE MODEL

Source	Identified Pathways	Receptors	Consequence	Probability	Risk Rating	Comments on Linkage Significance
ON-SITE						
Non-Ferrous Yard Current – Metal recycling yard. Past Electricity Substation 1982 & 1990 mid-east boundary	• Inhalation (vapours, dusts, fibres) • Ingestion (soils) • Direct contact (soils)	• Site users	Medium / Severe	Unlikely	**Moderate / Low**	Potentially moderate to low risk. The linkage to site users / human health are controlled with surface concrete on the Non-Ferrous Yard decreasing the probability of the source reaching receptors, including site users. Should the concrete be removed this may need to be reassessed. Any earth workers working within the ground will have a high risk from potential soil / water contaminants. Also, for the land owner EMR there is the potential contaminative liability with on-site contaminants.
	• Soil leaching	• Groundwater • Site structures • Buried services	Medium / Severe	Low likelihood	**Moderate/ Low**	Potentially moderate to low risk from contaminants leaching & mobilising to groundwater and possibly affecting underground site structures and buried services, due to the Metal recycling yard being covered by a good quality of concrete limiting the infiltration.

	• Soil leaching	• Surface water -Grand Union Canal and River Brent	Medium	Unlikely	**Low**	Potentially low risk of soil leaching to Grand Union Canal, since this is likely to be lined, no grading for the Canal and no reported incidents in the life of the yard (circa 1994). The presence of concrete will limit infiltration through the soils and the tow path the distance between the Yard and canal.
Historical – railway and rail sidings, use as a coal depot	• Soil leaching	• Soils • Groundwater • Site structures • Buried services	Medium	Low likelihood	**Moderate/ Low**	Potential moderate to low risk for historical onsite activities to influence current groundwater underlying the subject site, potentially affecting underground site structures and buried services. The severity of risk to groundwater from historic contaminates is dependent on the location, timescale, ground conditions (hard or soft standing), geology and nature of the activities. But may effect soils - localised hotspots may remain.
	• Soil leaching	• Surface water -Grand Union Canal	Medium	Unlikely	**Low**	Potentially low risk of historical site activities influencing on site groundwater and subsequently affecting surface waters. Reasons detailed above.

Source	Identified Pathways	Receptors	Consequence	Probability	Risk Rating	Comments on Linkage Significance
OFF-SITE						
Current – potentially contaminative site uses within circa 200m of the site (concrete production, aggregate / quarry processes involved with these and associated waste transfer, reference to tarmac / asphalt)	• Soil leaching	• Groundwater • Site structures • Buried services	Medium	Low likelihood	**Moderate to Low**	Potentially low to moderate risk for contaminants off site to leach and mobilised to groundwater on site potentially affecting underground site structures and buried services. The severity of risk to groundwater from off site contaminates is dependent on the location, ground conditions (hard or soft standing), geology and nature of the activities. Neighbouring site appear to mostly have hardstanding
	• Soil leaching	• Surface water - Grand Union Canal	Medium	Low likelihood	**Moderate/ low**	Potentially moderate risk of offsite contaminants influencing on site ground conditions and subsequently affecting surface waters. Reason detailed above.
Current – Ferrous Scrap Metal Yard circa 104m SW of the site	• Soil leaching	• Groundwater • Site structures • Buried services	Medium	Low likelihood	**Moderate/ Low**	Potentially low risk for contaminants off site to leach and mobilise to ground water on site potentially affecting underground site structures and buried services. The severity of risk to groundwater from off site contaminates is dependent on the location, ground conditions (hard or soft standing), geology and nature of the activities.

	• Soil leaching	• Surface water Grand Union Canal	Medium	Unlikely	**Low**	Potentially low risk of offsite contaminants influencing on site ground conditions and subsequently affecting surface waters. Reasons detailed above.
Historical – Electricity substations, indicated in 1982 & 1990, 10m to 104m S & SW of site	• Soil leaching	• Groundwater • Site structures • Buried services	Medium	Low likelihood	**Moderate/ Low**	Potential moderate to low risk for historical activities to influence groundwater underlying the subject site, potentially affecting underground site structures and buried services. The severity of risk to groundwater from historic off site contaminates is dependent on the location, timescale, ground conditions (hard or soft standing), geology and nature of the activities.
	• Soil leaching	• Surface water - Grand Union Canal	Medium	Unlikely	**Low**	Potentially low risk of historical off site activities influencing on site groundwater and subsequently affecting surface waters. Reasons detailed above.

Source	Identified Pathways	Receptors	Consequence	Probability	Risk Rating	Comments on Linkage Significance
Historical – Vehicle respraying 114m SE.	• Soil leaching	• Groundwater • Site structures • Buried services	Medium	Low likelihood	**Moderate/ Low**	Potential low risk for this historical activities to influence groundwater underlying the subject site, potentially affecting underground site structures and buried services. The severity of risk to groundwater from historic off site contaminates is dependent on the location, timescale, ground conditions (hard or soft standing), geology and nature of the activities.
	• Soil leaching	• Surface water - Grand Union Canal	Medium	Unlikely	**Low**	As above
Historical – Industrial Uses, including coal yard / shed, railway sidings, rubber tyre factory, engineering works, biscuit factory.	• Soil leaching	• Groundwater • Site structures • Buried services	Medium	Low likelihood	**Moderate/ Low**	Potential moderate to low risk for historical uses to contaminate groundwater underlying the subject site, potentially affecting underground site structures and buried services. Risk will depend on historical use, location, age and condition of tanks and whether they were stored underground or above ground. The ground conditions and geology near the tanks will also influence the risk.

	• Soil leaching	• Surface water - Grand Union Canal	Medium	Unlikely	**Low**	Potential low risk for historical uses to influence groundwater underlying the subject site and subsequently affecting current Grand Union Canal.
Historical – In-filled Land	• Soil leaching	• Groundwater • Site structures • Buried services	Medium	Unlikely	**Low**	Potential low risk due to the age, likely nature of infill.
	• Soil leaching	• Surface water - Grand Union Canal	Medium	Unlikely	**Low**	Potential low risk due to the age, likely nature of infill.

Classification of consequence: Severe – Medium – Mild – Minor

Classification of probability: High likelihood – Likely – Low likelihood – Unlikely

Risk Rating: No potential risk – Very low risk – Low risk – Moderate/low risk - Moderate risk – High risk – Very high risk

Based on the initial conceptual site model an environmental risk assessment has been undertaken. Where a pollution linkage has been identified, a qualitative classification of the consequence and probability is undertaken to determine the risk. The simple risk classification matrix provided in Annex 4 of R&D 66 (NHBC) helps provide consistency in the decision making process. The risk classification for each pollution linkage is used to determine the overall associated risk rating for the site. Each risk classification also helps inform the scope of further investigations if required.

6 SUMMARY, RISK RATING & RECOMMENDATIONS

6.1 General Summary

Mayer Environmental Ltd (MEL) has been instructed by EMR to conduct a Phase I Desk Study for the Non Ferrous Depot, Brentford.

This Phase I Desk Study is intended to provide information to determine the baseline land condition.

The historical and recent site information has revealed potentially contaminative uses on site, mainly with the site being use as a metal recycling facility since circa 1994 and industrial use around the site, mainly as part of the Transport Avenue Industrial Estate and preceding similar industrial activity. Regarding in-filling / landfilling, site historical information is contradictory. Some sources suggest the site has been landfilled, other sources suggest this occurred further to the south. However, there is little on the site plans to suggest the area experienced quarrying to produce a void for backfill (geology also suggests little significant gravels present) and on-site observations did not suggest a significant land raise had taken place. Refer to Section 4 for further details.

Superficial deposits comprising Alluvium may partially underlie the site on the north boundary area, otherwise the site is underlain by the London Clay (solid), which are classified as a Secondary A aquifer and non aquifer respectively. The Grand Union Canal to the north may be clay lined. Therefore, the pathway and hence potential risk, to the controlled waters (groundwater and Grand Union Canal) is likely to be low.

6.2 Summary Risk Rating

An outline Conceptual Site Model (CSM) has been developed based on the relevant findings of this Phase I assessment. The following assessment of the Relevant Pollutant Linkages has been produced:

- Potential **Low to Moderate** risks to human health (site users / groundworkers) from direct dermal contact, ingestion and inhalation of the on-site soils due to the presence of concrete across the site.
- Potential **Low to Moderate** risks to groundwater along with buried infrastructure from vertical / lateral migration of potential contaminants in the shallow soils. The hardstanding and impermeable London Clay will reduce mobilisation of potential contaminants within groundwater. These risks would be similar to those of neighbouring sites.
- Potential **Low to Moderate** risks to human health and **Low** risk to controlled water from off site historical and current activities.

Records and maps of historical and current data have identified a number of potentially contaminative features and activities on or nearby the subject site. The variability and age of these past and present activities result in the likeliness of ground contamination as being Low to Moderate.

OVERALL RISK RATING
Low to Moderate

6.3 Outline Recommendations

Due to the use of the site as a scrapyard since circa 1994 and use industrial use around the site; we recommend a site investigation be undertaken to confirm ground conditions and the presence or absence of fill materials. The ground investigation will identify baseline conditions for the permit to assist the eventual surrender of the permit and inform, manage and limit the potential costs of possible remediation therein.

Since the Grand Union Canal forms the northern boundary of the site, the Canal and River Trust may have easement / wayleaves to protect the integrity of the Canal that may extend into the EMR Depot. Consequently, we recommend legal matters are checked, including Title Plans etc and that the Canal and River Trust are contacted before any intrusive works are undertaken to discuss any requirements they may have and review the scope of works.

6.4 Report Limitations

This report presents desk study information, our interpretation of the findings and their significance. On any site, and in particular on sites of potentially contaminative previous uses, ground conditions can change rapidly over short distances. No responsibility can therefore be accepted for any issues that have not been highlighted by the desk study information. The databases relied on are only updated intermittently and some development may not have appeared on historical maps due to gaps in the map editions available.

Site assessments can range from limited observations to extensive investigations and testing. The degree of uncertainty in interpreting a site's environmental condition will depend upon the budget and scope of work authorised by the client. Some degree of uncertainty will always exist.

This report has been prepared solely for the benefit of our client, London Borough of Ealing, for the purpose of initially characterising the site's environmental condition.

No warranty is offered to any third party and no responsibility or liability will be accepted for any loss or damage in the event that this report is relied upon, either in its entirety or in part, by a third party or used in circumstances for which it was not originally intended. This report shall not be transferred to or relied upon by any other party without express written permission from Mayer Environmental Ltd.

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We thank EMR for entrusting Mayer Environmental Ltd with this commission. If there are matters arising from our report, which merit further attention, we would be pleased to offer any assistance.

7 REFERENCES

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