constructiveevaluation
Building & Material Test Consultants

Stage 1: Desktop Study & Walkover Survey

at

Land Off,
Plover Road,
Minster,
Sheerness,
Kent
ME12 3GA

for

Starnes PLC

Job No. 13.7506
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Trading Terms

Unless specifically stated within the tender/quotation or unless identified within the introduction to this report it is confirmed that this report has been compiled wholly in accord with Constructive Evaluation Limited's terms of engagement.

Copyright

The following notes should be read in conjunction with the report. Any variation to the general procedures outlined below are indicated in the text.

Foreword

The recommendations made and opinions expressed in the report are based on the conditions revealed by the site works as indicated on the site record sheets, together with an assessment of the data from the insitu and laboratory testing or in respect of the desktop reports. No responsibility can be accepted for conditions that have not been revealed by the research, for example, due to inaccuracies in the data. While the report may offer opinions, these comments are for guidance only and no liability can be accepted for their accuracy.

Routine Sampling

During the site investigation, soil, water and leachate samples have been taken in accordance with recommendations within BS.5930: 1990 *Code of Practice for Site Investigations* (Amendment 2: 2010), & BS.10175: 2011. All samples have been marked accordingly, and stored under suitable conditions to prevent any deterioration of the specimen (e.g. volatilisation of hydrocarbons). All samples have been placed in suitably labelled sealed plastic containers and sampling equipment cleaned between sample locations to prevent possible cross contamination.

During the compilation of desktop studies a number of sources have been contacted in order to provide any relevant information regarding the site in question. The sources contacted provide their own Terms & Conditions with regard to the data provided. As such, each source, e.g. Sitescope, Council Websites, etc. must be considered only in relation to these individual Terms & Conditions. All research has been carried out in accordance with recommendations within BS.10175: 2011.

The method of construction employed to form trial pits is entered on their records. In general, it is not possible to extend machine excavated trial pits to depths significantly below the local water table, especially in predominantly granular soils. Except for manually excavated pits, and unless otherwise stated, the trial pits have not been provided with temporary side support during their construction, hence personnel have not entered them and examined the strata or any construction details so exposed.

Laboratory Testing

Unless stated otherwise within the text, all laboratory tests have been performed in accordance with the requirements detailed in British Standards 1881:1990 or other standards or specifications that may be appropriate.

Regulatory Bodies

After the compilation of desktop study and walkover survey or site investigation works all parties must communicate with regulatory bodies including the Local Authority (both Planning & Environmental Health) and the Environment Agency. It must be accepted that further requirements may develop. It is possible that aspects of desktop study may need to be altered to conform to the requirements of the regulatory bodies.

Definitions

Reference to the word "contamination" in this report does not relate to the statutory definition of contaminated land under 1990 Environmental Protection Act unless otherwise stated. The definition used in this report is: "Land that contains substances that, when present in sufficient quantities or concentrations, are likely to cause harm, directly or indirectly, to man, to the environment, or on occasion to other targets" (NATO CCMS, 1985).

Walkover Survey

It should be noted that a walkover survey is designed as a brief inspection of the site in question, however every reasonable effort has been made to access all areas of the site, areas where this has not proved possible will be referenced in the text. The site reconnaissance is undertaken with permission of the client after the document search is completed with the aim of recording any further aspects of the site not revealed by the desktop study however this does not in itself guarantee that every possible risk has been seen.

Conceptual Model/Risk Assessment/ Sampling Regime

The conceptual model, Risk assessment and sampling regime has been formulated in accordance with BS10175:2011 and CLR 8 based upon the relevant information gained from the desktop and walkover survey. While the model and assessment offer opinions and interpretations of these guidelines, the comments made are for guidance only and no liability can be accepted for their accuracy.

Restrictions

In some instances a site investigation must be separated into two stages, depending on the access to the sub soils at the time of the initial site attendance. It must also be noted that in many instances the access afforded is restricted due to continuing activity on the site. In such instances all reasonable effort were to achieve maximum sampling coverage. This does not imply a guarantee that inaccessible areas are similar.

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SUMMARY

Context and Purpose	This assessment is a Stage 1 evaluation of environmental liability associated with potential contamination issues at a site located at Plover Road, Minster, Sheerness, ME12 3GA.
Current Site Use	The site is undeveloped and comprises of a field with long grass and young trees.
Proposed End Use	At the time of issuing this report we understand proposed development plans for the site include a 105no. residential dwellings with associated car parking, soft landscaping, a food store and 4no. retail units.
Surrounding Area	Residential estates are located to the north and south of the site, with further undeveloped land to the northeast. Residential dwellings are also present to the immediate west as well as Sheppey Community Hospital.
Physical Setting	The relevant 1:50,000 British Geological Survey (BGS) Map indicates the site to be underlain by London Clay Formation (bedrock geology). No superficial geology is recorded. The aquifer status within the bedrock geology is classified as Unproductive Strata.
Environmental Sensitivity	The nearest surface water feature is considered to be a drainage ditch on site. The closest surface, groundwater and potable abstraction points are 1720m northeast, 1204m northwest and 1244m northeast respectively.
Site History	From the earliest mapping available (1865) the site remains undeveloped until present day and appears to have been used for agricultural purposes.
Surrounding History	The surrounds largely comprise of rural development with large scale development (presumed residential) occurring from the 1930's onwards, to the town of Minster.
Previous Investigations	We are not aware of any previous site investigations have been completed at the study site.
Recommendations	Generally, the site is considered to present a **LOW** risk to end users, site workers, services and 'controlled waters'. We see no reason to complete a Site Investigation for contamination purposes. However, we understand that an intrusive investigation may be completed for geotechnical requirements and as such it may be prudent that samples are obtained for the purposes of contamination analyses. This assessment is precautionary nature and should comprise of pesticide, herbicide, fertilizers and ammonia analysis, as well as a basic screen testing for heavy metals, Total Petrol Hydrocarbons (TPH), Poly Aromatic Hydrocarbons (PAH), pH and SOM. We would recommend that this report be forwarded to the relevant authorities including Local Authority Planning and Environmental Health Departments as well as the Environment Agency prior to commencing with any proposed site investigation works for their subsequent comments and acceptance.

1.0 INTRODUCTION

Constructive Evaluation (CE) Limited was instructed by Starnes PLC (EQ8572, dated 1st March 2013) to carry out a Stage 1: Desktop Study and Walkover Survey at a site located on Plover Road, Minster, Sheerness, Kent, ME12 3GA.

This work has been undertaken in relation to the redevelopment of the site which will comprise of a 105no. residential dwellings with associated car parking and soft landscaping in the east, and a food store and 4no. retail units in the west. A proposed site layout plan can be reviewed within Appendix A.

The client has instructed CE to undertake an environmental risk assessment to enable determination of the potential source – pathway – receptor linkages associated with the site and surrounding environs historical and current context.

The purpose of the Desktop Study was to provide information on:

- The expected geology & hydrogeology.
- The development history and most recent use.
- Potential sources of contamination.
- To enable the development of a conceptual site model (CSM) and risk assessment.

This report presents results of the assessment, including historical Ordnance Survey maps and published geological & hydrogeological maps, as well as information from various sources such as Centremaps.

This report has been formulated in accordance with BS10175:2011 *Investigations into Potentially Contaminated Sites – Code of Practice*, CLR11 – *Model Procedures for the Management of Land Contamination*, and National Planning Policy Framework (2012). The Planning Policy Statement 23 – *Planning and Pollution Control* was withdrawn on 27th March 2012, and superseded by the National Planning Policy Framework.

2.0 PHYSICAL SETTING

The following information has been obtained from public archive via the data supplier Centremaps. The full Centremaps report is presented in Appendix D.

The site is located in the town of Minster on Sea, Sheerness on a National Grid Reference (NGR) 594521, 172314 with a site area of approximately 3.45 hectares (Ha).

2.1 Geology

The relevant 1:50,000 British Geological Survey (BGS) Map indicates the site to be underlain by London Clay Formation (bedrock geology). No superficial geology is recorded.

Bedrock Geology:

London Clay Formation – Predominantly argillaceous, slightly calcareous, grey to bluish grey silty to very silty Clay characteristically fissured, and brown where weathered.

Geological Hazards – On site there is moderate risk of shrink-swell with a very low risk from landslide and collapsible ground hazards. In addition, there is a negligible risk from compressible and running sands with a null-negligible risk from soluble rock hazards.

Radon Affected Areas – The property is not in a radon affected area, as less than 1% of properties are above the action level, therefore no radon protective measures are required in new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment.

2.2 Hydrogeology

Aquifer within Superficial and Bedrock Deposits – Due to the presence of the London Clay Formation the underlying aquifer is recorded as being unproductive. This is defined as rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

2.3 Hydrology

Detailed River Networks – There are a significant number of network entries located within 500m, the closest of which is located 44m northeast for a secondary river.

Surface Water Feature – The nearest surface water feature is located within 0 – 50m periphery and is considered to be a pond approximately 30m east. However, during a walkover survey a drainage ditch was noted on site.

Surface Water Abstractions Licences – There is one (1no.) licence within 2000m which is located 1720m south for the purposes of general use relating to secondary category (low loss).

Potable Water Abstraction Licenses – There are five (5no.) licences within 2000m, the closest of which is 1244m northeast for the purposes of water bottling.

Groundwater Abstraction Licences – There are six (6no.) licences within 2000m, the closest of which is located 1204m northeast for general use relating to secondary category (medium loss).

Flooding – An indicative Zone 2 (tidal models) floodplain is located 125m north and an indicative Zone 3 (tidal models) 150m north. There are no flood defences or areas used for flood storage within 250m, however, there are areas benefitting from flood defences within this distance. There is no British Geological Survey (BGS) groundwater flooding susceptibility flood areas within 50m of the boundary of the study site. The highest susceptibility to groundwater flooding based on the underlying geological conditions is recorded as being negligible. The BGS confidence rating in this result is not applicable.

2.4 Topography

The site is approximately 10m Above Ordnance Datum (mAOD).

3.0 SITE CONDITIONS

3.1 Site Description

The site can be accessed off both Plover Road and Parish Road via a number of footpaths. It is undeveloped and covered with long grass, brambles and young trees. The western portion of the site contains a notable amount of litter and dumped rubbish centred around a playground within this area.

The western side of the site has a higher elevation than the east creating a gradual slope. The ground was noted to be saturated and boggy with pools of water present to the east given the topography. There is a stream located in the central southern area, however, it was not possible to determine flow direction and it is considered that this is likely to be a drainage ditch given the water appears to be standing.

3.2 Surroundings

Residential estates are located to the north and south of the site, with further undeveloped land to the northeast. Residential dwellings are also present to the immediate west as well as Sheppey Community Hospital.

A photograph identification plan and site photographs from the walkover survey can be reviewed within Appendix B

3.3 Potential Sources of Contamination - Walkover Survey

The following potential sources of contamination have been identified by the site walkover survey:

On Site

No potential sources identified.

Off Site

No potential sources identified.

3.4 Site History

The following observations are made based on the available historic map extracts presented in Appendix C of which the most salient points have been discussed in relation to the site and surrounding environs.

1865 – 1866: The site is undeveloped and comprises of two (2no.) larger arable fields. It is possible to observe the rural nature of the surrounds which consist of small holdings and farms. The village of Minster can be observed approximately 900m northeast.

1888 – 1898: The site remains unchanged and there have been no discernible changes to the surrounding environs.

1906 – 1908: The site remains unchanged. It is possible to observe that there has been small scale development to the surrounds. Of notable interest off site is a railway line approximately 200m north which runs from east to northwest and a railway station 250m northwest. A development is occurring 50m west which is presumed to be residential in context.

1931 – 1933: The site remains unchanged. The surrounding environs have undergone large scale development particularly to the northeast associated with the urban sprawl of Minster and also to the west of the site.

1939: The site remains unchanged and there have been no discernible changes to the surrounding environs.

1955: The site remains unchanged. Development continues to the outskirts of Minster particularly to the northeast and north.

1963: The site remains unchanged. It is possible to clearly observe the residential dwelling to the west and northwest of the site.

1968 – 1970: The site remains unchanged. An electrical substation has been built as part of a residential estate 160m northeast. Development continues to the outskirts of Minster particularly to the northeast and north.

1977 – 1988: The site remains unchanged. Residential development has continued to the immediate northern boundary.

1994 – 1995: Only an area to the northwest is covered on the available maps, however, no significant changes are noted within this.

2002: The site remains unchanged and no new potential off site risks identified.

2012: The site remains unchanged. Residential dwellings are now present to the immediate east and west, as well as a hospital 50m west.

3.5 Potential Contamination Sources – Historical

On Site

- Agricultural land, which may have involved the use of herbicides and pesticides.

Surroundings

- Railway line and station.

However, given the respective distance from the site to the aforementioned surrounding features it is not considered to pose a contaminative risk to the site.

3.6 Information on Public Record

The following information has been obtained from public archive via the data supplier Centremaps. The full Centremaps report is presented in Appendix C.

Records of Licensed Discharge Consents – There is one (1no.) consent recorded as being within 500m which is located 478m northwest for the purposes of sewage discharge storm overflow.

Environment Agency Recorded Pollution Incidents – There is one (1no.) record of an incident having occurred within 250m, which was 59m west and took place in 2003 involving oils and fuels. The incident was recorded as having a category 2 (significant) impact to land and a category 3 (minor) impact to both water and air.

Records of Environment Agency Historic Landfills – There is one (1no.) site within 1500m which is located 1400m north. The waste type which was deposited here is listed as being inert.

Records of Potentially Contaminative Industrial Sites – There are six (6no.) sites within 250m, the closest of which is a hospital 120m west. The other remaining sites are listed as being electrical sub stations, the closest being 153m southeast.

Designated Environmentally Sensitive Sites – There is a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar located at 1660m south. In addition, there is an Environmental Sensitive Area (ESA) located 569m south.

4.0 PRELIMINARY CONCEPTUAL SITE MODEL & RISK ASSESSMENT

The below Conceptual Site Models (CSM) have been formulated in accordance with BS10175:2011 to provide information regarding the possible sources of contamination on site, the pathway in which the contamination can migrate and a vulnerable receptor to the contamination, all of which need to be present for there to be a risk. Two (2no.) CSMs have been produced given that both 'residential' and 'commercial' land uses are proposed for the site. The following Source – Pathway – Receptor relationships have been identified:

4.1 Residential Development:

Source	*Pathway*	*Receptor*	*Potential Risk*
Herbicides, pesticides, fertilizers and ammonia from potential historic on site farming.	Inhalation, ingestion and dermal contact from exposure to contaminated soils.	End users.	Low risk given that the redevelopment of the site is proposed to include areas of landscaping.
		Site workers.	Low risk, given that site workers will be in direct contact with soils. If impacted soils are encountered during any proposed construction phase, however, correct usage of PPE will mitigate this risk.
	Impacted Soils.	Services.	Low risk, given the probability of agricultural land resulting in toxic and/or organic contaminants as per the Water Regulations Advisory Scheme.
	Leaching of contaminants through soils and/or via surface run off.	Unproductive Strata (London Clay Formation).	Negligible given the unproductive nature of the bedrock.
		Drainage ditch on site.	Low risk, given that the feature is on site.

Negligible Risk	Defined as the site should be considered suitable for the present or future use and environmental setting. Contaminants unlikely to be present, which might have unacceptable impact on key targets.
Low Risk	Defined as the site should be considered suitable for the present or future use and environmental setting. Contaminants may be present but unlikely to have unacceptable impact on key targets.
Moderate Risk	Defined as the site may not be suitable for the present or future use and environmental setting. Contaminants are probably present and might have unacceptable impact on key targets.
High Risk	Defined as the site is probably or certainly not suitable for the present or future use and environmental setting. Contaminants are probably or certainly present and likely to have unacceptable impact on key targets.

Risk Assessment

Generally, the site is considered to present a **LOW** risk to end users, site workers, services and 'controlled waters'.

4.2 Commercial Development:

Source	*Pathway*	*Receptor*	*Potential Risk*
Herbicides, pesticides, fertilizers and ammonia from potential historic on site farming.	Inhalation, ingestion and dermal contact from exposure to contaminated soils.	End users.	Negligible risk given that the redevelopment will consist largely of hardstanding.
		Site workers.	Low risk, given that site workers will be in direct contact with soils. If impacted soils are encountered during any proposed construction phase, however, correct usage of PPE will mitigate this risk.
	Impacted Soils.	Services.	Low risk, given the probability of agricultural land resulting in toxic, organic and/or flammable contaminants as per the Water Regulations Advisory Scheme.
	Leaching of contaminants through soils and/or via surface run off.	Unproductive Strata (London Clay Formation).	Negligible given the unproductive nature of the bedrock.
		Drainage ditch on site 50m northeast of commercial development.	Low risk, given the distance to the feature, however, due to the topography of the site, surface water movement is preferential to the ditch.

Negligible Risk	Defined as the site should be considered suitable for the present or future use and environmental setting. Contaminants unlikely to be present, which might have unacceptable impact on key targets.
Low Risk	Defined as the site should be considered suitable for the present or future use and environmental setting. Contaminants may be present but unlikely to have unacceptable impact on key targets.
Moderate Risk	Defined as the site may not be suitable for the present or future use and environmental setting. Contaminants are probably present and might have unacceptable impact on key targets.
High Risk	Defined as the site is probably or certainly not suitable for the present or future use and environmental setting. Contaminants are probably or certainly present and likely to have unacceptable impact on key targets.

Risk Assessment

Generally, the site is considered to present a **LOW** risk to site workers, services and 'controlled waters', and a **NEGLIGIBLE** risk to end users.

5.0 CONCLUSIONS

From the earliest mapping available (1865) the site remains undeveloped until present day and appears to have been used for agricultural purposes. The surrounds largely comprise of rural development with large scale development (presumed residential) occurring from the 1930's onwards, to the town of Minster.

The relevant 1:50,000 British Geological Survey (BGS) Map indicates the site to be underlain by London Clay Formation (bedrock geology). No superficial geology is recorded. The aquifer status within the bedrock geology is classified as Unproductive Strata.

The nearest surface water feature is considered to be a drainage ditch on site. The closest surface, groundwater and potable abstraction points are 1720m northeast, 1204m northwest and 1244m northeast respectively.

Based on the foregoing the site is considered to present a **LOW** risk to end users, site workers, services and 'controlled waters'.

We see no reason to complete a Site Investigation for contamination purposes. However, we understand that an intrusive investigation may be completed for geotechnical requirements and as such it may be prudent that samples are obtained for the purposes of contamination analyses. This assessment is precautionary nature and should comprise of pesticide, herbicide, fertilizers and ammonia analysis, as well as a basic screen testing for heavy metals, Total Petrol Hydrocarbons (TPH), Poly Aromatic Hydrocarbons (PAH), pH and SOM.

The soil samples should be removed in accordance with current guidance and protocol and submitted to a UKAS and MCERTs accredited laboratory for contaminant analyses.

6.0 RECOMMENDATIONS

From the information contained within this report the following recommendations have been formulated in order to produce a remediation strategy for the site.

6.1 Statutory Consultees

We would recommend that this report be forwarded to the relevant Statutory Consultees including the EA and Local Council's Environmental Health and Planning Department prior to any future site works commencing to seek their comments and subsequent approval.

The Statutory Consultees should review this information prior to commencement of the Site Investigation works.

The results of the proposed Site Investigation and subsequent monitoring must be used to undertake a risk assessment for the site, and identified receptors, in order to enable an appropriate remediation strategy to be formulated.

6.2 Site Works

Any personnel involved with intrusive ground works should employ the use of PPE and good working practice.

During construction works visual and olfactory appraisal of the underlying soils should be made. If during construction works any material is noted to show visual and/or olfactory sign of contamination a suitable geo-environmental consultant should be contacted to supervise/guide further works. This material should be stockpiled separately and tested prior to its appropriate removal of site or re-use as necessary.

6.3 Flood Risk

This report is not intended to replace a full hydrogeological survey and it is recommended that additional specialist studies be conducted to confirm the flood risks at the site.

6.4 Soakaways

Soakaways are for the disposal of clean uncontaminated surface water only and must not be constructed in contaminated land.

7.0 LIMITATIONS

Should the currently proposed layout and/or end-use of the development change, or areas of softscaping be subsequently included, then the risks posed by the contaminants of concern will need to be re-assessed.

The EA has recently undertaken revision of the SGVs which are partially complete. Where standards are available using the "new" approach, these have been utilised for correlative purposes. Where standards have not yet been revised, guidance following the "old" approach has been utilised. Please note that upon release of the remaining guidelines, the standards contained within this report may be subject to change. In addition, the second edition of the LQM CIEH guidance has now been released and will be utilised in favour of previously published guideline values.

The current UK Drinking Water Standards (DWS) do not list a threshold hydrocarbon value, as a collective parameter. The former UK DWS 1989, provide a value of 10µg/l for dissolved or emulsified hydrocarbons, which has been use in absence of current guidance.

Advice and recommendations given in this report are provided for information purposes; they are advisory and do not constitute a conclusive specification for a further investigation.

The advice given in this report with respect to contaminated land, groundwater and gas is based on current guidelines available at the time of writing.

The client is advised that the conditions observed on site by CE at the time of the walkover survey are subject to change. Certain indicators of the presence of hazardous substances may have been latent at the time of the most recent site reconnaissance and they may subsequently have become noticeable.

The client is advised that although every effort is made to identify suspect areas CE cannot be held responsible if buildings on site contain Asbestos, whilst every effort is made to identify materials which may contain it, access is not always afforded to all areas on site. Additionally Engineers sent on site are not specially trained in this aspect of work, if further determination is required the expertise of a BIOH trained surveyor should be sought.

Comments made relating to soil or groundwater conditions are obtained from the sources described within the text and observations made at the time of the walkover survey unless otherwise stated. Soil or groundwater conditions may vary as a result of seasonal fluctuations or other effects.

The accuracy of the map extracts can not be guaranteed and it should be noted that different conditions may have existed between and subsequent to the various map surveys. Therefore, there can be no certainty that all areas of contamination have been identified during the Phase 1 investigation.

Every effort is undertaken to provide detailed information regarding the potential risks associated with flooding, however CE may not be party to information the LA and EA may hold in relation to historical or flash flood events.

This assessment is preliminary in its nature and may be subject to amendment in light of additional information becoming available or statutory consultee review, including the EA, Local Council and NHBC etc. The statutory consultees have not been contacted at this time.

The findings and opinions conveyed in this report are based on information obtained from a variety of sources, including that from previous Site Investigations and chemical testing laboratories, and which CE has assumed that such information is correct. Nevertheless, CE cannot and does not guarantee the authenticity or reliability of the information it has relied upon. CE can accept no responsibility for inaccuracies within the data supplied by other parties.

This report is written in the context of an agreed scope of work between CE and the client and should not be used in a different context. In light of additional information becoming available, improved practices and changes in legislation amendment or re-interpretation of the assessment or report in whole or part may be necessary after its original submission.

This report is provided for sole use by the client and is confidential to them. No responsibility whatsoever for the contents of the report will be accepted to anyone other than the client.

CE believes that providing information about limitations is essential to help the Client identify and thereby manage risks.

The copyright of written materials supplied shall remain the property of CE but with a royalty-free perpetual licence, granted to the client on payment in full of any outstanding monies.

CE does not provide legal advice and the advice of the client's legal advisors may also be required.

An ecological, topographical, archaeological or asbestos survey and service search was outside the scope of this report.