Report on

Proposed Dwellings at Land Rear of 45 West End South Cave

Phase 1 - Contamination

Risk Assessment

For

Mr T Morgan

with Scott Young of SAY Architectural,
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February 2024

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Contaminated Land Risk Assessment Phase 1

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Appendices

References

1. Technical Guidance for Developers, Landowners and Consultants - Yorkshire and Lincolnshire Pollution Advisory Group Version 12.2 – July 2023
2. Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance April 2012
3. BS 10175:2011 + A2:2017, “Investigation of Potentially Contaminated Land - Code of Practice”
4. BS 5930:2015+A1:2020, “Code of Practice for Site Investigations”
5. BS 8576:2013 Guidance on investigations for ground gas - Permanent gases and volatile organic compounds (VOCs)
6. LCRM Guidance (gov.uk)
7. CL:AIRE Guidance (https://www.claire.co.uk/information-centre/water-and-land-library-wall)
8. ENVIRONMENT AGENCY/DEFRA – Model Procedures for the Management of Land Contamination Contaminated Land Report 11 September 2004
9. New groundwater vulnerability mapping methodology Report: SC040016 – September 2017
10. The Chalk aquifer of Yorkshire British Geological Survey – 2006
11. NHBC/ENVIRONMENT AGENCY/CIEH - Guidance for the Safe Development of Housing on Land Affected by Contamination 2008
12. National Planning Policy Framework (NPPF)
13. Indicative Atlas of Radon in England and Wales (2007)
14. UK Health Security Agency and British Geological Survey – Guidance Radon Risk (2022)

1 Introduction & Scope

1.1 A&F Consulting Engineers LLP was appointed by Scott Young of SAY Architectural, on behalf of Troy Morgan to provide a Phase 1 Preliminary Investigation, relating to land to the rear of 45 West End, South Cave, HU15 2EX. The proposal is for two residential dwelling houses. The purpose of this preliminary investigation is to evaluate likely ground conditions and significant geoenvironmental issues at the site, and to plan the scope of subsequent phases of investigation. This report may be regarded as a Preliminary Risk Assessment in accordance with the guidance document DEVELOPMENT ON LAND AFFECTED BY CONTAMINATION Technical Guidance for Developers, Landowners and Consultants Yorkshire and Lincolnshire Pollution Advisory Group Version 12.2 – July 2023.

1.2 This preliminary investigation has been undertaken with due regard to current national contaminated land guidance, East Riding of Yorkshire Council current guidelines for possible contaminated land, incorporates the general principles of PPS23, the Environmental Protection Act 1990 and with BS 10175:2011 + A2:2017, *"Investigation of Potentially Contaminated Land - Code of Practice"* and relevant sections of BS 5930:2015+A1:2020, *"Code of Practice for Site Investigations",* and BS8576:2013 and LCRM.

1.3 The objectives of the investigation were as follows:

- To determine the land use history of the site from an inspection of available Ordnance Survey (OS) plans and other sources
- To determine the environmental setting of the site from available sources
- To determine whether past mining may have had an influence on the site
- To determine whether the site has previously been used for purposes that may have given rise to significant ground contamination
- To provide recommendations for further investigation.

1.4 Information has been obtained from various sources and the full responses received are presented later in this document. This report was prepared by Richard Bate with contributions by Graham Bate and Mr Troy Morgan (site history), and Jon Tait, Principal Officer – Environmental Control, East Riding of Yorkshire Council (site contaminated land history and search).

1.5 This report was prepared by Richard Bate. LIMITATIONS. The information contained in this report is intended for the use of the named client (or their approved contractors). Should any part of this report be relied on by a third party, that party does so wholly at its own risk and A&F disclaims any liability to such parties. Should the purposes for which the report is used, or the proposed use of the site change, this report may no longer be valid and further use of, or reliance upon the report in those circumstances shall be at the client's sole and own risk. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. A&F should in all such altered circumstances be commissioned to review and update this report accordingly.

1.6 Glossary of Terms

A&F	A&F Consulting Engineers LLP
ACM	Asbestos Containing Material
BS	British Standard
EPA	Environmental Protection Act 1990
ERYC	East Riding of Yorkshire Council
LCRM	Land Contamination Risk Management
NFA	No further action

2 EA Methodology & LCRM

2.1 The Environment Protection Act of 1990 (Part II A) as amended defines "contaminated land" as:-

Any land which appears to the local authority, in whose area it is situated, to be in such a condition, by reason of substances in, on, or under the land, that:-

a) Significant harm is being caused or there is a significant possibility of such harm being caused.

b) Pollution of controlled waters is being, or is likely to be caused

2.2 The Phase 1 Desk Study identifies any potential sources of contamination resulting from the current and historical activities at the site by reviewing available information from sources such as archives, plans and records, databases and information from regulatory authorities. In this way we can discover the past and current activities at a site and assess them for potentially contaminative processes, in order to determine the potential for the presence of contamination. This report has been prepared by a competent person with experience of contaminated land and the safe development of housing on land affected by contamination.

2.3 The Phase 1 study also identifies any potentially sensitive receptors, e.g. humans, surface watercourses, aquifers, buildings or ecological receptors and also collates the information relating to the site's environmental setting, i.e. geology, hydrogeology, industrial activity, location of controlled waters, pollution incidents and proximity to open/closed landfill sites.

2.4 This information is then used to undertake a qualitative Risk Assessment through the development of a conceptual model for the site. The conceptual model identifies any Significant Pollutant Linkages which may be present. If Significant Pollutant Linkages are present then a Phase 2 site investigation may be required to quantify the risk and also to assess the potential for environmental liability associated with the site.

2.5 Role of the Owner/Developer In general, where development is proposed, the developer is responsible for ensuring that development is safe and suitable for use for the purpose for which it is intended. The developer is thus responsible for determining whether land is suitable for a particular development or can be made so by remedial action.

3 Site Appraisal

3.6 Appraisal of Site History

3.6.1 Our studies involved a desk study of the history of the site and its immediate area. The East Riding of Yorkshire Council makes use of GIS and Ordnance survey mapping information, and they have provided a *Contaminated Land Search* (Environmental Enquiry Report - Appendix B). ERYC's reply has been used in the assessment of the site's history. In addition, other information, covering local history has been used, including our own archives. Interviews with the manager of the site (Mr Troy Morgan) were made in February 2024, providing additional information. The site was used as part of a farm residence until 2002. Since 2002 the site has become vacant. The study also included internet surf, which identified various interests, old mapping and local activities. There are no known coal mining activities in the area.

3.2 Ordnance Survey Mapping

Ordnance Survey maps of the area, which include the development site, are available, at good mapping scales from 1852 onwards. Ordnance Survey maps have been viewed in 1852, 1888, 1908, 1950, 1997, 2004, 2008, 2017 and 2024. Other mapping sources have also been studied or referred to.

3.3 Site History

The site's history has been for agricultural and residential (farmyard, garden and hobbies), including outbuildings / sheds, and a vehicular pedestrian access. The rear garden is now a vacant area.

3.3.1 Pre-1850's

No information regarding any excavations or related industry was discovered on or near the site.

3.3.2 1852

The Ordnance Survey map shows the site as an undeveloped field parcel, presumably agricultural land or possibly part of a large garden, with a single small neighbouring building shown along the eastern boundary. Other boundaries are not confirmed. Neighbouring land uses also appear to be of agriculture or residential land, with significant development within 250m predominantly along *West End*. There is other limited development in the area. Access is from *West End* only.

3.3.3 1852 – 1950

The site and the surrounding area are unchanged. The site remains undeveloped, with formal boundaries present on the east as well as the west sides. The site probably forms part of a residential garden orchard to 45 (or 43) *West End*. On the opposite side of *West End* (~60m SE) a *Smy.* (*Smithy*) is shown between 1888 and 1908. The area within 250m of the site has some gradual additional development.

3.3.4 1950 – 1997

The site had three detached buildings erected during this period – all presumed agricultural or domestic outbuildings. In addition, development is noted to the north (presumed agriculture), west (residential) and south. Additional boundaries are present near the site. There is also significant residential development within 250m of the site during this period.

3.3.5 1997 – 2004

The site is unchanged. A building constructed to the north has now disappeared, and an additional building is constructed to the south. To the east *West End Farm* has disappeared with extensive residential development now present in *West End Farm Close* and *West End Farm Mews*. Additional buildings and extensions are noted within 250m of the site.

3.3.6 2004 – 2008

The site is unchanged, although the three buildings may have been demolished during this period. The building to the south has been altered. A boundary now exists between the site and 45 *West End*, which is the same as observed today. All current site boundaries are established. The current site access from *West End Farm Close* was probably established during this period.

3.3.6 2008 - 2022

The three buildings on the site were demolished during this period (or previously). From discissions with the owner this was around 2008. The site was acquired in 2022 by the current owner. It is thought that the site was vacant for most of this period. Additional building development occurred to the north and north east of the site.

3.3.7 2022 - 2024

The site is currently vacant.

3.3.8 2024 onwards

The proposal is to develop the site with two new dwellings, whilst retaining the existing site access.

3.4 Assessment of Environmental Setting

3.4.1 Geology

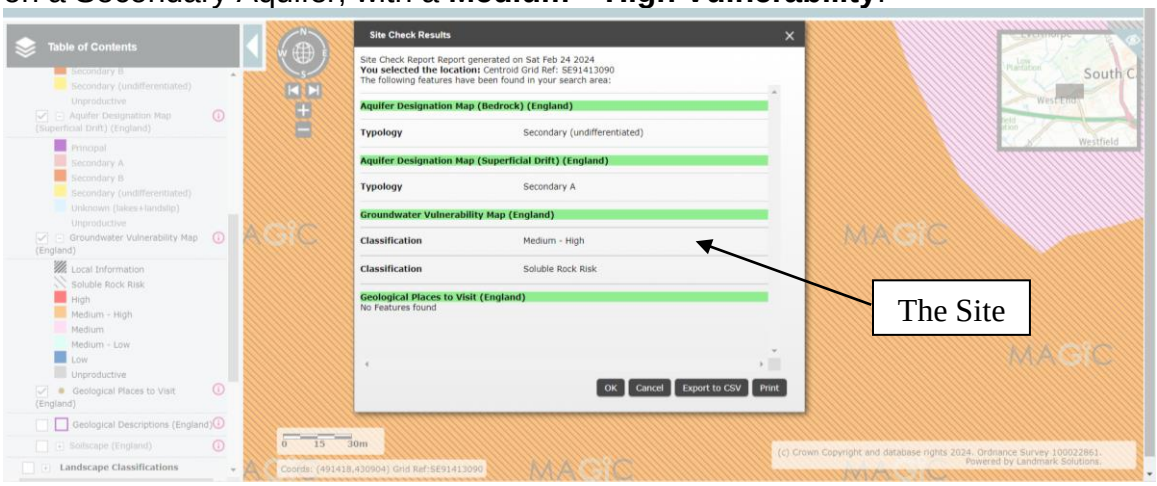
The site lies on approximately flat land (its level is approximately 17.8metres above Ordnance datum Newlyn), located in South Cave approximately 17.8km west of Kingston-Upon-Hull's Paragon Interchange.

From the British Geological Survey website, superficial deposits are Bielby Sand Member - Sand, clayey. Sedimentary superficial deposit formed between 116 and 11.8 thousand years ago during the Quaternary period, which overlay the Charmouth Mudstone Formation - Mudstone. Sedimentary bedrock formed between 199.3 and 182.7 million years ago during the Jurassic period.

3.4.2 Hydrogeology

The Charmouth Mudstone Formation – Mudstone is generally impermeable to water. Presumed top soils are likely to be partially pervious to water.

The site is located on the Groundwater vulnerability map, and is located on a Secondary Aquifer, with a **Medium – High Vulnerability**.



Data from Magic website 24 February 2024

The *Aquifer* is monitored for pollution and contamination.

3.4.3 Hydrology

There is no open watercourse on or adjacent to the site, there are however several open waterbodies within 250m of the site. The two main open water bodies are: *South Cave Beck (closest 130m)*; and *Cave Castle Fish Pond (closest 200m)*; there are also numerous other open channels (unnamed – closest 60m) and a small pond and a small pumping station. It is presumed that surface water eventually drains into the *North Sea*.

Generally surface water drains away from the site, with most draining to the *South Cave Beck* (land west, east and south), with land to the north draining northerly. Existing waste foul water drains to the public sewer managed by Yorkshire Water Services Limited, the new dwellings will connect into the existing YWS system on *West End Farm Close*. The existing surface water for the site was not confirmed, likely to a combined system and will be retained if present or informal green field run-off if not. The new dwellings will drain surface water to two soakaway systems.

3.4.4 Information from gov.uk[1]

Within 1km of the site: Waste Operations Permits – 0 results; Authorised Treatment Facilities (ATF) for End of Life Vehicles (ELV) – 0 results; Installation Permits - 0 results; Radioactive Substances Permits – 0 results; Water Quality Exemptions – 0 results; Flood Risk Exemptions – 0 results; Total results list above within 1000m – 0 results.

Discharges to water and groundwater – 5 results within 1km, see extracts below (all more than 250m distant):

Name	Address	Permit Number	Distance (km)
SHEEP DYKE FARM	SHEEPDYKEFRM, SHEEP DYKE FARM, COMMON ROAD, BROUGH, SOUTH CAVE, EAST YORKSHIRE	NE/WRA8940/001	0.8
MR STEFANO LUCATELLO & MRS LESLEY LUCATELLO	43 BACCHS LN, PROPOSED DWELLING, 43 BACCHUS LANE, SOUTH CAVE, BEVERLEY	NE/WA6257/001	0.8
MR STEFANO LUCATELLO & MRS LESLEY LUCATELLO	43 BACCHS LN, PROPOSED DWELLING, 43 BACCHUS LANE, SOUTH CAVE, BEVERLEY	NE/WA6257/002	0.8
WHITE HOUSE FARM	WHITE HOUSE, THE WHITE HOUSE, NORTH CAVE, BOOTHFERRY	NE/C5257/001	1.0
WHITE HOUSE FARM	WHITE HOUSE, THE WHITE HOUSE, NORTH CAVE, BOOTHFERRY	NE/C5257/002	1.0

Waste Exemptions - 3 results within 1km, see extracts below (all more than 250m distant):

Name	Address	Registration Type	Registration Number	Distance (km)
Karen Graham	67, FERRY ROAD, SOUTH CAVE, BROUGH, HU15 2JG	T28	WEX278670	0.7
The Ridings Medical Group	67, FERRY ROAD, SOUTH CAVE, BROUGH, HU15 2JG	T28	WEX355188	0.7
john leaf	NEWFIELDS, COMMON ROAD, SOUTH CAVE, BROUGH, HU15 2EA	D7, T6, U1, U10, U12, U13, U4, U8	WEX344876	0.9

[1] environment-agency.gov.uk (and associated websites)

Waste Carriers, Brokers, and Dealers – 4 results within 1km (all more than 250m distant):

Name	Address	Registered as	Registration	Distance (km)
joneswindowcleaners.co.uk	62, BRIDGE ROAD, BROUGH, HU15 2JE	Carrier, Broker, Dealer - Lower Tier	CBDL36771	0.4
marsons	71, CHURCH STREET, BROUGH, HU15 2EP	Carrier, Broker, Dealer - Lower Tier	CBDL104623	0.7
Carl Hardwick trading as Local Garage Door Services	70, CHURCH STREET, SOUTH CAVE, BROUGH, HU15 2EP	Carrier Dealer - Upper Tier	CBDU446735	0.7
Prestige Plumbing & Heating	30, CASTLE RISE, BROUGH, HU15 2ET	Carrier, Broker, Dealer - Lower Tier	CBDL326558	0.8

Total results within 250m – 0 results.

Scrap Metal Dealers within 1km of the site – 0 results.

Enforcement Notices within 1km of the site – 0 results.

3.4.5 Information from ERYC

The Council has not declared any part of the property Statutorily Contaminated Land as part of its duties under Part 2A. However, there are sites within 250m of the property that has been identified as potentially contaminated land in need of further detailed investigation. For details see later 3.8.12 and Appendix B.

Potential sites identified include:

- Recent adjacent residential developments (1997-2017)
- A blacksmiths (1886-1908)

Other information includes:

- A TLP report (Contaminated Land 2017) which includes a contamination re-evaluation statement (below):

CONTAMINATION RE-EVALUATION STATEMENT
Comparing the environmental screening values and ground gas monitoring data detailed in the 2012 Phase 2 Report with current guideline values, the conclusions drawn in the Initial Phase 2 Report are considered relevant at this time in that no specific ground / groundwater remediation will be necessary to render the site suitable for its proposed residential end use and no ground gas protective measures will be required in the proposed new dwellings.

The Council has not declared any part of the property Statutorily Contaminated Land.

3.4.6 Information from ukradon.org

Radon is a natural radioactive gas, which enters buildings from the ground. Exposure to high concentrations increases the risk of lung cancer.

United Kingdom Health Security Agency (UKHSA) recommends that radon levels should be reduced in homes where the annual average is at or above 200 becquerels per cubic metre (200 Bq m-3). This level is termed the Action Level.

United Kingdom Health Security Agency defines radon Affected Areas as those with 10-30% chance of a house having a radon concentration at or above the Action Level of 200 Bq m-3. **The site falls in the second highest band.**

Data from https://www.ukradon.org/ website 24 February 2024

The comprehensive control strategy, recommended by the NRPB and accepted by the Government (DOE, 1990; NRPB, 1990), includes recommendations which are still extant and relevant to the current document.

a Existing homes in Affected Areas should have radon measurements.

b Radon concentrations at or above the Action Level of 200 Bq m^{-3} should be reduced to as low as reasonably practicable.

c New homes built within localities delimited by the appropriate Government authorities should be constructed with precautions against radon.

Extract from Indicative Atlas of Radon in England and Wales (2007)

3.5 Site Inspection

3.5.1 The centre of the site is located at OS Grid Ref SE91413091 (491412, 430914). The site is situated within South Cave approximately 17.8km west of Kingston-Upon-Hull's city centre. The site location is shown in Appendix C to this report. The preliminary site inspection was undertaken by Mr Richard Bate on Wednesday 21st February 2024 and site photographs are presented in Appendix D.

3.5.2 The site is a flat parcel of land currently vacant with a rubble pile located in a disused garden. There are also a few other scattered small heaps of rubble, timber, wind-blown wastes and a disused concrete access. The entrance to the site is via a shared private residential easement from *West End Farm Close*.

3.5.3 Shared Site Access (entrance). A thin strip of land from *West End Farm Close* permits access to the site, no evidence of polluting materials was noted at the site entrance. This strip of land forms a shared easement between two adjacent dwellings and the site. The entrance is made of consolidated clean crushed stone, with grass and moss present. The area is open at *West End Farm Close* and at the development proposal area, with residential dwellings to the immediate north and south – both of which are outside the scope of this report. At the time of the survey a waste skip – used by a neighbour, was located on the easement. The skip contained inert material (builders' rubble and soil) and no spillage was noted. In addition, coloured domestic waste bins again from neighbouring properties were present, again no obvious contamination risk was noted. It is not known when the access easement came into being, probably between 2008 and 2022. No odours or vegetation distress was noted in the entrance area. No areas were overgrown. No other potential sources of pollution were noted in the residential access area.

3.5.4 Plot 1 and Access to Plot 2 (south). This parcel of land is adjacent to the site entrance, and had limited evidence of site pollution. The area appears to have been part of a previous garden area, with various trees, overgrown shrubs, hedges, old timber fencing, daffodils and snowdrops present. An overgrown concrete roadway passes through this area. Piles of cut timber, discarded plastic gardening materials (tubs, containers, timber trellis, weed membrane, and hedge spiral guards), corrugated roof sheeting, an old door, poultry wire, and some wind-blown domestic wastes were also noted. The remains of a timber fire were noted. No odours or vegetation distress was noted in the area. Some areas were overgrown, limiting visual inspection. Some scattered inert building materials were noted. Some wind-blown wastes, broken and waste materials were noted (steel Heras fencing, steel, wire, concrete blocks, plastic). No other potential sources of pollution were noted in this area.

3.5.5 Plot 2 (north). This parcel of land is north of Plot 1, and had limited evidence of site pollution. The area also appears to have been part of a previous garden area, with various trees, overgrown shrubs, hedges, old timbers, a washing line pole, daffodils and snowdrops present. A large overgrown pile of building rubble is present in this area. The rubble pile appears to consist mainly of inert block and concrete, with small amounts of plastic, corrugated sheet roofing, poultry wire and domestic waste present. Piles of cut timber, on old timber farm gate, corrugated plastic drainage pipe, discarded plastic gardening materials (tubs, containers and weed membrane), corrugated steel roof sheeting, poultry wire, and some wind-blown domestic wastes were also noted. No odours or vegetation distress was noted in the area. Some areas were overgrown, limiting visual inspection. Some scattered inert building materials were noted. Some wind-blown wastes, broken and waste materials were noted (steel, wire, concrete blocks, plastic). No other potential sources of pollution were noted in this area.

3.6 Current Use of Site

The current use of the site is vacant with redundant garden areas, a shared access, and obsolete residential garden/farmyard areas. The proposed redevelopment consists of a change of use from redundant / residential / farmyard to residential.

There are no buildings on the site.

Extensive vegetation was noted around the site, with most areas and hedges recently strimmed. Vegetation consisted of moss and grasses to the entrance area, with Plots 1 & 2 having mosses, grasses, briars, nettles, bulbs, climbing plants, hedges, shrubs, trees and numerous other garden varieties. Some vegetation partly obscured some areas; however, a site visual inspection was generally possible. There were some concrete hard standing areas and stoned areas. A pile of building rubble was present in Plot 2. Around the perimeter of the site is steel post and chain link fence / timber fence, timber fence with corrugated steel sheets, timber fence, open entrance areas, brick walls, hedges with plastic coated chain link fence, and hedges.

It was noted on site that typical land uses were:-

- Vacant
- Vegetation (overgrown garden grass)
- Vegetation (miscellaneous weeds, etc)
- Vegetation (trees, shrubs & hedging)
- Farm yard (miscellaneous storage, poultry wire, plastic drainage pipes)
- Access (concrete area covered with ivy and moss)
- Storage (miscellaneous storage of building materials, rubble, and gardening materials)
- Residential garden (previously used by adjacent development – compost, plastic & timber)

Vegetation generally did not prevent access or inspection.

From the site walkover survey inspection, previous activities and uses could produce the following contaminants: -

- Building materials/wastes (inert rubble, blocks, concrete, corrugated steel sheets & plastics)
- Domestic materials/wastes (binned/skip materials, steel, old wooden door, windblown, plastics & toys)
- Farm materials (wire mesh, drainage pipe & timber gate)
- Gardening wastes (compost, plastic & timber)
- General wastes arising from previous site activities

3.7 Proposed Use of Site - Assessment

The proposed development involves the construction of two new detached residential dwelling houses with parking, garden and lawn areas.

The current use of the site is vacant. The new residential development has the potential to sit well with the existing adjacent developments (residential). During the proposed construction, wastes and suspected contaminated materials, if discovered, will need to be assessed and disposed of safely.

3.8 Preliminary Assessment of Site (Phase 1)

We have split our assessment into the same separate time periods which we have previously referred to (in 3.3 Site History):-

3.8.1 Pre-1850's

Typical site activities: Agricultural and/or residential.

Contamination risk: Low. Contamination is expected to be limited to agricultural organic wastes, or garden wastes, which are expected to have decomposed to inert compounds. Adjacent activities are agricultural or residential.

It is not expected that any possible pollutants will have significantly migrated on to the site from adjacent activities.

3.8.2 1852

Typical site activities: Agricultural and/or residential.

Contamination risk: Low. Contamination is expected to be limited to agricultural organic wastes, or garden wastes, which are expected to have decomposed to inert compounds. Adjacent activities are agricultural or residential.

It is not expected that any possible pollutants will have significantly migrated on to the site from adjacent activities.

3.8.3 1852 – 1950

Typical site activities: Agricultural and/or residential.

Contamination risk: Low. Contamination is expected to be limited to agricultural organic wastes, or garden wastes, which are expected to have decomposed to inert compounds. Adjacent activities are agricultural or residential.

It is not expected that any possible pollutants will have significantly migrated on to the site from adjacent activities.

3.8.4 1950 - 1997

Typical site activities: Agricultural, residential, building construction, and possible residential and agricultural goods storage and access.

Contamination risk: Low - Medium. Contamination is expected to be limited to residential and agricultural organic wastes, and building waste, which are expected to have decomposed to inert compounds. Adjacent activities are agricultural or residential or access.

It is not expected that any possible pollutants will have significantly migrated on to the site from adjacent activities.

3.8.5 1997 - 2004

Typical site activities: Agricultural, residential, building construction (adjacent), and residential and agricultural goods storage and access.

Contamination risk: Low. Contamination is expected to be limited to residential and agricultural organic wastes, and building waste, which are expected to have decomposed to inert compounds. Adjacent activities are agricultural or residential or access or building construction.

It is not expected that any possible pollutants will have significantly migrated on to the site from adjacent activities.

3.8.6 2004 – 2008

Typical site activities: Agricultural and/or residential, building demolition, residential and agricultural goods storage, access and vacant.

Contamination risk: Low-Medium. Contamination is expected to be limited to residential and agricultural organic wastes, and building waste, which are expected to have decomposed to inert compounds or disposed of safely. Adjacent activities are agricultural or residential or access.

It is not expected that any possible pollutants will have significantly migrated on to the site from adjacent activities.

3.8.7 2008 - 2022

Typical site activities: Agricultural and/or residential, building demolition, building construction (adjacent), residential and agricultural goods storage, access and vacant.

Contamination risk: Low-Medium. Contamination is expected to be limited to residential and agricultural organic wastes, and building waste, which are expected to have decomposed to inert compounds or disposed of safely. Adjacent activities are agricultural or residential or access.

It is not expected that any possible pollutants will have significantly migrated on to the site from adjacent activities.

3.8.8 2022 – 2024

Typical site activities: None - vacant.

Contamination risk: Low. Contamination is expected to be limited to residential wastes, which are expected to have decomposed to inert compounds. Adjacent activities are residential.

It is not expected that any possible pollutants will have significantly migrated on to the site from adjacent activities.

3.8.9 2024 onwards

Typical site activities: Site developed as a residential residence.

Contamination risk: Low. Contamination is expected to be limited to waste building materials, some of which are expected to decompose into inert compounds or safely disposed of off-site.

It is not expected that any pollutants will have significantly migrated on to the site from adjacent activities.

3.8.10 Site Infilling

Site activities: During the history of the site, some limited infilling in the form of made up ground is likely to have occurred in the form of stone or rubble to form access or building foundations or raised beds.

Contamination risk: Low. It is unlikely that landfill has occurred on the site. It is likely that some inert material has been imported following the construction of the site buildings or access/yard areas.

3.8.11 Asbestos Cement

Typical activities: None confirmed. This material may have been used on the previous onsite buildings (reported in 2005) but was not confirmed.

Contamination risk: Low. The buildings have been demolished and no visual evidence of asbestos cement sheeting was noted. Most likely the building were concrete block walls with corrugated steel sheets to the roof. If asbestos materials were present, they were most likely removed safely by a competent contractor – risks are considered low.

Additional Remarks: During the walk-over survey no broken sheets or other evidence of asbestos were observed.

3.8.12 Contaminated Land Search

Consultation with East Riding of Yorkshire Council and a contaminated land search (Appendix B) has allowed us to prepare our interpretation of information in the table below for contamination risk assessment:-

Source Sites	***On site***	***Within 250m?***	***Notes***	***Risk at Site***
Statutorily Contaminated Land	None	None		None
Farms & Outbuildings	**Yes x1**	**Yes x4**	1 No. Westcote Farm 1 No. S Cave Piggeries 1 No. West End Farm 1 No. Fairways Farm	**Onsite** Low (B1)
Abattoirs	None	None		None
Tanks	None	None		None
Hospitals	None	None		None
Petroleum	None	None		None
Depots	None	None		None
Tannery	None	None		None
Fire Stations	None	None		None
Chemical Works	None	None		None
Ship Building	None	None		None
Ship Yards	None	None		None
Timber works, saw mills and joiners	None	**Yes x1**	*1 No. builder's yard*	Low (B1) Remote *
Cemetery	None	**Yes x1**	*1 No. Cave Castle Cemetery*	Low (D1) Remote *
Possible landfill sites	None	**Yes x5**	*3 No. Northfield Close* *2 No. Nunnery Walk*	Low (B1&B4) Remote *
Closed landfill sites	None	None		None
Gasworks	None	None		None
Sewage	None	None		None
Sewage works	None	None		None
MOD Land	None	None		None
Industrial Estates	None	None		None
Sewage sludge disposal	None	None		None
Part B Processes	None	None		None
General Works	None	**Yes x1**	*1 No. Smithy*	Low (B1) Remote *
Scrap Yards	None	None		None
Sheep Dips	None	None		None
Old disused railways	None	None		None
Existing railways	None	None		None
ERY Trades 1855 – 1982	None	None		None
Surrendered Petroleum Licences	None	**Yes x2**	*1 No. site (two references)*	Low (B1) Remote *
Haulage	None	None		None
Explosives	None	None		None
Airfields	None	None		None
Fuel Stations	None	None		None
Pre 1972 waste tips	None	None		None
Historical trades	None	None		None
Permitted waste sites authorised landfill site boundaries (ES)	None	None		None
Historic Landfill (EA)	None	None		None

OTHER ENTRIES				
Slurry Ponds	None	None		None
Electricity Substations	None	**Yes x1**	*1 No. Substation*	Low (D1) Remote *
Landfill sites	None	None		None
Contaminated Land Notices	None	None		None
EPA 1990 Register	None	None		None
EPA 1990 consultation	None	None		None
EPA 1990 (adjacent)	None	None		None
Waste Operations	None	None		None
ATF ELV	None	None		None
Installation Permits	None	None		None
Discharges to water and groundwater	None	None		None
Radioactive Substances Permits	None	None		None
Waste Exemptions	None	None		None
Water Quality Exemptions	None	None		None
Flood Risk Exemptions	None	None		None
Waste Carriers, Brokers, and Dealers	None	None		None
Scrap Metal Dealers	None	None		None
Enforcement Notices	None	None		None

* source does not pass through site via watercourses or topography

Other possible contaminant sources have also been considered:

Historical Tanks And Energy Facilities, Potentially Infilled Land (Non-Water), Potentially Infilled Land (Water), Cont. Land Register, Pollution Incidents, Prosecutions – water, Prosecutions – processes, Enforcements – hazardous, Enforcements – PPC, Registered Landfill, LA Landfill, BGS Landfill, Permitted Landfill, Integrated PC Landfill, RWTD Landfill, EPR Waste Sites, RWT Sites, LA PPC, COMAH, Hazardous Consents, Hazardous Handling, Contemporary Trades, Trades 1855 – 1982,

ERYC have reported no record of pollution incidents.

3.8.13 Contaminated Land Search (Further Examination)

Prioritisation and risk assessment (from 3.8.12).

Source Sites	***On site***	***Within 250m?***	***Further Examination***	***Residual Risk***
Farms & Outbuildings	**Yes**	**Yes**	*Part of previous farm* *On site*	Low (this report) Has been used by residents since 2004ǂ
Farms & Outbuildings	None	**Yes**	*Fairways Farm, Northfield Close, South Cave* *~100m NW of the site*	Low (residential) ǂ±
Farms & Outbuildings	None	**Yes**	*Westcote Farm, Westcote Fold, South Cave* *~100m SE of the site*	Low (residential) ǂ±
Farms & Outbuildings	None	**Yes**	*South Cave Piggeries, Thornham Close, South Cave* *~220m SE of the site*	Low (distant & residential) ǂ±
Timber works, saw mills and joiners	None	**Yes**	*Builders Yard, West End, South Cave* *~88m SW of the site*	Low (residential) ǂ±
Cemetery	None	**Yes**	*All Saints Church Cemetery, South Cave* *~150m NE of the site*	Low (residential) ǂ±
Possible landfill sites	None	**Yes**	*Former Drain, Northfield Close, South Cave* *~100m N of the site*	Low (residential) ǂ±
Possible landfill sites	None	**Yes**	*Former Pond, 41 Northfield Close, South Cave* *~88m NW of the site*	Low (residential) ǂ±
Possible landfill sites	None	**Yes**	*Former Drain, Northfield Close, South Cave* *~100m NW of the site*	Low (residential) ǂ±
Possible landfill sites	None	**Yes**	*Former Drain, Nunnery Walk, South Cave* *~160m W of the site*	Low (residential) ǂ±
Possible landfill sites	None	**Yes**	*Former Pond, Nunnery Walk, South Cave* *~200m W of the site*	Low (residential) ǂ±
General Works	None	**Yes**	*Smithy, West End, South Cave* *~60m SE of the site*	Low (residential) ǂ±
Surrendered Petroleum Licences	None	**Yes**	*3 Church Hill, South Cave* *~140m W of the site*	Low (residential) ǂ±
Surrendered Petroleum Licences	None	**Yes**	*3 Church Hill, South Cave* *~140m W of the site*	Low (residential) ǂ±
Electricity Substations	None	**Yes**	*1 Barnards Drive, South Cave* *~204m S of the site*	Low (distant & residential) ǂ±

ǂ - The potential source is located in a residential area with potential contaminants likely to be reported by residents.

± - The potential source drains away from the site.

Since all pollution sources are located in the *Secondary Aquifer* and on potentially sandy land, pollutants could migrate in and out of the site.

Notes to Accompany Appendix B

The pathways on a site are generally deduced by proximity to, or interception of sources, rather than actual knowledge of their occurrence. There are three categories of pathway considered in the model: i) direct contact; ii) groundwater; and iii) surface water. Four relevant receptor groups are then considered: 1) humans; 2) controlled waters (surface water and groundwater); 3) ecology; and 4) property. These are combined by the model, resulting in seven possible pollutant linkage scenarios.

The output from the assessment of each pollutant linkage is given in terms of five ranking classes, 'A' through to 'E', with 'A' indicating the highest priority for further inspection and 'E' indicating the lowest. The ranking class and receptor group are combined to give a single score for each site. The council has decided to concentrate initially on those sites which have been categorised as 'A1' (highest priority based on a human receptor). In order to prioritise which sites are inspected first, the council will order them according to the number of residential properties and gardens, so that priority will usually be given to those sites where potentially the largest number of receptors is present.

4 Conceptual Site Model

4.1 Source – Pathway – Receptor Pollutant Linkages

Contaminant Sources: Residential organic wastes, agricultural organic wastes, wastes generated from building demolition, wastes generated from general works, radioactive radon gas; wastes generated from building construction, materials used in building construction, wastes generated from agriculture and residential use; the migration of pollution or contamination from other adjacent users. No other adjacent sources of contamination have been identified.

Pathway: The contaminants are unlikely to have the potential to migrate through the water table on to the site due to topography and the remoteness from the site and the regular monitoring of the aquifer and the predominance of residential dwellings which are likely to report contamination problems if they were to occur. Site infilling may have introduced some contaminants to made up ground. The only obvious pathway is the *Secondary Aquifer*, which is located throughout the site. Contaminants on site may affect receptors. Local aquifers are regularly monitored as they provides drinking water, contamination is therefore unlikely, since any contamination would have already been reported.

Receptors: The site is proposed to be developed for residential use. It is possible that during development of the site contact with contaminated material may be made. However, and depending on the nature of the material discovered, it should be possible to remove any residual risk.

The pile of building rubble will be safely disposed of off-site.

If present, in filled material was not suspected to be contaminated. A conceptual model is shown in Appendix A.

5 Conclusions and Recommendations

The desktop study (Phase 1) has revealed the potential for contamination on site, which may be able to affect receptors. The proposed development is for the conversion of a residential garden (now vacant) to two new independent residential properties. The information from the Environment Agency indicates no major pollution incidents. Evaluation of the East Riding of Yorkshire Council and other research suggests low or very low contamination risks. A remote risk of asbestos may be present in the form of asbestos cement which has probably been safely removed from the site by a suitable contractor. **Radioactive radon gases** may be present at actionable concentrations – **high risk**. Other research indicates low contamination risks. The site is likely to be suitable for residential development, with proper management of risks.

a Existing homes in Affected Areas should have radon measurements.

b Radon concentrations at or above the Action Level of 200 Bq m^{-3} should be reduced to as low as reasonably practicable.

c New homes built within localities delimited by the appropriate Government authorities should be constructed with precautions against radon.

We recommend that both dwellings have radon gas measurements taken, and have suitable gas vapour barriers/membranes fitted below floor level. Consultation with the local authority is required. No basements or lower ground floors are to be constructed.

An intrusive ground investigation is not considered necessary, since risks on site are generally low.

An outline strategy is summarised below, based on the preliminary conceptual site model and information obtained during the desk study:

- The safe removal of wastes and potentially contaminated material from the site
- The use of correctly installed impermeable membranes beneath the proposed floor slab

The removal of contamination sources/pathway discovered breaks any *source – pathway – receptor pollutant linkages*, which may exist on the site.

However if during any additional construction, areas of suspected contamination* are discovered, it is recommended that additional tests are carried out and that construction materials are not used in the vicinity of

suspected contamination until the nature of such contamination is comprehensively identified.

All recommendations should be read in conjunction with the National Planning Policy Framework and the local authority's relevant policies.

Signed…  … Dated:- 26th February 2024

Graham Bate BSc C.Eng MICE MIStructE

Signed……  …… Dated:- 26th February 2024

Richard Bate BSc (Applied Physics) Graduate Member of IStructE

On behalf of A & F Consulting Engineers LLP

NOTES

†***Asbestos Regulations***
From the 21 May 2004 regulations came into force, which made it a legal obligation to for owners of property or those responsible for the repair and maintenance of premises to manage the risk of asbestos.

**** R&D PUBLICATION CLR 8 18***
Risk to building and construction materials
A.12 In addition to soil contaminants possibly having adverse effects on human health and the environment, some can have deleterious effects on building and construction materials.
A.13 Materials at risk from attack from possible soil contaminants include inorganic matrices such as cement and concrete, as well as organic materials such as plastics and rubbers (Environment Agency, 2001). Plastics and rubbers are generally used for piping and as service ducts, and are potentially attacked by a variety of chemicals, most of which are organic chemicals, particularly petroleum-based substances. Drinking water supplies can also be tainted by substances that can penetrate materials used in piping.