

Table 3 - Historical Summary		
Date	Potentially Contaminative Land Uses / Significant Changes	
	On-site [Direction]	Off-site [Distance/Direction]
	<ul style="list-style-type: none"> ○ Slaughter house in the north east of site ○ Timber yard no longer shown 	<ul style="list-style-type: none"> ○ 330m/W – Instrument factory
1966-1986	<ul style="list-style-type: none"> ○ No significant changes 	<ul style="list-style-type: none"> ○ 320m/S – Engineering works ○
1970-1976	<ul style="list-style-type: none"> ○ No significant changes 	<ul style="list-style-type: none"> ○ No significant changes
1972-1987	<ul style="list-style-type: none"> ○ Site now shown as empty, road no longer passing through site 	<ul style="list-style-type: none"> ○ 30m/W – Sports ground ○ 50m/N – Garage ○ 120m/NE – Garage ○ 140m/N – Electrical substation ○ 180m/SW - Tank
1974 - 1992	<ul style="list-style-type: none"> ○ No significant changes 	<ul style="list-style-type: none"> ○ No significant changes
1982-1992	<ul style="list-style-type: none"> ○ Icon office complex now present on site 	<ul style="list-style-type: none"> ○ No significant changes
1999-2016	<ul style="list-style-type: none"> ○ No significant changes 	<ul style="list-style-type: none"> ○ No significant changes

Notes:
 It should be noted that the dates of the maps do not always correspond with the time of the surveys.

The review of historical maps provided information about changes to the site and its surroundings between 1881 and 2016.

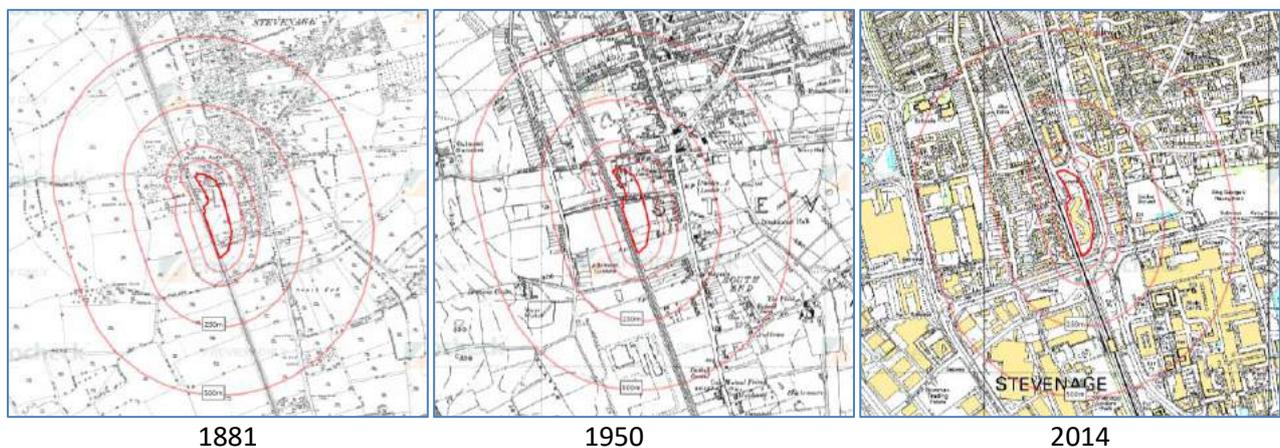


Figure 3 – Extracts from Historical Ordnance Survey Maps between 1881 and 2016

4.2 Anecdotal Evidence

Anecdotally the landscaped area by the front entrance to the site, has been impacted by bamboo which grew out of control. This has apparently subsequently been dug out, with any returning bamboo removed as and when it regrows.

4.3 History of the Site – Summary

The review of historical maps provided information about changes to the site and its surroundings, between 1881 and 2016. In 1881 the majority of the site was shown as open land, with areas of trees and small unidentified buildings. In 1923 a road is shown passing through the site, with a timber yard operating in the north. A slaughter house is shown in the north of the site on the 1965 to 1974 map. In the 1972 to 1982 map, allotment gardens are present in the south of the site. From 1982 until the present day, the Icon office complex is present on site.

The surrounding area has become increasingly developed from 1881 to the present day. In 1881 the surrounding area to the south, west and northwest is shown primarily as open land with residential development to the east and northeast, increasing residential development in the south and west is noted from 1946. Industrial usage to the south and southwest increases from 1962, with factories and works present.

5. CONCEPTUAL MODEL

The risk assessment methodology is based upon current guidelines, (refs. **R.3**, **R.11** and **R.9**), and legislation (refs. **R.1** and **R.2**).

The current guidance requires that a conceptual model be formulated, based upon the findings of the research. The conceptual model is limited at this stage to the identification and assessment of potential 'hazards', identified or suspected from the results of the research; the potential 'receptors' that may be affected and the anticipated 'pathways' to those receptors. The findings are summarised in the following subsections.

The guidance proposes a four-stage approach for the assessment of contamination and the associated risks. The four stages are listed below:

- Hazard Identification;
- Hazard Assessment;
- Risk Estimation;
- Risk Evaluation.

In accordance with the guidance, (ref. **R.11**), only the first two stages are addressed in a preliminary risk assessment; should hazards exist which are a potential risk then more intrusive investigation works are recommended.

5.1 Hazard Identification: On-Site

The desk based research and historical review identified the following potential hazards on the site:

- Made Ground associated with former structures and historic/current embankments;
- Contaminants associated with the former historic slaughter house, timber yard and depot;
- Mobilisation of hydrocarbons from potential leaks of interceptors or generator.

5.2 Hazard Identification: Off-Site

The desk based research and historical review identified the following potential hazards off-site that may impact upon the site:

- Leachable contaminants and hazardous ground gasses from any Made Ground associated with the adjacent railway embankment or backfilled pits (Brick field/Clay and sand pits);
- Mobilisation of hydrocarbons from potential leaks of underground tanks associated with nearby fuel stations.

The gas works, hospital, electricity substation and surrounding factories have been discounted as potential sources of contamination, as they were considered too far from the site to have an impact on the site.

Furthermore, whilst the adjacent railway line may historically be considered a source of contamination from the distribution of soot or asbestos from steam trains, the likelihood that these contaminants remain within the soils on site is considered very low, given the sites history of development, which is likely to have removed these contaminants from the site. Nevertheless, should these contaminants exist on the site, it is likely that investigation of the other sources on the site will highlight whether the railway line does present a significant risk.

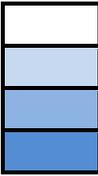
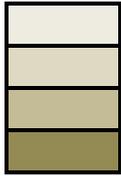
5.3 Hazard Assessment

The preliminary risk assessment has identified a few potential sources of contamination, which may pose risk to human health and the Controlled Waters. Potential pollutant linkages that require further consideration are presented in Table 4 shown below:

Table 4 – Conceptual Model													
Sources	PATHWAYS:					RECEPTORS:					Risk Rating	Comments	
	Root Uptake	Direct Contact	Ingestion	Respiration	Gas Accumulation	Plants	End Users	Structures (Concrete)	Services/Utilities	Construction Workers			Controlled Waters (GW)
Made Ground associated with former structures and historic/current embankments	L	HL	L	L	L	Mi	Mi	Mi	Mi	Mi	Mi	LR - HR	Given the presence of landscaping and embankments, in various forms, across the site it is likely that Made Ground exists on a site-wide basis. It is unknown whether any importing of soils occurred and may therefore contain a variety of contaminants.
Contaminants associated with the former historic slaughter house, timber yard and depot	U	L	L	U	U	Mi	N	N	N	Mi	Mi	LR - MR	This source may be considered to be limited to their respective areas and therefore represent hotspots of contamination. The risk is therefore reflective of the particular hot spot rather than the site as a whole.
Mobilisation of hydrocarbons from potential leaks of interceptors or generator	U	L	L	L	L	Mi	Mi	Mi	Mi	Mi	Mi	LR - MR	Given the expected geology, there is a potential for contaminants to migrate across the site and therefore represents a site-wide risk
Leachable contaminants and hazardous ground gasses from any Made Ground associated with the adjacent railway embankment	N	N	N	L	L	N	Mo	N	N	Mi	N	LR - MR	Given the expected geology, there is a potential for contaminants and ground gases to migrate across the site and therefore represents a site-wide risk.

or backfilled pits (Brick field/Clay and sand pits)				
Mobilisation of hydrocarbons from potential leaks of underground tanks associated with nearby fuel stations.	U U U U U	Mi Mi Mi Mi Mi Mi	LR	The fuel station to the north of the site boundary is currently operational, however it is likely that any tanks include precautionary measures for any leaks and spills, therefore the risk is considered to be low.

Legend:-

<p>Probability:</p> <p>Negligible (N)</p> <p>Unlikely (U)</p> <p>Likely (L)</p> <p>Highly Likely (HL)</p>		<p>Consequence (Severity):</p> <p>Negligible (N)</p> <p>Mild (Mi)</p> <p>Moderate (Mo)</p> <p>Severe (S)</p>		<p>See Comparison of Consequence Against Probability within Appendix 6 for Key to Legend.</p>
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Based upon the findings of the desk study data and in accordance with the guidance provided within the CLR 11 document, (ref. **R.11**), a source-pathway-receptor string has been completed for potential contamination on the site and therefore a risk exists.

The above should be investigated further through an intrusive type ground investigation, which should target the specific sources of contaminants detailed above, and include a comprehensive schedule of laboratory-based chemical analyses. The investigation should also ensure a number of gas monitoring wells are installed across the site so that an assessment of hazardous gasses can be undertaken for use in determining any protection measures which may be required for the future development of the site.

Given the location of the site within a Zone 1 Source Protection Zone, leachate analysis should be undertaken as a minimum and, where possible, a groundwater sampling and chemical analysis exercise should be undertaken to fully assess the risk to the underlying aquifer.

It is recommended that the presence of Japanese Knotweed is investigated during the intrusive works, by a specialist and qualified professional, who is able to identify the species in-situ to ensure the appropriate control measures are recommended, i.e. further identification and treatment.

The intrusive works may be programmed with other elements of site investigation to reduce the costs of supervisory works during the on-site investigation of the site, i.e. requirements for geotechnical intrusive investigation.