Site Conditions Report for Bewley Homes

Project name	Cotswold Community School, Ashton Keynes		
Title	Site Conditions Report		
Document reference	9616-HYD-XX-XX-GE-TN-001		
Author	Scott Williams		
Revision	S2/P01		
Date	27 March 2023	Approved	✓

1. Introduction

In March 2023, Hydrock Consultants Limited (Hydrock) was commissioned by Bewley Homes (the Client) to undertake a site conditions report, comprising a walkover and review of previous data at the former Cotswold Community School, Ashton Keynes. The reasoning for this is to allow for an updated and longer term of warranty (12 years) and an increase in insurance value (£5m Professional Indemnity) for the report Hydrock undertook in 2018, undertaken for Acorn Property Group.

Previously the proposed development was to comprise 75 new dwellings including replacement of 27 existing dwellings and conversion of a listed building as well as associated infrastructure.

The works have been undertaken in accordance with Hydrock's proposal referenced (Email, dated 21 Mach 2023) and the Client's instructions to proceed (by email from Andrew Driscoll, dated 21 Mach 2023).

Site Description

The site covers approximately 16 ha and currently comprises a number of former school buildings, some of which are understood to be listed, including a gymnasium and swimming pool facility. A number of the buildings are currently used for agricultural purposes.

The site setting is typically rural, with vegetation present on and around the site and the surrounding land predominantly comprising agricultural/pastoral fields and sand extraction quarries. There is a private road network around the site. Since the 2018 investigation significant quarrying has been and is currently being undertaken around the site boundaries. This has resulted in significant open cast quarry's and remediated quarry's now forming lakes.

Sources of information

- Hydrock - Desk Study and Preliminary Ground Investigation Report - July 2018. Ref: CCS-HYD-XX-GI-RP-G-1001.P1, dated 26 July 2018.

2. Hydrock 2018 Desk Study and Preliminary Ground Investigation Report

Hydrock undertook a Desk Study and Preliminary Ground Investigation in 2018 for Acorn Property Group. The pertinent findings of which are summarised below, with some commentary added as part of this review, the Hydrock 2018 Report (Ref: CCS-HYD-XX-GI-RP-G-1001.P1, dated 26 July 2018) should be read in conjunction with this site conditions update.

It is important to note the limitations of this investigation - "This was a targeted investigation, predominantly designed to assess contamination risk from currently identified sources of contamination, to assess groundwater levels at the time of the works and to give an understanding of the natural soil conditions." This was undertaken at the request of the client.

It should be anticipated that a level of risk is to be associated with the limited scope of works requested by the client and that there is potential for variations in ground conditions and the potential for further contamination to be present on site.

2.1 Summary of Desk Study

Site History

Historically the site has been home to farm buildings and agricultural fields. Further development took place between the 1940s and 1960s when the site was converted to a school. An historical small gravel pit was present on site, although this has been backfilled.

The change of site usage and name is understood to have taken place in the early 1940s with the opening of the 'Cotswold Approved School for Intermediate Boys', accommodating up to approximately 140 students. The school closed in 2011.

There is anecdotal evidence that there had been a hydrocarbon leak to the east of the access lane.

Anticipated Geology

Geological sources indicate the site to be underlain by the Northmoor Sand and Gravel Member and, at depth, the Kellaways Clay Member. Made Ground is anticipated locally due to the current/former development of the site.

Hydrogeology and Hydrology

The Northmoor Sand and Gravel Member is classified by the Environment Agency as a Secondary A aquifer. The underlying Kellaways Clay Member is an unproductive stratum. The site is within a Groundwater Source Protection Zone 2. (SPZ2).

The nearest surface water feature is a pond on site. There are a number of lakes relating to former gravel pits to the north, west and south of the site.

The site is partially in Flood Zone 3.

Mining and Mineral Extraction

The surrounding area is known to have been used for sand and gravel extraction. Many of these sand and gravel pits are now filled with water and are used as recreational lakes and ponds. It is important to note that the majority of the local gravel extraction pits surrounding the site are not believed to have been backfilled with solid waste but have flooded to form lakes.

Waste Management

There are two records of potentially infilled ground on the site, one is the infilled gravel pit and the other is the pond in the north western part of the site.

It should be noted that although there are landfill licenses for the North End West/Lake 62 sites it does not seem to have been completely landfilled because this area appears to be a lake used for triathlon training according to google earth satellite imagery and internet searches. It is feasible that landfill licenses were obtained and never used or the area was partially landfilled and then flooded to form the lake. This discrepancy in the data requires clarification and further enquiries to try to find out the extent of any landfilling which took place.

Unexploded Ordnance

A non-specialist UXO assessment indicates low bomb risk. No further consideration of UXO is required.

2.2 Summary of The Ground Investigation

The investigation comprised:

- 1 cable percussive borehole to 10.45m bgl;
- 6 trial pits to a maximum depth of 2.0m bgl;
- chemical testing of soils and water and geotechnical testing of soils;
- two months of continuous groundwater monitoring; and
- A number of the exploratory holes were located to target an historical hydrocarbon spill, oil tanks within the built-up area of the site and the boiler house associated with the leisure centre and swimming pool.

Ground Conditions

- Topsoil – to between 0.2m and 0.5m below ground level (bgl), comprising dark brown gravelly clay. Gravel sub-angular to sub-rounded fine to medium of limestone.
- Made Ground – to between 0.35 and 0.7m bgl (maximum proven), comprising soft brown and grey clay with frequent medium to coarse gravel and fragments of brick and concrete fragments and occasional brick and concrete cobbles.; over
- Shallow Cohesive Materials – to between 0.6m and 0.8m bgl, comprising soft brown sandy gravelly clay. Gravel sub-angular to sub-rounded fine to medium of limestone.
- Northmoor Sand and Gravel Member – to a maximum proven depth of 5.5mbgl, comprising medium dense [inferred] creamy brown sandy sub-angular to sub-rounded fine to coarse gravel of limestone. Sand is medium to coarse; over
- Kellaways Clay Member – to a maximum proven depth of 10.45mbgl, stiff blue grey slightly sandy clay with occasional fossil shell fragments.

Groundwater

Groundwater was encountered at between 1.7mbgl and 2.0mbgl within the Northmoor Sands and Gravels during the investigation. Water levels recorded post-fieldwork range from 1.8mbgl to 2.2mbgl.

2.3 Geotechnical Recommendations

Obstructions

There is existing development on the site comprising a number of buildings historically relating to the sites former farm and school usage. Obstructions associated with this development, including foundations, floor slabs and services, should be anticipated.

Groundworks and Earthworks

Excavation of shallow soils should be readily achievable with standard excavation plant. Excavations above the ground water level are likely to be stable.

Water seepages into excavations are unlikely to be adequately controlled by sump pumping and alternative methods of dewatering are likely to be required.

Excavated soils should be re-useable as follows:

- Made Ground – re-useable as landscaping material only;
- Northmoor Sand and Gravel Member – re-useable as General Fill; and
- Kellaways Clay Member – re-useable as General Fill.

Foundations

Strip/trench fill foundations in the Northmoor Sand and Gravel Member at a minimum depth of 0.75mbgl and extending at least 300mm into the granular material dependent upon foundation depths being above seasonal groundwater levels.

Allowable net bearing pressure of 150kN/m^2 should be available, keeping total and differential settlement within acceptable limits. Alternatively, a piled foundation solution will may be required.

Floor Slabs

Suspended because of depth of Made Ground (where present).

Roads and Pavements

CBR values: <2% on natural fine soils, 5% on natural coarse soils.

Concrete Classification

Design Sulfate Class - DS-1 and ACEC Class AC-1 for the Made Ground, shallow cohesive soils and Northmoor Sands and Gravels. Additional testing on the Kellaways Clay will be required if a piled foundation solution is proposed.

Waste Classification

HazWaste Online assessment categorizes materials as 'Non-Hazardous'.

2.4 Geo-Environmental Recommendations

Human health

Slightly elevated concentrations of benzo(a)pyrene. However, not considered an unacceptable risk (subject to regulatory approval).

Plant growth

Minor boron exceedance. Not considered an unacceptable risk.

Radon

The site is not in a Radon Affected Area.

Hydrock note that the Radon risk maps have been updated in December 2022 and have confirmed based on up-to-date information that less than 1% of homes at or above the Action Level. Therefore, no protection measures are required.

Water supply pipes

Brownfield site and the presumption in the guidance is that barrier pipe will be used. However, the investigation and assessment has indicated no significant Contaminants of Concern and as such standard pipework may be suitable for the site following negotiations with the supply company.

However, for site planning purposes and budgeting it is recommended that barrier pipe provision is assumed pending liaison with the supply company.

Gas protection

CS1 assumed at the time of writing. May need to be revised subject to confirmation of existence of landfill within 250m to east of the site and subsequent gas monitoring indicates the presence of gas.

Remediation

No remedial measures are considered necessary at the site based on the current works that have been undertaken. Further assessment will be required to fully assess the site.

2.5 Uncertainties and Limitations

Acorn Property Group stipulated that the preliminary ground investigation carried out was to target potential sources of contamination and indication of groundwater level.

It should be noted that although there are landfill licenses for the North End West/Lake 62 sites it does not appear to have been completely landfilled because this area appears to be a lake. It is feasible that landfill licenses were obtained and never used or the area was partially landfilled and then flooded to form the lake. This discrepancy in the data requires clarification and further enquiries to try to find out the extent of any landfill. If this cannot be clarified it is advised that gas monitoring is undertaken within the existing borehole on site to get an initial indication as to whether there is any ground gas present.

The report states that groundwater level logger monitoring is incomplete, however this was subsequently completed with a groundwater level of 1.8 to 2.2m bgl. It is important to note that the groundwater monitoring is taking place during the summer and there has been a low level of rainfall. Groundwater levels fluctuate and therefore it should be noted that monitoring may not record worst-case groundwater data.

The footprints of the existing buildings have not been investigated.

The suspected asbestos roofed burnt barn has not been investigated.

Overgrown areas of the site were not able to be accessed due to ecological risks (bird nesting season).

2.6 Recommendations for further work

- Further investigation into the suspected burnt asbestos roofed barn in the west of the site in conjunction with a pre-demolition asbestos survey;
- Investigation of infilled gravel pit onsite.
- Discussions with service providers regarding the materials suitable for pipework;
- Post demolition ground investigation to fully characterise the site;
- Detailed design of foundations;
- Gas monitoring if extent of landfilling cannot be established.
- Ground conditions across large areas of the site will require investigation due to the potential for variable ground and conditions and further potential sources of contamination.

3. Hydrock 2023 Walkover

On the 23 March 2023 Hydrock undertook a walkover of the site in order to observe any changes to site conditions and inform the client of any new potential risks to the proposed development.

During the walkover all of the existing points of interest were checked and several new points where noted. This is summarised on the Site Walkover Plan (Ref: 09612-HYD-XX-XX-DR-GE-1000, dated 27 March 2023). A summary of pertinent photographs and included in this report.

The landfills noted 210m to the east of site are at present is still a lake, historical landfilling records detail that there was waste deposited in to the landfill in 1992.

Geo-Environmental Considerations

- Previously unknown fuel tanks (three).
- Previously unknown boiler house.
- Extensive use of asbestos containing materials in the agricultural buildings and sewage works.

Geotechnical Considerations

- Tension cracks along the remediated quarry (lake) to the south east of site.

3.1 Recommendations For Further Works

- Pre-demolition asbestos survey for all structures noted to contain asbestos containing materials;
- Cataloguing and removal of asbestos debris/lagging/cement from site;
- Removal and verification of the numerous fuel tanks present on site;
- Further ground investigation including (but not limited to);
  - Investigate the suspected burnt asbestos roofed barn in the west of the site (whilst this no longer seems to be present the area should still be considered for investigation);
  - Investigate areas that are currently inaccessible, post demolition;
  - Investigate the potential for variable ground and conditions;
  - Install ground gas monitoring wells;
  - Potential, and not currently investigated, sources of contamination; and
  - Investigation of infilled gravel pit onsite.
- Detailed design of foundations;
- Consideration of tension cracks and ground instability from the remediated quarry to the south west and any potential future instability from the quarries to the north west/north;
- Extensive gas monitoring if extent of landfilling to the east cannot be established; and
- Discussions with service providers regarding the materials suitable for pipework.

Enclosed

Desk Study Photograph 1	
Date: 23/03/2023	
Direction Photograph Taken: North west.	
Description: Sewage works.	

Desk Study Photograph 2	
Date: 23/03/2023	
Direction Photograph Taken: North west.	
Description: Sewage works potential asbestos.	

Desk Study Photograph 3	
Date: 23/03/2023	
Direction Photograph Taken: South east.	
Description: Pumping house electrical box.	

Desk Study Photograph 4	
Date: 23/03/2023	
Direction Photograph Taken: North west.	
Description: Southern field area.	

Desk Study Photograph 5	
Date: 23/03/2023	
Direction Photograph Taken: North east.	
Description: Historical fuel spill area and new stockpile.	

Desk Study Photograph 6	
Date: 23/03/2023	
Direction Photograph Taken: North west.	
Description: Electrical room and former orchard.	

Desk Study Photograph 7	
Date: 23/03/2023	
Direction Photograph Taken: South west.	
Description: Fuel tank.	

Desk Study Photograph 8	
Date: 23/03/2023	
Direction Photograph Taken: South west.	
Description: Fuel tank.	

Desk Study Photograph 9	
Date: 23/03/2023	
Direction Photograph Taken: South west.	
Description: General site.	

Desk Study Photograph 10	
Date: 23/03/2023	
Direction Photograph Taken: North.	
Description: Stockpile	

Desk Study Photograph 11	
Date: 23/03/2023	
Direction Photograph Taken: North east.	
Description: Quarrying activities.	

Desk Study Photograph 12	
Date: 23/03/2023	
Direction Photograph Taken: North west.	
Description: Quarrying activities.	

Desk Study Photograph 13	
Date: 23/03/2023	
Direction Photograph Taken: South west.	
Description: Tennis courts.	

Desk Study Photograph 14	
Date: 23/03/2023	
Direction Photograph Taken: South.	
Description: Gym.	

Desk Study Photograph 15	
Date: 23/03/2023	
Direction Photograph Taken: West.	
Description: Empty ponds.	

Desk Study Photograph 16	
Date: 23/03/2023	
Direction Photograph Taken: South west.	
Description: Agricultural buildings.	

Desk Study Photograph 17	
Date: 23/03/2023	
Direction Photograph Taken: North west.	
Description: Quarrying activities.	

Desk Study Photograph 18	
Date: 23/03/2023	
Direction Photograph Taken: South.	
Description: Livestock barns.	

Desk Study Photograph 19	
Date: 23/03/2023	
Direction Photograph Taken: West.	
Description: Unspecified tank on a trailer.	

Desk Study Photograph 20	
Date: 23/03/2023	
Direction Photograph Taken: South east.	
Description: Water pump, tension cracks visible in crest in back ground.	

Desk Study Photograph 21	
Date: 23/03/2023	
Direction Photograph Taken: North east.	
Description: Asbestos warning.	

Desk Study Photograph 22	
Date: 23/03/2023	
Direction Photograph Taken: South west.	
Description: Asbestos warning.	

Desk Study Photograph 23	
Date: 23/03/2023	
Direction Photograph Taken: North east.	
Description: Swimming pool.	

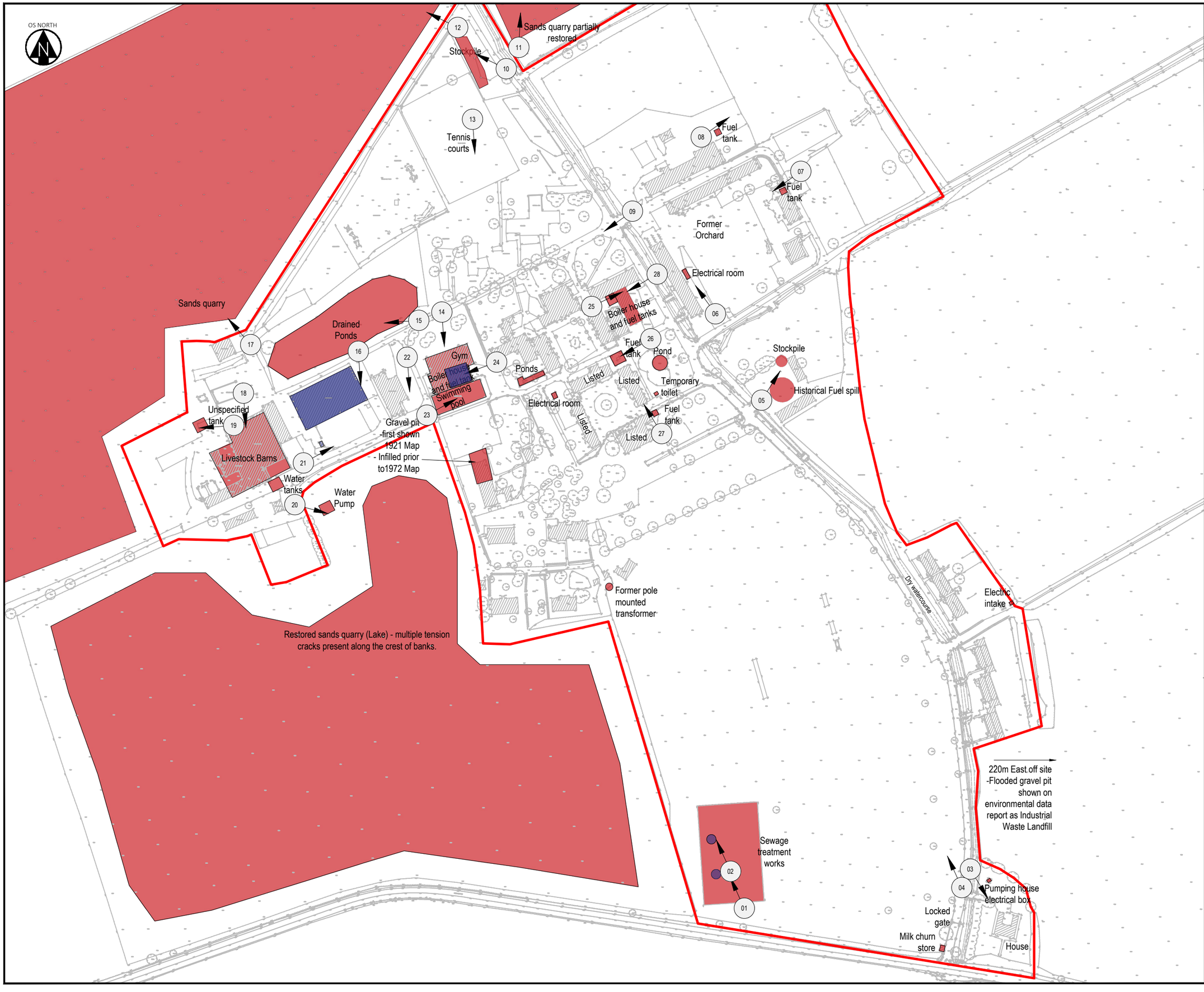
Desk Study Photograph 24	
Date: 23/03/2023	
Direction Photograph Taken: West.	
Description: Fuel tank for boiler house.	

Desk Study Photograph 25	
Date: 23/03/2023	
Direction Photograph Taken: North east.	
Description: Fuel tank for boiler house. (Hydrocarbon odours noted).	

Desk Study Photograph 26	
Date: 23/03/2023	
Direction Photograph Taken: South west.	
Description: Fuel tank.	

Desk Study Photograph 27	
Date: 23/03/2023	
Direction Photograph Taken: South west.	
Description: Fuel tank.	

Desk Study Photograph 28	
Date: 23/03/2023	
Direction Photograph Taken: South west.	
Description: Boiler house.	



KEY

01 Photo location and reference

Notable site feature

Asbetos Containing Materials Present

NOTES

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.

2. This drawing is to be read in conjunction with all relevant Engineers' and Service Engineers' drawings and specifications.

3. This drawing has been based on the following drawings and information:
Topographic Survey
- Site Survey T_MG0377

REV.						
P1	FIRST ISSUE					
	SW	23/03/23	AJ	27/03/23	AJ	27/03/23
REV.	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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CLIENT
BEWLEY HOMES

PROJECT
COTSWOLD COMMUNITY SCHOOL, ASHTON KEYNES

TITLE
SITE WALKOVER PLAN

HYDROCK PROJECT NO.	SCALE @ A3
C-09612-C	1:1750

PURPOSE OF ISSUE	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
09612- HYD-XX-GI-DR-G-1002	P1