

A photograph of a cross-section of a stream bed, showing a mix of dark green silt, brown soil, and light-colored rocks and stones. The text "Preliminary Geoenvironmental Investigation" is overlaid in white.

Preliminary Geoenvironmental Investigation

Land at Yew Tree Farm, Farnley Tyas For Radcliffe Developments Ltd

Report no: 3381/1

Date: June 2021



YEW TREE FARM, FARNLEY TYAS SUMMARY OF GEOENVIRONMENTAL ISSUES

Job No.	3381	Site area/ha	0.75ha
Client:	Radcliffe Developments Ltd	NGR:	SE 164 127
Site:	Yew Tree Farm, Farnley Tyas	Nearest postcode:	HD4 6UD

The site is located off 'The Village' (road), approximately 4.5km southeast of Huddersfield town centre, and currently comprises a farm with residential dwellings, outbuildings, barns, paddocks and concrete surfaced yards.

Lithos were commissioned by Radcliffe Developments to provide a preliminary geoenvironmental appraisal of the site. It is understood that the site is to be redeveloped with housing including 10 no. new build plots, the refurbishment and conversion of 9 no. existing stone barns and retention of 2 no. existing dwellings; a proposed layout has been prepared.

Lithos' investigation included an inspection of historical and geological maps and information provided by the Landmark Information Group, the Coal Authority and QGIS. In addition, a site inspection has been carried out.

A summary of salient geoenvironmental issues is provided in the table below.

Issue	Remarks
Former uses	The site is shown to be occupied by a farm since the earliest edition OS plan of 1854.
Anticipated ground conditions	Likely veneer of made ground with Residual soils overlying predominantly Grenoside Sandstone from around 1m to 2m depth.
Anticipated contamination	Possible inorganic contaminants (metals, asbestos) within the made ground, together with localised spillage/leakage of fuels/oils from USTs and/or plant and machinery maintenance.
Mining & quarrying	The site is located in a CA Development Low Risk Area. There are no known quarries at or adjacent to the site.
Hazardous gas	No special precautions required.
Flooding & drainage	The site is located in Flood Zone 1. Soakaways constructed in shallow sandstone may provide a suitable drainage solution for surface water run-off.
Preparatory works	Demolition of existing buildings not scheduled for conversion, with grubbing up of hardstand and relict foundations.
Anticipated foundation solutions	Residual soils (firm/stiff clays or medium dense gravels) or weathered Sandstone should provide sufficient bearing capacity to enable the adoption of strip footings for two storey housing.
Recommendations for ground investigation	Appropriate ground investigation will be required to confirm ground conditions and concentrations of contaminants, if any. Investigation should comprise trial pitting where access allows with soakaway testing in selected pits. Further hand excavation should be undertaken adjacent to existing buildings to be retained and refurbished to confirm existing foundations. In areas of restricted access Dynamic Sampling should be undertaken.

At this stage, anticipated significant abnormalities relating to geoenvironmental issues at the site are:

- Demolition of existing buildings with grubbing up of hardstand and relict foundations.
- Post demolition investigation will be required.
- A Remediation Strategy will be required on completion of post demolition works for submission to regulators.

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01	Environmental setting
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Appendix B – Drawings

Drawing	Title
3381/1	Site location plan
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3381/3	Site features
3381/4	Site photos
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Appendix C - Commission

Appendix D – Historical OS plans*

Appendix E – Search responses*

From	Date	Content
Landmark	18 th May 2021	Envirocheck report
The Coal Authority	18 th May 2021	Coal Mining Report

* Some of this data is not included within the paper or PDF copies of this report; by request, it can be provided on a CD.

FOREWORD (preliminary geoenvironmental investigation report)

This report has been prepared for the sole use and reliance of the Client named on page 1 and cannot be relied upon by any other parties without the express written authorisation of Lithos Consulting Limited (Lithos). Any unauthorized third party relies on this report at their own risk and the authors owe them no duty of care.

This report has been reviewed by a Competent Person, as defined in the National Planning Policy Framework. We ensure that all projects are managed by individuals with necessary experience, relevant qualifications, and current membership of a relevant professional organisation. Records of engineers, project managers and reviewers involved in this project are maintained by us. Lithos QA/QC procedures for all our work forms an integral part of our ISO9001 accreditation and as such is regularly audited.

The report presents observations and factual data obtained during our site investigation, and provides an assessment of geoenvironmental issues with respect to information provided by the Client regarding the proposed development. Further advice should be sought from Lithos prior to significant revision of the development proposals.

The report should be read in its entirety, including all associated drawings and appendices. Lithos cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context. However, it should be noted that in order to keep the number of sheets of paper in the hard copy to a minimum, some information (e.g. full copy of the Landmark/Groundsure Report) is only included within the “electronic”, PDF Report on the accompanying CD.

The findings and opinions conveyed in any Desk Study section of the report (including review of any third party reports) are based on information obtained from the sources listed, which Lithos understands are reliable. Reasonable skill, care and diligence has been applied in examining the information obtained. However, Lithos accept no responsibility for inaccuracies in the data supplied or for opinions based on any such inaccurate data.

Where the report refers to the potential presence of invasive weeds such as Japanese Knotweed, or the presence of asbestos containing materials, it should be noted that the observations are for information only and should be verified by a suitably qualified expert.

Lithos reserve the right to amend their conclusions and recommendations in the light of further information that may become available.

**PRELIMINARY
GEOENVIRONMENTAL INVESTIGATION
OF LAND AT
YEW TREE FARM, FARNLEY TYAS**

1 INTRODUCTION

1.1 The commission and brief

- 1.1.1 Lithos Consulting were commissioned by Radcliffe Developments Ltd to carry out a preliminary investigation of land at Yew Tree Farm, Farnley Tyas.
- 1.1.2 Correspondence regarding Lithos' appointment, including the brief for this investigation, is included in Appendix C. The agreed scope of works included:
- A site walkover and inspection
 - An assessment of the land use history
 - Determination of the site's environmental setting
 - A mining risk assessment in accordance with Coal Authority guidance.
 - Assessment of anticipated ground conditions, including potential contaminants
 - Assessment of anticipated foundation and engineering issues associated with redevelopment for a residential end-use
 - Provision of recommendations for an appropriate ground investigation
- 1.1.3 This Preliminary Investigation comprised an inspection of historical and geological maps and information provided by the British Geological Survey, and the Landmark Information Group, the Coal Authority, and QGIS¹. In addition, a site inspection has been carried out by Lithos.
- 1.1.4 Primary aims of this investigation were to identify salient geoenvironmental issues affecting the site to enable design and costing of an appropriate intrusive investigation, and to support the submission of a planning application.

1.2 The proposed development

- 1.2.1 It is understood that consideration is being given to redevelopment of the site with traditional two storey domestic dwellings, associated gardens and adoptable roads & sewers.
- 1.2.2 A site layout has been provided by Watson Batty Architects (Drawing reference WBA-00-00-DR-A 00-001 Revision B, dated October 2018) which is reproduced as Drawing No. 3381/2 in Appendix B to this report. The layout shows the retention of two existing residential properties, the conversion of existing barns (9 no. Plots) and the construction of 10 no. new dwellings.

1.3 Report format and limitations

- 1.3.1 Standard definitions, procedures and guidance are contained within Appendix A, which includes background, generic information on assessment of the site's environmental setting.
- 1.3.2 General notes and limitations relevant to all Lithos preliminary investigations are described in the Foreword and should be read in conjunction with this report. The text of the report draws specific attention to any modification to these procedures and to any other special techniques employed.

¹ An Open Source Geographic Information System used by Lithos to access publicly available Government held digital data.

2 SITE DESCRIPTION

2.1 General

- 2.1.1 The site's location is shown on Drawing 3381/1 presented in Appendix B to this report. Site details are summarised in the table below.

Detail	Remarks
Location	4.5 km south east of Huddersfield city centre
NGR	SE 164 127
Area	0.75 ha (1.85 acres)
Known services	Underground electric, water, sewer. Overhead telecom. An electricity sub-station is located in the northwest which is to be retained as part of the development

2.2 Site features

- 2.2.1 Lithos completed a walkover survey of the site on 30th May 2021.
- 2.2.2 Existing salient features, at the time of the walkover are presented on Drawing 3381/3 in Appendix B to this report, and summarised in the table below.

Feature	Remarks
Current access	Off 'The Village' which runs along the northern boundary.
Topography	Slight fall to the north. Where larger barns have been constructed the ground has been 'cut' resulting in localised retaining walls of around 1.5m height on some sides.
Approximate areas	2,650m ² buildings. 550m ² tarmac hardstand/rough gravel. 1,900m ² concrete hardstand. 65m ² paving. 2,335m ² grass/dense vegetation.
Nature of boundaries	North – stone wall. East – wooden fence. South – no physical boundary. West – stone walls, blockwork walls (barns).
Surrounding land uses	North & east – The Village road with housing beyond. South – Arable farmland. West – Unnamed track with St Lucius Church beyond.

- 2.2.3 A selection of site photographs are included on Drawing 3381/4.
- 2.2.4 The site is currently in use as a farm though at the time of the walkover no livestock was present within the farmyard or associated barns. Numerous buildings of various age and construction are present, with areas of concrete, tarmac, stone paving, rough gravel, grass and dense vegetation.
- 2.2.5 Access is from three separate points to the north from 'The Village'.
- 2.2.6 Three fuel/oil storage tanks were noted including:
- an old cylindrical steel tank that appears to no longer be in use
 - a relatively new plastic bunded waste oil tank
 - a relatively new plastic bunded fuel tank on a raised plinth

- 2.2.7 The locations of the tanks are shown on Drawing 3381/3, with detailed photographs on Drawing 3381/5 in Appendix B. The tanks are discussed further in the following sections.
- 2.2.8 A vegetable garden is present in the far north west, with a grassed paddock in the far southeast.
- 2.2.9 Each of the buildings have been numbered (1 to 18) as shown on Drawing 3381/3 in Appendix B to this report, and are described in turn in the following sections.

Buildings 01 & 02

- 2.2.10 Currently occupied (residential) Building 1 is of two storey stone construction with a rough surfaced yard to the front (north) and a grassed garden to the rear (south). Building 1 could not be accessed but a basement/cellar is evident from low windows at ground level on the north wall.
- 2.2.11 Building 2 comprises a single storey front (north) with a 2 storey rear. Grassed gardens are located to the south and east with a tarmac and paved parking areas to the north. The western wall of Building 2 is supported by scaffolding

Building 03

- 2.2.12 Comprises a two storey stone barn used for storage, with silos (possible feedstuffs) located inside. The northeast corner of the building is supported by scaffolding. Two single storey 'lean-tos' lie against the western wall of Building 3, used for storage of farm equipment.
- 2.2.13 A large full height barn door provides access on the east wall.

Building 04

- 2.2.14 Comprises a two storey stone barn used for storage of farm equipment. The eastern wall of the building is supported by scaffolding.

Building 5

- 2.2.15 Comprises a single storey stone former milking shed though milking equipment appeared redundant/disused.

Building 6

- 2.2.16 Comprises a portal frame canopy with corrugated sheet roof adjoining Building 5.

Buildings 7, 8 & 9

- 2.2.17 Comprise relatively modern steel portal frame barns with timber clad walls and corrugated sheet roof. Previously used to house cattle, at the time of the walkover the barns were used for storage, including a caravan and farm equipment. The western wall of the barns drops down into the building by around 1.5m.
- 2.2.18 A section of timber sleepers, around 1m², is present adjacent to Building 9. Possibly providing access to a sump/wash.

Building 10

- 2.2.19 Comprises a relatively modern portal frame barn with low blockwork walls and upper timber cladding used for storage.

Building 11

- 2.2.20 Comprises a relatively modern portal frame barn with low blockwork walls and upper sheet metal cladding. Used for storage of machinery and the parking of cars.
- 2.2.21 A relatively modern plastic bunded waste oil tank is located adjacent to the outside of the northern wall on concrete hardstand. No evidence of leakage or spillage was noted.

Building 12

- 2.2.22 Comprises a relatively modern portal frame barn with low blockwork walls and upper sheet metal cladding, open to the east with an overhanging canopy. Used for storage of machinery and materials.

Building 13

- 2.2.23 Comprises a single storey, stone built outbuilding which was locked at the time of the walkover.
- 2.2.24 A plastic bunded fuel tank with dispensing pump is located adjacent to the outside of the eastern wall. No evidence of spillage or leakage was noted, although the base of the plinth which stands on rough grass was slightly overgrown.
- 2.2.25 A much larger, older, cylindrical fuel tank is located adjacent to the outside of the western wall of Building 13. The base of the tank is also heavily overgrown though no evidence of spillage or leakage was noted.

Building 14

- 2.2.26 A two storey stone built house, currently boarded up with no access.

Building 15

- 2.2.27 A two storey height timber portal frame barn with stone walls on three sides, open to the east, used for the storage of farm machinery.

Buildings 16 & 18

- 2.2.28 Dilapidated timber sheds, with Building 18 used for parking of cars.

Building 17

- 2.2.29 Existing electricity sub-station that is to be retained as part of the development.

3 SITE HISTORY

- 3.1 In order to investigate the development history and previous land uses at the site and immediate surrounding land, site centred extracts from Ordnance Survey (OS) plans dating back to 1854 have been examined. These plans are presented in Appendix D to this report.
- 3.2 The table below provides a summary of the salient points relating to the history of the site with respect to the proposed end use. It is not the intention of this report to describe in detail all the changes that have occurred on or adjacent to the site. Significant former uses/operations are highlighted in **bold** text for ease of reference.

Date	Site	Surrounding land
1854 1:10 000 map - poor resolution	Buildings shown in north, typically on the footprint of the existing stone barns, milking sheds and farmhouses with some additional buildings on the northern boundary.	Village of Farnley Tyas, with buildings typically to north and northeast. Track running adjacent to western boundary. 'The Village' (road) running adjacent to northern boundary. Smithy immediately to east and also to north, beyond 'The Village' .. Sandstone Quarry 270m west. St Lucius Church adjacent to the western boundary. Land to the south comprises open fields.
1893 1:2500		Circular Reservoir shown 190m west (approx. 30m diameter). Graveyard (part of St Lucius Church) adjacent to western boundary.
1906	No significant changes.	Smithy to east no longer labelled. Housing to east.
1932	Smaller buildings along the northern boundary no longer shown.	Quarry no longer labelled – outline of highwall still shown.
1963	Some additional smaller buildings shown. Farm house in centre labelled as 'Yew Tree Farm' with house in northeast labelled as 'Manor Farm'. Electricity sub-station in the northwest.	Manor Farm labelled adjacent to eastern boundary. Reservoir to west now labelled as 'Tank'.
1985	3 no. large buildings shown in south with barn on western boundary and southwest boundary (on footprint of existing portal frame barns).	Quarry outline no longer shown – possibly backfilled.
1992	No significant changes.	Building (on footprint of existing barn) shown to south, labelled as 'New Lane Farm'. Reservoir no longer shown.
2000 (Aerial Photography)	Large barn shown on southern boundary (on footprint of existing barn).	No significant changes.

4 ENVIRONMENTAL SETTING

4.1 General

- 4.1.1 Notes describing how the site's environmental setting has been assessed are included in Appendix A to this report. Reference has been made to publicly available Government held digital data via QGIS (an Open Source Geographic Information System). The response received from the Coal Authority and extracts from the Landmark Report are presented in Appendix E.

Issue	Data reviewed	
Geology	1:50,000 BGS map (Sheet 77 Huddersfield & Glossop) 1:10,000 BGS map (Sheet SE 11 SE)	Drift soils – none shown. Solid (bedrock) - Grenoside Sandstone of Carboniferous Age. Pennine Lower Coal Measures (mudstone, siltstone & sandstone) on northern boundary. Shallowest coal seam - un-named discontinuous thin coal from at least 20m depth. 36 Yard Coal (thin) from at least 160m depth. Strata Dip – around 4 degrees to the east. Faults – none at or adjacent to the site.
Mining	Coal Authority BGS maps	This site is located within a Coal Mining Development Low Risk Area. Past and present workings - none. Opencast - none. Mine entries – none at, or within 20m, of the site.
Quarrying	Historical OS plans	None at or adjacent to the site.
Landfills	Envirocheck	No known landfills within 250m
Radon	Public Health England	The site lies in an area where between 1% & 3% of homes are estimated to be above the action level. Therefore no measures required.
Hydrogeology	Environment Agency electronic open data via QGIS	Source Protection Zone? none at the site, SPZ2 located around 70m to east associated with a potable abstraction borehole 320m east. Aquifer: Secondary A (Solid). Groundwater abstractions? nearest 320m east, for general farming and domestic use. Pollution incidents? None at or relevant to the site.
Hydrology	Envirocheck Report	Site lies within the Colne & Holme catchment (within the Aire & Calder) classed as ecologically moderate and chemically poor. The reasons for not achieving a good status include agriculture and land management, industry, Local and Central Government, mining and quarrying, urban and transport, water industry. Nearest watercourse(s) – Range Dike around 272m to southeast, flowing to east. Pollution incidents? None affecting the site, nearest 210m to southeast, spillage of oils/diesel to Fenay Beck (minor incident). Abstractions? nearest 618m to east for domestic and agricultural use. Discharge consents? none within 500m.
Flood risk	Environment Agency electronic open data via QGIS	The site lies in Flood Zone 1, where the risk of flooding from rivers or the sea is classified as low. In accordance with Chapter 10 of the National Planning Policy Framework, a site-specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1.

4.2 Local knowledge

- 4.2.1 Lithos have undertaken ground investigation on two sites (now developed) located around 100m and 200m to the east.
- 4.2.2 A ground investigation was undertaken at Beech Farm, 100m east, in January 2013, comprising 10 trial pits, with soakaways in 6 pits, and 12 window sample boreholes. A supplementary ground investigation (a further 10 trial pits) was undertaken in September 2014.
- 4.2.3 The second investigation was undertaken at Park Farm, around 200m east, in March 2018 and included the excavation of 13 trial pits, with soakaway tests in 5 of the pits.
- 4.2.4 Ground conditions typically comprised Residual Soils (gravelly clay) with sandstone rockhead from around 1.0m to 2.0m depth. Results of in-situ testing suggested that soakaways constructed in the sandstone bedrock should provide a suitable drainage solution for surface water run-off.
- 4.2.5 Some made ground was encountered, including localised hydrocarbon spillages which would be anticipated given the history and former use of the sites (agricultural with fuel storage).

4.3 Hazardous gas

- 4.3.1 The site is not believed to be affected by sources of hazardous gas generation as it is:
- Not located within 250m of a known former or current landfill site or backfilled feature (e.g. quarry, pond, canal etc)
 - Neither underlain by shallow mineworkings nor located in an area considered susceptible to mines gas emissions
 - Not underlain by a significant thickness of made ground
 - Not underlain by peat or shallow chalk deposits

Radon

- 4.3.2 Requirements with respect radon measures are set out in Building Regulations Approved Document C. Probability bandings (based on the proportion of properties in a given area that exceed the Action Level; currently 200 Bq.m⁻³) are used to determine whether a property requires no, basic or full measures. At present Approved Document C advocates basic measures for the probability banding 3% to 10% (full measures if >10%).
- 4.3.3 The Public Health England UK radon map and the Landmark report indicate that the site is in an area where **between 1% and 3%** of homes are estimated to be above the action level. Consequently, basic radon protection measures may not be required in new dwellings.
- 4.3.4 However, Public Health England would like to see all new build include basic measures. Given that the site lies in an area where >1% of homes are estimated to be above the action level, the Developer might consider providing all new dwellings with basic radon protection measures.

5 LAND CONTAMINATION - PART IIA & PLANNING

- 5.1 Local Authorities have responsibilities with respect to land contamination in the context both of Part IIA of the Environmental Protection Act 1990, and Planning.
- 5.2 The contaminated land regime in Part IIA was introduced specifically to address the historical legacy of land contamination. It applies where there is unacceptable risk, assessed on the basis of the current use and the relevant circumstances of the land. It is not directed to assessing risks in relation to a future use of the land that would require a specific grant of planning permission. This is primarily a task for the planning system, which aims to control development and land use in the future.

Planning

- 5.3 As of 27th March 2012, Planning Policy Statement (PPS23) was replaced by the National Planning Policy Framework (NPPF). The NPPF (updated in February 2019) includes the following with respect to contamination and site investigation:

'Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner'.

- 5.4 Planning policies and decisions should ensure that:
- The site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses, and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;
 - After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the environmental protection act 1990; and
 - Adequate site investigation information, prepared by a competent person, is presented'.
- 5.5 Annex 2 of the NPPF states that 'all investigations of land potentially affected by contamination should be carried out in accordance with established procedures (such as BS10175²)'.

This site

- 5.6 The underlying Sandstone is classified as a Secondary A aquifer. The nearest surface watercourse is the Range Dike, which flows in an easterly direction, approximately 272m beyond the site's southeast boundary. Therefore, the site's environmental setting is considered to be of low sensitivity.
- 5.7 With respect to human health, the proposed end use (residential) is considered sensitive.
- 5.8 It is considered likely that recent and former use of the site may have given rise to some ground contamination.
- 5.9 However, it is considered that the site should be suitable for the proposed use subject to implementation of appropriate preparatory works.

² BS10175 (2011) - Code of practice for the investigation of potentially contaminated sites

6 GROUND INVESTIGATION DESIGN

6.1 Anticipated ground conditions & potential issues

6.1.1 Based on the data reviewed in Sections 4 (Environmental Setting) and 4.2 (Local Knowledge), anticipated ground conditions are expected to comprise:

Anticipated condition	Remarks
Made ground	veneer of made ground associated with former construction and localised site regrade
Natural soils	Residual soils (clayey gravel and gravelly clays)
Bedrock	Sandstone anticipated from relatively shallow depth (1m to 2m bgl)
Mineworkings	none anticipated at shallow depth
Groundwater	Likely to lie at depth within the sandstone bedrock

6.1.2 Based on the data above and that in Sections 2 (Site Description) and 3 (History), potential ground-related issues associated with this site are likely to include:

Type of issue	Specific issue	Remarks
Potential on-site contamination sources	1. USTs 2. Plant maintenance and storage 3. Cattle 4. Raw material storage etc 5. Made ground	1. spillage/leakage of fuels/oils 2. spillage/leakage of fuels/oils 3. waste discharge 4. Spillage/leakage 5. Inorganic contaminants (metals, asbestos)
Potential off-site contamination sources	1. none	
Potential geotechnical hazards	1. Relict buried obstructions 2. Deep made ground	1. former buildings 2. Localised re-grade
Other potential constraints	1. Underground and/or overhead utilities	2. Will require decommissioning and/or incorporation into the site layout

6.2 Preliminary conceptual site model

6.2.1 A preliminary conceptual site model, presented as Drawing No 3381/6 in Appendix B, has been prepared after consideration of all the data presented in Sections 2 to 6.1 inclusive of this report.

6.2.2 An assessment of potential contaminants associated with the former uses has been undertaken with reference to CLR8. As a consequence of this assessment, anticipated potential contaminants, within soil and/or groundwater include:

- Inorganics (metals, asbestos associated with made ground and the possible storage of pesticides and fertilisers)
- TPH & PAH (fuels, oils associated with machinery use and maintenance, waste oils / diesel tanks identified during the walkover)

6.2.3 Potential contaminant linkages are shown on the preliminary conceptual site model. Potential contaminant **pathways** include:

- Ingestion
- Dermal Contact
- Inhalation of contaminated particulates and vapours
- Surface water run-off, including existing drainage infrastructure
- Downward infiltration of leachable/mobile contaminants to groundwater

6.2.4 Potential contaminant **receptors** include:

- The environment – Secondary A Aquifer
- End users of the site (residents)

6.2.5 The walkover identified the presence of 3 no. tanks that should be targeted during intrusive investigation.

6.3 Ground investigation design & strategy

6.3.1 The preliminary conceptual site model has been used as a basis for design of an appropriate ground investigation, the scope of which is summarised below.

6.3.2 Ground investigation is generally best undertaken once site operations have ceased and preferably post-demolition; access constraints associated with existing buildings, operations and underground service runs, can prevent thorough inspection of the ground via extensive trial pitting/trenching.

6.3.3 Consequently, some uncertainties may remain and a supplementary, post-demolition ground investigation will be required by the relevant regulatory authorities. Nonetheless, useful data can be obtained at this time and we will certainly aim to resolve as much uncertainty relating to ground as possible through the following scope of works.

Exploratory holes	Purpose
Trial Pits 1 to 6	To determine the general nature of soils underlying the site, including the: • Nature, distribution and thickness of made ground • Nature, degree and extent of contamination • Proportion of undesirable elements e.g. biodegradable matter, foundations etc • Suitability of the ground for founding structures and highways
4 no. Trial Pits	To determine whether soakaways could be utilised for storm water drainage
2 no. Trial Pits	To delineate potential hydrocarbon contamination around USTs.
3 no. Trial Pits	With hand digging where appropriate to investigate the depth and nature of existing foundations of buildings to be retained and refurbished.
Dynamic sampling (mini boreholes) c. 6 no.	To determine the general nature of soils underlying the site in areas of restricted access (within buildings, driveways, next to tanks etc).

6.3.4 Proposed exploratory hole locations should be selected to provide a representative view of the strata beneath the site and to target potential areas of interest identified in Section 6.1 above.

6.3.5 Representative soil samples of natural and any man-made ground should be taken during the works. The number of soil samples taken should be reflective of the geological complexity actually encountered, but in general about 3 samples should be taken from most exploratory holes.

6.3.6 The investigation should be undertaken in general accordance with:

- BS5930:2015 "Code of practice for site investigation"
- BS10175:2017 "Code of practice for the investigation of potentially contaminated sites"
- "Technical Aspects of Site Investigation" – EA R&D Technical Report P5-065/TR (2000)
- "Development of appropriate soil sampling strategies for land contamination" – EA R&D Technical Report P5-066/TR (2001)

6.3.7 **Trial pitting** will enable determination of:

- Nature, distribution and thickness of shallow soils
- Nature of made ground (uppermost 3m to 4m), including:
 - o visual/olfactory evidence of potential contamination and the proportion of undesirable elements e.g. biodegradable matter, relict foundations etc
 - o the proportion of "oversize", boulder-sized material
- Suitability of the ground for soakaways
- Suitability of the ground for founding structures and highways
- Allow additional hand pitting adjacent to existing buildings to be retained and refurbished to confirm the nature and depth of existing foundations

6.3.8 The mechanical excavator should be equipped with a breaker to enable excavation through surface hardstand and, where necessary, in bedrock for soakaway tests.

6.3.9 The in-situ shear strengths of any cohesive soils encountered should be determined by use of a hand-held shear vane.

6.3.10 The ground is expected to predominantly comprise sandstone from relatively shallow depth, and consequently soakaways may work. Testing should be carried out in at least 4 trial pits in order to assess the suitability of soakaways as a solution for the discharge of surface water run-off.

6.3.11 Drainage in bedrock is typically through open fractures within the rock mass rather than through the rock itself. As such, infiltration rates will be dependant on encountering such open fractures within the trial pits which cannot be guaranteed.

6.3.12 It should be noted that if the initial soakaway tests yield satisfactory results, in order to obtain approvals from the LLFA, Highways etc, the drainage designer is likely to require further testing: (a) within 25m of proposed chamber locations; and (b) to include 3 fills.

6.3.13 Access constraints within the farmyard area will necessitate the use of **dynamic sampling** techniques (mini-boreholes). It should be noted that window sampling allows only a limited inspection of the ground (cf trial pitting). Consequently, some uncertainties may remain and a supplementary, post-demolition ground investigation will be required.

6.3.14 **Mini-boreholes** will:

- Enable inspection of concrete slabs (thickness & any reinforcement) and underlying sub-base (especially with respect to fragments of ACM).
- Allow the installation of groundwater monitoring wells.
- Enable assessment of the density of granular soils either via discrete SPTs or dynamic probing
- Allow investigation within buildings (including those still in use) and in areas of limited access.
- Minimise disturbance of the surface (a 150mm diameter tarmac/concrete core can be lifted and put to one side), allowing subsequent reinstatement.

6.3.15 Routine **geotechnical soils analysis** (moisture content, Atterberg limits, pH, water soluble sulphate) should be scheduled on about 10 samples.

6.3.16 Appropriate **chemical analyses** based on the findings of this Report should be allowed for. This is likely to comprise 18 samples for a suite including heavy metals, asbestos ID, TOC, banded TPH (with supplementary speciation where appropriate), and speciated PAH. In the event that ground contamination is more significant or different to that anticipated, it might be necessary to carry out additional chemical testing.

- 6.3.17 On completion of the fieldwork and laboratory testing a comprehensive bound, factual and interpretative report should be issued. This should contain detailed engineering records, laboratory test results, copies of all relevant correspondence and drawings of the site. The report should also include qualitative risk assessment with respect to both controlled waters and human health.

7 CONCLUSIONS & RECOMMENDATIONS

7.1 General

- 7.1.1 The site comprises c. 0.75 hectares of land located off 'The Village', approximately 4.5km southeast of Huddersfield town centre, and currently comprises a farm with residential dwellings, outbuildings, barns, paddocks and concrete surfaced yards.
- 7.1.2 It is understood that Radcliffe Developments are considering acquisition of the site with a view to redevelopment with new housing (10 Plots), with refurbishment and conversion to residential of 9 no. existing barns and the retention of 2 no. existing dwellings.
- 7.1.3 The main issues considered in this report, and in particular in Sections 3 & 4 are based on a review of historical maps and available geological/environmental data. This report provides an assessment of geoenvironmental issues and implications associated with the proposed residential redevelopment, together with any implications for current use of the site.

7.2 Mining and quarrying

- 7.2.1 This site is located within a Low Risk Area (within the defined coalfield, but no known defined risks have been recorded by the Coal Authority; there may still be unrecorded issues).
- 7.2.2 There are no known quarries at or adjacent to the site.

7.3 Hazardous gas

- 7.3.1 The site is in an area where between 1% & 3% of homes are estimated to be above the radon action level.
- 7.3.2 There are no known or suspected areas of landfilling within 250m, and the site is not in area considered susceptible to mines gas, nor is it underlain by shallow mineworkings.
- 7.3.3 As such, no special precautions against hazardous gas are required on this site.
- 7.3.4 However, Public Health England would like to see all new build include basic measures. Given that the site lies in an area where >1% of homes are estimated to be above the action level, the Developer might consider providing all new dwellings with basic radon protection measures

7.4 Foundations

- 7.4.1 At present, no geotechnical ground investigation data is available and consequently it is only possible to estimate the ground conditions. Before firm foundation recommendations can be given, it will be necessary to undertake an appropriate ground investigation. However, tentative recommendations are provided below.
- 7.4.2 Made ground is not generally considered a suitable founding material and foundations should be taken through it, into underlying natural in-situ strata of adequate bearing capacity.

- 7.4.3 All concrete slabs and service ducts will require breaking out during the demolition of existing buildings. Foundations of plots that conflict with relict foundations should be taken to greater depth than the relict foundations and into natural ground of adequate bearing capacity.
- 7.4.4 Relict foundations, concrete bases or similar obstructions within 450mm of finished garden surface will require removal in accordance with NHBC Standards (10.2.9).
- 7.4.5 The published geological data suggests that the site will be underlain by shallow Grenoside Sandstone, with overlying Residual soils (clayey gravel and/or gravelly clay) anticipated.
- 7.4.6 Residual soils (firm/stiff clays or medium dense gravels) or weathered Sandstone should provide sufficient bearing capacity to enable the adoption of strip footings for two storey housing. Reinforcement, as a precaution against differential settlement, is recommended only where foundation excavations encounter significant lateral and vertical variations in strata.
- 7.4.7 Where rock is encountered at shallow depth, foundations should be placed entirely on rock and not partially on rock and partially on residual soil. This may, depending on surface gradient, necessitate significant over deepening of foundations.

7.5 Highways and external works

- 7.5.1 Some localised re-grade may be required in areas that have previously been subject to cut/fill to accommodate large barns. As such there may be a requirement for retaining walls, underbuild, tanking etc together with the need for deepened foundations where the thickness of made ground is increased.
- 7.5.2 Shallow cohesive Residual Soils should yield a CBR of at least 3%, with a CBR value of at least 10% likely where Residual Soils are granular. These values should be verified prior to or during construction.

7.6 Soakaways & drainage

- 7.6.1 Given anticipated ground conditions, soakaways may provide a viable solution for the disposal of surface water, subject to on testing.

7.7 Contamination

- 7.7.1 The site's environmental setting is considered to be of low sensitivity. With respect to human health, the proposed end use (residential) is considered sensitive.
- 7.7.2 Based on observations made during the site walkover, and given site's former and recent uses, a veneer of made ground is anticipated, and it is considered likely that some (probably minor) ground contamination will be present in shallow soils, most notably adjacent to USTs.
- 7.7.3 Consequently, a ground investigation is required in order to assess the degree and extent of any ground contamination, and enable the preparation of a Remediation Strategy.

7.8 Potential development constraints

- 7.8.1 The electricity sub-station in the far northwest presents a potential development constraint. However, it is understood that the sub-station is to be incorporated into the proposed layout. Service plans show underground cables enter and exit the substation from the western boundary and as such should not constrain further development.

7.9 Further investigation

7.9.1 Whilst the site is considered suitable for its current and proposed use, the proposed change in use will require intrusive investigation.

7.9.2 This would include:

- Machine-excavated trial pits to determine near surface ground conditions including depth to bedrock, the presence of obstructions, groundwater and stability
- Additional hand pitting adjacent to existing buildings to be retained and refurbished to confirm the nature and depth of existing foundations
- Dynamic sampling in areas of restricted access
- Geotechnical soils analysis to enable foundation recommendations
- Chemical testing on soil samples to assess the significance of contamination, if any, as a result of former land use

7.9.3 An appropriate ground investigation strategy is presented in Section 6.3. However, further post demolition investigation is likely to be required here prior to preparation and issue of a Remediation Strategy.

Appendix A
General Notes

General

Third party information obtained from the British Geological Survey (BGS), the Coal Authority, the Local Authority etc is presented in the "Search Responses" Appendix of this Geoenvironmental Report.

Geology, mining & quarrying

In order to establish the geological setting of a site, Lithos refer to BGS maps for the area, and the relevant geological memoir. Further information is sourced by reference to current and historical OS plans.

In July 2011, the Coal Authority (CA) formalised their requirements in relation to planning applications and introduced some new terminology. The CA, using its extensive records has prepared plans for all coalfield Local Planning Authorities, which effectively refines the defined coalfield areas into High Risk and Low Risk areas. **High Risk** areas are likely to be affected by a range of legacy issues that pose a risk to surface stability, including: mine entries; shallow coal workings; workable coal seam outcrops; mines gas; and previous surface mining sites. **Low Risk** areas comprise the remainder of the defined coalfield, and are areas where no known defined risks have been recorded; although there may still be unrecorded issues. Where a site lies within either a High or Low Risk area, a mining report is obtained from the CA.

Landfills

Reference is made to publicly available Government held digital data via **QGIS** (an Open Source Geographic Information System), data from Landmark or Groundsure, and sometimes the Environment Agency and the Local Authority with respect to known areas of landfilling within 250m of the proposed development site.

Historical OS plans are also inspected for evidence of backfilled quarries, railway cuttings, colliery spoil tips etc.

Radon

Radon is a colourless, odourless gas, which is radioactive. It is formed in strata that contain uranium and radium (most notably granite), and can move through fissures eventually discharging to atmosphere, or the spaces under and within buildings. Where radon occurs in high concentrations, it can pose a risk to health.

In order to assess potential risks associated with radon gas, Lithos refer to BRE Report BR211¹, and the Public Health England website. Advice on the limitation of exposure of the population to radon in buildings was originally published in 1990 by the National Radiological Protection Board (NRPB), which joined the Health Protection Agency (HPA) in 2005; the HPA updated NRPB advice in July 2010². The HPA became part of Public Health England in 2013.

The HPA recommended that the NRPB radon Action Level for homes be retained, and a new Target Level for radon in homes be introduced. The values of the Action Level and Target Level, expressed as the annual average radon concentration in the home, are 200 Bqm⁻³ and 100 Bqm⁻³ respectively. The Target Level was to provide an objective for remedial action in existing homes and preventive action in new homes.

The term 'radon Affected Area' is defined as those parts of the country with >1% of homes estimated to be above the Action Levels. The NRPB first indicated which parts of the country should be regarded as radon Affected Areas in 1990. A more detailed mapping method was developed by the HPA in conjunction with the British Geological Survey in 2007³. The level of protection needed is site-specific and can be determined by reference to this mapping on the Public Health England website, which indicates the highest radon potential within each 1km grid square. Each 1km grid square is classified on the basis of the percentage of existing homes within that grid square estimated to have radon concentrations above the Action Level. There are 6 'bands': <1%; 1 to 3%; 3 to 5%; 5 to 10%; 10 to 30%; and >30%.

The NRPB advised that action should be taken to reduce radon concentrations in existing homes if the radon concentration exceeded the Action Level of 200 Bqm⁻³ in room air averaged over a year; ten times the average UK domestic radon concentration. NRPB advice informed changes in the requirements for radon protection in new buildings.

- **Basic** preventive measures are required in new buildings, extensions, conversions and refurbishments if the probability of exceeding the Action Level is **>3%** in England and Wales, and **>1%** in Scotland and Northern Ireland.
- Provision for further preventive (**Full**) measures is required in new buildings if the probability of exceeding the Action Level is **>10%**.

At present Building Regulations Approved Document C advocates basic measures for the probability banding 3% to 10%, and full measures if >10%. However, Public Health England would like to see all new build include basic measures.

Action & Target Levels should also be applied to non-domestic buildings with public occupancy exceeding 2,000 hrs/yr and to all schools.

Hydrogeology

Reference is made to publicly available Government held digital data via QGIS, and Landmark or Groundsure with respect to:

- Groundwater quality
- Recorded pollution incidents
- Licensed groundwater abstractions

From April 2010 the EA's Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply), but also their role in supporting surface water flows and wetland ecosystems. The aquifer designation data is based on geological mapping provided by the British Geological Survey. The maps are split into two different types of aquifer designation:

- Superficial (Drift) - permeable unconsolidated (loose) deposits. For example, sands and gravels
- Bedrock - solid permeable formations e.g. sandstone, chalk and limestone

The maps display the following aquifer designations:

Principal aquifers: These are layers of rock or superficial deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary aquifers: These include a wide range of rock layers or superficial deposits with an equally wide range of water permeability and storage. Secondary aquifers are subdivided into three types:

- **Secondary A** - permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
- **Secondary B** - predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers
- **Secondary undifferentiated** - In most cases, this is because the rock type in question has previously been designated as both a minor and non-aquifer in different locations due to the variable characteristics.

¹ BRE Report BR211, 2015: "Radon: guidance on protective measures for new buildings.

² Limitation of Human Exposure to Radon, Documents of the Health Protection Agency - Radiation, Chemical and Environmental Hazards, RCE-15. July 2010.

³ Miles JCH, Appleton JD, Rees DM, Green BMR, Adlam KAM and Myers AH (2007). Indicative Atlas of Radon in England and Wales. Chilton, HPA-RPD-033.

Unproductive strata: These are rock layers or superficial deposits with low permeability that have negligible significance for water supply or river base flow.

The EA maps only display the principal and secondary aquifers as coloured areas. All uncoloured areas on the map will be unproductive strata. However, for uncoloured areas on the superficial (drift) designation map it is not possible to distinguish between areas of unproductive strata and areas where no superficial deposits are present; to do this, it is necessary to consult the published geological survey maps.

For the purposes of the EA's Groundwater Protection Policy the following default position applies, unless there is site specific information to the contrary:

- If no superficial (drift) aquifers are shown, the bedrock designation is adopted
- In areas where the bedrock designation shows unproductive strata (the uncoloured areas) the superficial designation is adopted
- In all other areas, the more sensitive of the two designations is used (e.g. If secondary superficial overlies principal bedrock, an overall designation of principal is assumed)

The EA have also designated groundwater Source Protection Zones, which are based on proximity to a groundwater source (springs, wells and abstraction boreholes). The size of a Source Protection Zone is a function of the aquifer, volume of groundwater abstracted and the effective rainfall, and may vary from tens to several thousand hectares.

Hydrology

Reference is made to publicly available Government held digital data via QGIS, and Landmark or Groundsure with respect to:

- Surface water quality
- Recorded pollution incidents
- Licensed abstractions (groundwater & surface waters)
- Licensed discharge consents
- Site susceptibility to flooding

The EA have set **water quality** targets for all rivers. These targets are known as River Quality Objectives (RQOs). The water quality classification scheme used to set RQO planning targets is known as the River Ecosystem scheme. The scheme comprises five classes (RE1 to RE5) which reflect the chemical quality requirements of communities of plants and animals occurring in our rivers.

General Quality Assessment (GQA) grades reflect actual water quality. They are based on the most recent analytical testing undertaken by the EA. There are 6 GQA grades (denoted A to F) defined by the concentrations of biochemical oxygen demand, total ammonia and dissolved oxygen.

The susceptibility of a site to **flooding** is assessed by reference to a Flood Map on the Environment Agency's website. These maps show natural floodplains - areas potentially at risk of flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas. There are two different kinds of area shown on the Flood Map:

1. Dark blue areas (Flood Zone 3) could be flooded by the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year, or by a river by a flood that has a 1% (1 in 100) or greater chance of happening each year
2. Light blue areas (Flood Zone 2) show the additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1% (1 in 1000) chance of occurring each year

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements. Where there is no blue shading (Flood Zone 1), there is less than a 0.1% (1 in 1000) chance of flooding occurring each year.

The maps also show all flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, or floods from the sea with a 0.5% (1 in 200) chance of happening each year, together with some, but not all, older defences and defences which protect against smaller floods.

The Agency's assessment of the likelihood of flooding from rivers and the sea at any location is based on the presence and effect of all flood defences, predicted flood levels, and ground levels.

It should also be noted that as the floodplain shown is the 1 in 100 year, areas outside this may be flooded by more extreme floods (e.g. the 1 in 1000 year flood). Also, parts of the areas shown at risk of flooding will be flooded by lesser floods (e.g. the 1 in 5 year flood). In some places due to the shape of the river valley, the smaller floods will flood a very similar extent to larger floods but to a lesser depth.

If a site falls within a floodplain, it is recommended that a flood survey be undertaken by a specialist who can advise on appropriate mitigating measures; i.e. raising slab levels, provision of storage etc. In accordance with Chapter 10 of the National Planning Policy Framework, a site-specific flood risk assessment is required for: proposals of 1 hectare or greater in Flood Zone 1, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency); and any new development in Flood Zones 2 and 3.

COMAH & explosive sites

Lithos obtain information from Landmark or Groundsure with respect to Control of Major Accident Hazards (COMAH) or explosive sites within 1km of the proposed development site. Lithos' report refers to any that are present, and recommends that the Client seeks further advice from the HSE.

Areas around COMAH sites (chemical plants etc) are zoned with respect to the implementation of emergency plans. The HSE are a statutory consultee to the local planning authority for all COMAH sites. The COMAH site may have to revise its emergency action plan if development occurs. This might be quite straightforward or could entail significant expenditure. Consequently, the COMAH site may object to a proposed development (although it is the Local Authority who have final say, and they are likely to place more weight on advice from the HSE).

Preliminary conceptual site model

The site's environmental setting (and proposed end use) is used by Lithos to assess the significance of any contamination encountered during the subsequent ground investigation.

Assessment of contaminated land is based on an evaluation of pollutant linkages (source-pathway-receptor). Contaminants within the near surface strata represent a potential source of pollution. The environment (most notably groundwater), site workers and end users are potential receptors.

Potential pollutant linkages are shown on a preliminary conceptual site model (pCSM). A CSM is essentially a cross-section through a site that reflects both the surface topography and underlying geology, and shows surface features of interest. The most significant sources of contamination are then superimposed onto this cross-section together with potential receptors (human health & controlled waters), and plausible pathways between the two. In addition to environmental issues, the CSM should also highlight geotechnical issues.

A pCSM is prepared after consideration of all available "desk study" data, and before design of the ground investigation. Data reviewed should include historical plans (with superimposition on a current-day plan), previous SI reports, geological maps etc. The pCSM, in conjunction with knowledge of site constraints (buildings, services, slopes etc) is used to design the ground investigation.

The revised CSM takes account of data obtained during the ground investigation, including the distribution of made ground, the nature and distribution of contamination etc.

Appendix B

Drawings



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info@lithos.co.uk
www.lithos.co.uk
Tel 01937 545330

CLIENT

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JOB TITLE

**YEW TREE FARM,
FARNLEY TYAS**

DRAWING TITLE

**SITE LOCATION
PLAN**

DRAWN

ASw

DATE

03 06 21

CHECKED

REG

DATE

03 06 21

STATUS

FOR COMMENT ☐

DRAFT ☐

FOR APPROVAL ☐

FINAL ☒

SCALE

1:25,000

SHEET

A4

DRAWING NO.

3381/1

REVISION



NOTES		
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	APPROXIMATE SITE BOUNDARY	
	HOUSE TYPE A (1506 sqft - 3no.) PLOTS 12, 16 & 18	
	HOUSE TYPE B (1571 sqft - 1no.) PLOT 15	
	HOUSE TYPE C (1915 sqft - 1no.) PLOT 13	
	HOUSE TYPE D (1119 sqft - 3no.) PLOTS 17, 19 & 21	
	HOUSE TYPE E (1506 sqft - 2no.) PLOTS 12, 16 & 18	
	HOUSE TYPE F (Existing Buildings Converted - 9no.) PLOTS 1 TO 3, 5 & 7 TO 11	
	PLOTS OCCUPIED (2no.) PLOTS 4 & 6	
REV.	DESCRIPTION	DATE



info@lithos.co.uk
www.lithos.co.uk
Tel 01937 545330

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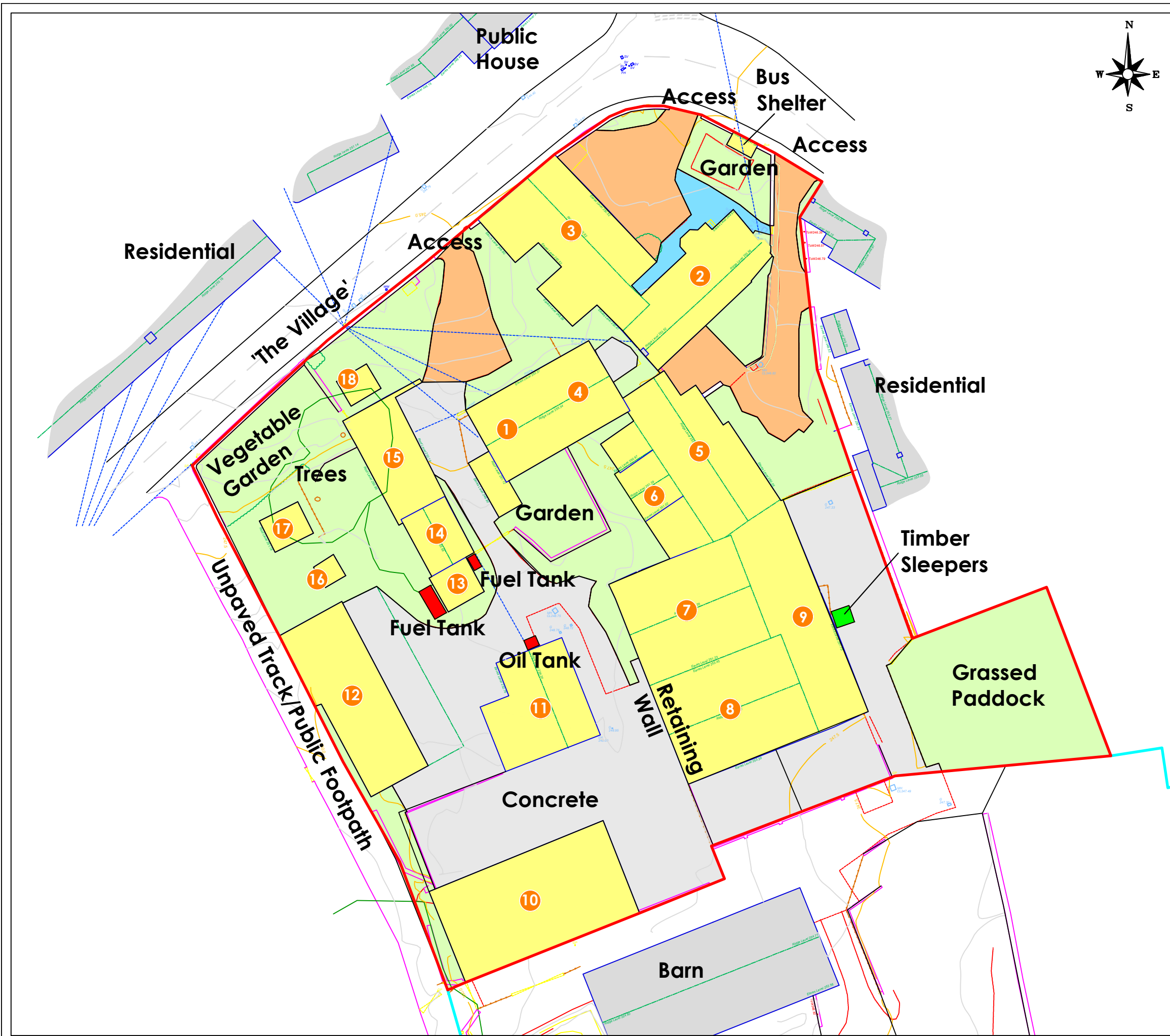
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YEW TREE FARM,
FARNLEY TYAS

DRAWING TITLE

PROPOSED SITE LAYOUT

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CHECKED	REG	DATE	03 06 21	FOR APPROVAL	DRAFT	☐
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NOTES		
	GRASS & OVERGROWN AREAS	
	BUILDING	
	PAVING	
	TARMAC HARDSTAND	
	CONCRETE HARDSTAND	
	FUEL STORAGE TANKS	
	APPROXIMATE SITE BOUNDARY	
	BUILDING REFERENCE NUMBER	
	OVERHEAD TELEPHONE	
REV.	DESCRIPTION	DATE

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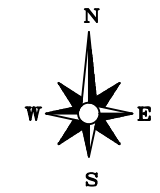
JOB TITLE

YEW TREE FARM,
FARNLEY TYAS

DRAWING TITLE

SITE FEATURES

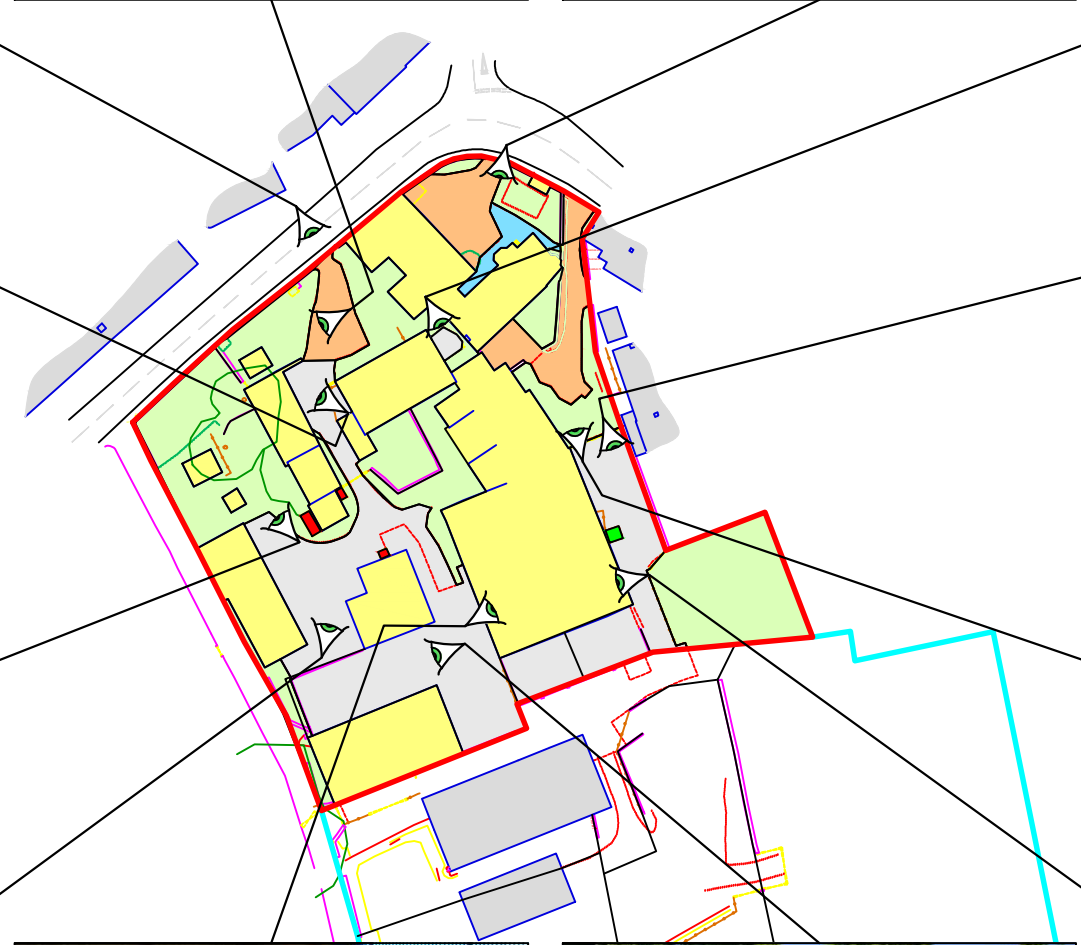
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NOTES

- GRASS & OVERGROWN AREAS
- BUILDING
- PAVING
- TARMAC HARDSTAND
- CONCRETE HARDSTAND
- FUEL STORAGE TANKS
- APPROXIMATE SITE BOUNDARY
- LOCATION & ORIENTATION OF PHOTOGRAPH

REV.	DESCRIPTION	DATE



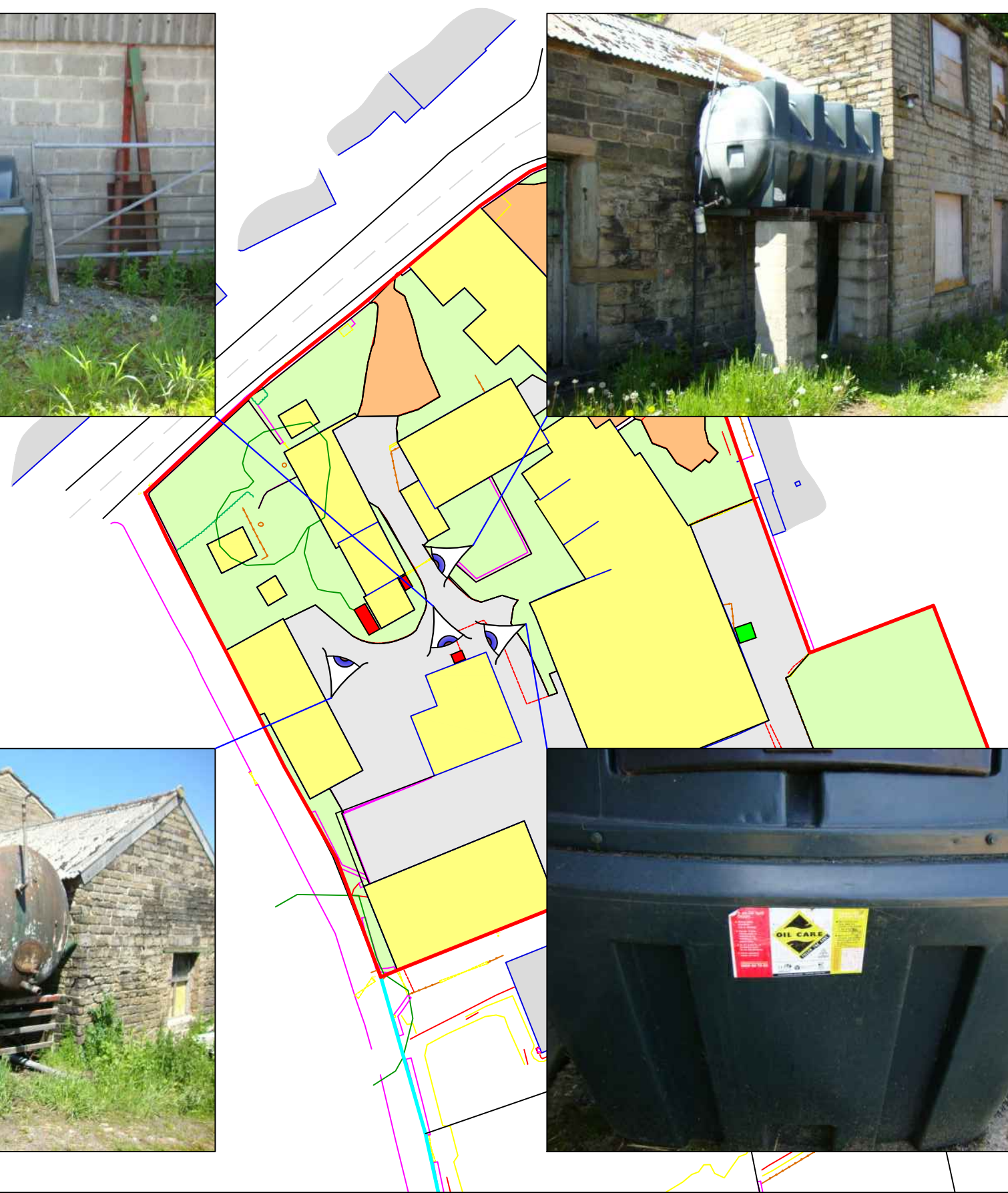
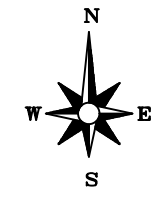
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www.lithos.co.uk
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YEW TREE FARM,
FARNLEY TYAS

SITE PHOTOGRAPHS

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CHECKED	REG	DATE	30 05 21	FOR APPROVAL	DRAFT	☐
				FINAL		☒
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NOTES

- GRASS & OVERGROWN AREAS
- BUILDING
- PAVING
- TARMAC HARDSTAND
- CONCRETE HARDSTAND
- FUEL STORAGE TANKS
- APPROXIMATE SITE BOUNDARY
- LOCATION & ORIENTATION OF PHOTOGRAPH

REV.	DESCRIPTION	DATE
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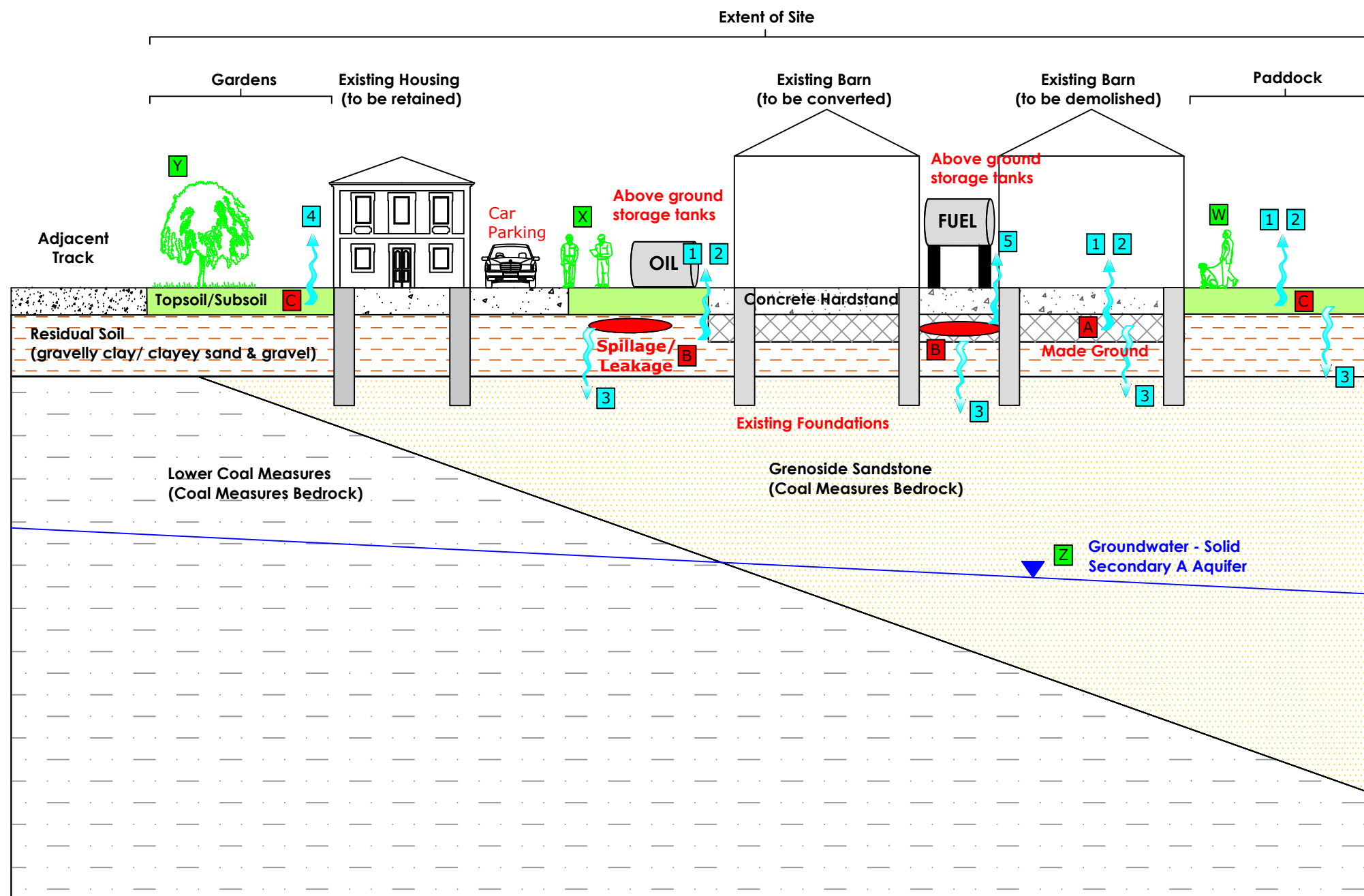
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SITE PHOTOGRAPHS (FUEL TANKS)

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CHECKED	REG	DATE	30 05 21	FOR APPROVAL	DRAFT	☐
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SCALE	NOT TO SCALE	SHEET	A3	DRAWING NO.	3381/5	REVISION



SOURCES	
A	MADE GROUND (INORGANICS)
B	LEAKAGE/SPILLAGE (ORGANICS)
C	TOPSOIL (INORGANICS/ORGANICS)

PATHWAYS	
1	DERMAL CONTACT
2	INGESTION/INHALATION
3	LEACHING OF CONTAMINANTS
4	UPTAKE BY PLANTS
5	VOLATILISATION

RECEPTORS	
W	END USERS (RESIDENTS)
X	SITE WORKERS
Y	VEGETATION
Z	GROUNDWATER

NOTES		
REV.	DESCRIPTION	DATE

LITHOS CONSULTING

info@lithos.co.uk
www.lithos.co.uk
Tel 01937 545330

RADCLIFFE DEVELOPMENTS (FARNLEY) LTD

YEW TREE FARM, FARNLEY TYAS

PRELIMINARY CONCEPTUAL SITE MODEL

DRAWN	ASw	DATE	04/06/21	STATUS	FOR COMMENT
CHECKED	REG	DATE	04/06/21		FOR APPROVAL
					DRAFT
					FINAL

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