



PHASE 3 REMEDIATION STRATEGY

South Lincolnshire FEZ Hub Building
for Lincolnshire County Council



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Document History

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The South Holland Food Enterprise Zone (FEZ) site is located within South Holland District, to the south west of the A151/A17 Junction, known as Peppermint Junction. It lies to the west of Holbeach. Access to the site is via an improved roundabout junction from the A17 leading to a new roundabout junction from the A151 giving direct access to the site.

The new Hub Building is Plot 12 of the proposed development which has the aim of creating bespoke space for new businesses and SMEs in the agri-tech sector.



Figure 1 – Proposed Site plan (Core Architecture)

National Grid Ref: 534801E, 325622N

2. Report Objective and Scope

The objective of this report is to develop the remediation strategy from the phase 2 Ground Investigation for the purposes of a focused scope of remediation requirements.

The remediation works are necessary to break the pollution linkages between the sources of contamination and the sensitive receptors that have been identified in the Phase 2 Ground Investigation report by blocking or preventing the pathway. Any linkages that still existing following the Phase 2 investigation need to be remediated as part of the Phase 3 Remediation Strategy.

3. Site History and Current Use

It is understood that the site has been undeveloped through it's history, having been used as agricultural land.

4. Areas of Potential Contamination

4.1. Risk Assessment (From AECOM report 60550563)

Sources

- Made Ground – *there is potential for Made Ground to be present which could contain contaminants*
- Natural Strata – *the underlying superficial stratum was identified as being Tidal Flat Deposits which could be a potential source if they have become contaminated by other sources*
- Soil Leachate – *potential contaminants may be leached from soils, such as pesticides/herbicides which are likely to have been used on the agricultural land within the site boundaries*
- Agricultural land use – *the site has historically been used as an agricultural field which could be a source of contaminants such as pesticides/herbicides from crop spraying and fuels (spillage)*
- Groundwater – *groundwater may be present within the underlying strata which could potentially contain contaminants.*
- Ground Gases – *concentrations of ground gases (methane and carbon dioxide) and other volatile gases may originate from the underlying natural strata (particularly where it has appreciable organic content).*
- Off-site sources – *two historical landfill sites, a distillery, historical road upgrades and travellers' sites exist within 1km of the wider site boundaries. Contamination via groundwater, ground gas and soil leachate is possible from any of the above.*

Pathways

- Inhalation – *of contaminants in soil-derived dust from areas where soil is exposed at the surface or from excavations, and of soil/water derived vapours and ground gases*
- Ingestion – *of contaminants in soil-derived dust and entrained surface water run-off*
- Dermal contact – *of contaminants in contaminated soils, leachate and groundwater*

- Lateral migration – *of contaminants present in the natural strata/made ground through groundwater to surface water discharge/run-off*
- Direct contact – *of buildings, foundations or services with contaminants in soils, leachate and shallow groundwater*

Sensitive Receptors

- Human Receptors – *end users, construction workers, public via site frontage –very low depending on contamination levels revealed*
- Controlled Waters Receptors – *unnamed drains that surround the wider site & groundwater*
- Buildings Receptors – *proposed development – very low if remediation measures in place if necessary*
- Ecological Receptors – *no potential on or off-site ecological receptors identified*
- Off-site receptors – *includes residents of nearby housing, the travellers' site, workers at local industries*

The proposed development is for commercial use.

5. Contamination to Site

13 samples at various depths were extracted from the site for testing. A suite of sampling with no specific target was presented.

The Phase 2 Ground Investigation revealed no elevated levels of the determinants analysed when compared with the guideline values for a standard land use of commercial and industrial.

An asbestos screen was undertaken on two samples and no asbestos was detected.

There were no elevated levels of methane detected in the ground gas monitoring. However, elevated levels of carbon dioxide with depleted levels of associated oxygen and gas flows have been detected in boreholes on occasions.

See Sub Surface Phase 2 report for full summary and results.

6. Proposed Remediation Statement for the Site

Based on the Phase II contamination testing carried out on site, there were generally no elevated levels of any contaminant found. The site is therefore considered suitable for commercial use.

- Any made ground found on site should be excavated and removed from site.
- A minimum depth of 300mm of clean topsoil and sub-soil should be provided to all proposed landscaping areas of the site.
- Proving chemical suitability prior to importation of all sub-soils and top-soils proposed for use in the capping system, in accordance with the Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG) guidance Verification Requirements for Cover Systems: Technical Guidance for Developers, Landowners and Consultants, v3.4, November 2017. Guidance appended to the rear of this document. Certificates to be provided by main contractor.
- The sub-soils and topsoil capping thickness should be validated in accordance with the Lincolnshire County Council's policy Acceptable Methods and Validating Capping Thickness.
- Production of a Phase 4 Validation Report which outlines the evidence and verification of the remediation works carried out.

Based on the gas monitoring carried out on site, the site falls into Characteristic Situation 2 (CS2). BS8485:2015, Table 4, indicates that for a CS2 and the type of development proposed, a score of 2.5 gives the level of protection and remedial measures required. As such, the following gas protection measures are required:

- Passive sub floor ventilation/dispersal layer (clear void) of good performance (Score 1.5).
- Gas resistant membrane meeting the following criteria (Score 2.0):
 - Sufficiently impervious to gases with a methane gas transmission of <40.0 ml/day/m²/atm (average) for sheets and joints.
 - Sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions.
 - Sufficiently strong to withstand in-service stresses.
 - Sufficiently strong to withstand the installation process and following trades until covered.
 - After installation being capable of providing a complete barrier to the entry of the relevant gas.
 - Verified in accordance with CIRIA C735.

In road, hardstanding and car park areas over-site concrete and/or bituminous macadam surfaces will prevent ground gas escaping naturally to the atmosphere. It

would be advisable for the contractor to provide vent pipes through which ground gases are able to escape. These vent pipes might be placed in adjoining landscaped areas or incorporated in lamp post or other similar furniture.

All excavations of greater than 1.20m depth should be routinely checked for air quality prior to man entry and appropriate precautions taken.

Any manholes, inspection chambers or other void spaces formed beneath the sites ground surface are potential ground gas traps. Precautions as per the excavations noted above should be taken.

7. Proposed Verification Works

7.1. Cover Systems

Note all imported topsoil material for the local landscaping pockets should be certified as clean and free from contamination through test certificates.

It will be necessary to validate that this material has been imported to the depths and details as referenced as per the appended Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG) guidance document Verification Requirements for Cover Systems: Technical Guidance for Developers, Landowners and Consultants, version 3.4, November 2017.

The materials proposed for importation for use in a clean capping system will be tested (in accordance with the YALPAG guidance), and such materials will be proven chemically suitable prior to importation. The contractor will obtain said testing. The acceptable criteria against which will be considered against the appended document – FOR 'COMMERCIAL' GAC.

7.2. Gas Protection Systems

The gas resistant membrane is to be independently verified in accordance with CIRIA C735.

8. Consents, Agreements, Permits & Licenses

No consents, agreements, permits and licenses (discharge consents, waste management licenses etc) are required for the remediation of this site.

Additional Works for Contractor Not Part of Remediation

De-watering of foundations and deeper drainage runs may be required due to the level of the perched water table.

The contractor will require WAC testing and should initially present the soil sample results and this section of the Phase 2 report to achieve a cart off cost for the material. These tests are specifically required only for cart off purposes and typically take 15 days to procure.

9. General Remarks

This report has been based on all the information presented within the desk top study and whilst this was undertaken in a professional manner the results and conclusions drawn relate solely to the information on which it was based. Other conditions may exist which have not been revealed by this report. This report was prepared to consider the site in question only and should not be used for interpretation elsewhere. The preceding conclusions are only a brief summary of this report; it is recommended that the report is read in full to ensure that all recommendations have been understood.

The report should be presented to any party requiring approval and their comments should be sought prior to commencing any works in these locations.

10. References

1. BS10175:2001 Investigation of Potentially Contaminated Site – Code of Practice
- British Standards Institution
2. CLR Report No 2 “Guidance on Preliminary Site Inspection of Contaminated Land”
- Department of the Environment
3. CLR Report No 3 “Documentary Research on Industrial Sites” -Department of the Environment
4. CLR Report No 11 “Model Procedures for the Management of Contaminated Land”.
- Department of the Environment
5. CLR Report No 12“A Quality Approach for Contaminated Land Consultancy”. -
Department of the Environment
6. Technical Guidance for Developers, Landowners and Consultants: Verification
Requirements for Cover Systems – Yorkshire and Lincolnshire Pollution Advisory
Group. Ver 3.4, November 2007
7. Technical Guidance for Developers, Landowners and Consultants: Development on
Land Affected by Contamination – Yorkshire and Lincolnshire Pollution Advisory
Group. Ver 9.2, March 2018

11. Appendices

1. GAC for the Topsoil
2. Verification Requirements for Cover Systems from YALPAG

Document Authors and Approval

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Signed Date 28 th June 2021	Signed Date 1 st July 2021

Appendix 1. GAC for Topsoil

See appended document.

Appendix 2. Verification Requirements for Cover Systems YALPAG

See appended document.

