



Abbeydale
Geoscience

REMEDIATION METHOD STATEMENT

BATLEY SHOPPING CENTRE, ALFRED'S WAY,

BATLEY, WEST YORKSHIRE

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Client:

Taylor & Brown Investments Ltd
203 Manningham Road
Bradford
West Yorkshire
BD8 7HP

REMEDIATION METHOD STATEMENT
BATLEY SHOPPING CENTRE, ALFRED'S WAY, BATLEY

DOCUMENT VERIFICATION SHEET

	Prepared By:	Checked By:
Name:	Glyn Hogg	Richard Saville
Qualifications:	MSci FGS	BSc CGeol FGS
Position:	Engineer	Managing Director

SUMMARY

Grid Ref: 424400(E), 424280(N) **Elevation:** 58m - 60m AOD **Site Area:** 0.64 ha

Development proposals: Construction of a two storey retail unit and renovation to part of existing shopping centre building.

Past site development: Woollen mill, replaced with open space associated with existing shopping centre.

Environmental Assessment: No further assessment required.

Ground Gas: The site is classified as a CS2..

Gas Protection: Gas protection measures for CS2 required for the new buildings.

Verification: On completion a Verification Report will need to be produced and sent to Local Planning Authority for their approval.

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TABLE OF CONTENTS

1. INTRODUCTION1

2. OBJECTIVES.....2

3. THE SITE.....2

4. PREVIOUS INVESTIGATION4

 4.1. Historical Setting

 4.1.1. The Site

 4.1.2. Surrounding Area

 4.2. Intrusive Ground Investigation

 4.3. Generic Quantitative Risk Assessment (GQRA)

 4.4. Ground Gas Risk Assessment

5. GROUND GAS PROTECTION MEASURES6

 5.1. Floor Construction

 5.2. Passive Ventilation

 5.3. Gas Resistant Membrane

6. VALIDATION OF GAS PROTECTION MEASURES8

 6.1. Overview

 6.2. Good Construction & Installation Practises

 6.3. Validation Visits

 6.4. Contractor’s Quality Assurance (CQA)

 6.5. Integrity Testing

7. VERIFICATION OF REMEDIATION WORKS10

8. UNEXPECTED GROUND CONDITIONS10

9. WASTE DISPOSAL.....10

10. REGULATORY APPROVAL10

APPENDICES

APPENDIX A - PROPOSED LAYOUT DRAWINGA

REMEDIATION METHOD STATEMENT

BATLEY SHOPPING CENTRE, ALFRED'S WAY, BATLEY

1. INTRODUCTION

On the instruction of Taylor & Brown Investments Ltd, a Remediation Method Statement was carried out by Abbeydale Building Environment Consultants Ltd (Abbeydale BEC) on a site at Batley Shopping Centre, Alfred's Way, Batley, West Yorkshire.

The site is situated near the centre of Batley, centred on National Grid Reference 424400, 424280, with a site area of around 0.64 ha. See Figure 1.

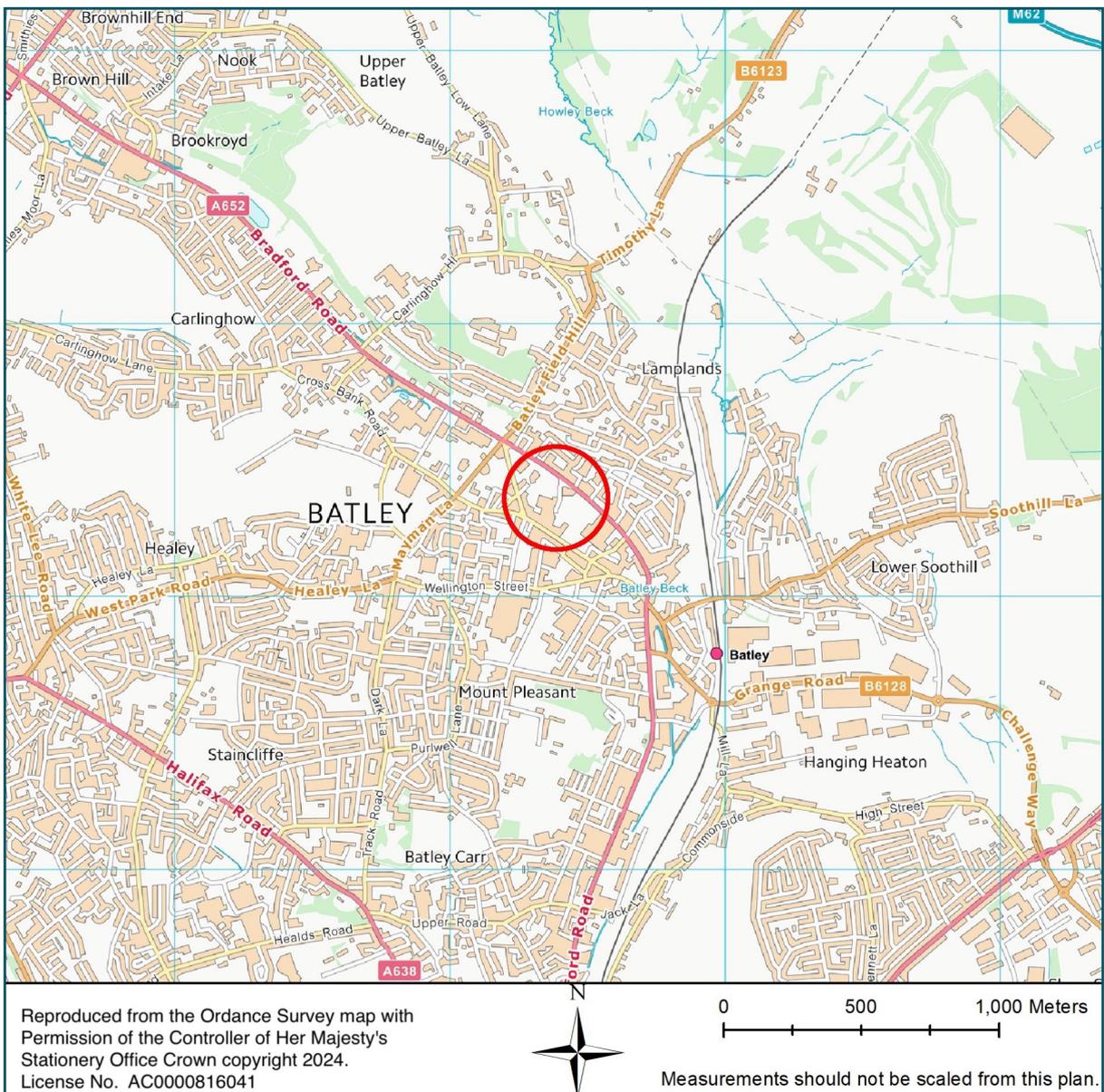


FIGURE 1 - LOCATION PLAN

This report was produced for our client, Taylor & Brown Investments Ltd, and their advisors and financiers; it should not be relied upon or transferred to any other parties without the express written authorisation of Abbeydale BEC and our client. If any other unauthorised third party comes into possession of this report they rely on it at their own risk and the authors owe them no duty of care or skill.

The comments and recommendations presented in this Remediation Method Statement are based on the findings of a review of available information; ground conditions encountered during the intrusive investigation work included in our previous Ground Investigation report (Ref: 487003-GI).

When writing this report the proposed development was for the renovation of part of the existing shopping centre building and the construction of a new two storey retail unit at, or close to, existing ground levels. If there are changes to these proposals then some modification to the comments and recommendations given may be required. The proposed site layout is shown on the site plan in Appendix A.

2. OBJECTIVES

This report has been produced to outline what remediation measures will be implemented as part of the redevelopment of the site to ensure that site users are not at risk from any soils they may be exposed to in any soft landscaping areas.

Remediation measures that will needed to be implemented into the design and construction of the proposed buildings to mitigate ground gas ingress into the building will also be outlined.

The validation measures that will be used to confirm the remediation works have been implemented successfully will also be outlined, so that the site can be considered as “suitable for use” on completion of the Verification Report.

3. THE SITE

The site is a roughly L-shaped parcel of land, with the northern part comprising an area of open space surfaced with grass and demolition rubble. This part of the site slopes up from the north-western corner adjacent to Alfred’s Way, up towards the centre of the site; a brick retaining wall supports the higher ground. A paved ramp runs along the northern boundary of the site, and leads to a paved area which occupies the north-eastern corner of the site.

The southern and and south-western part of the site comprises a car park, surfaced with asphalt, used for the adjacent shopping centre. The south-eastern part of the site comprises a vacant retail unit which is part of the Batley Shopping Centre.

There was no visual or olfactory signs of potential contamination at the surface, distressed vegetation or any potentially contaminative sources noted on the site.

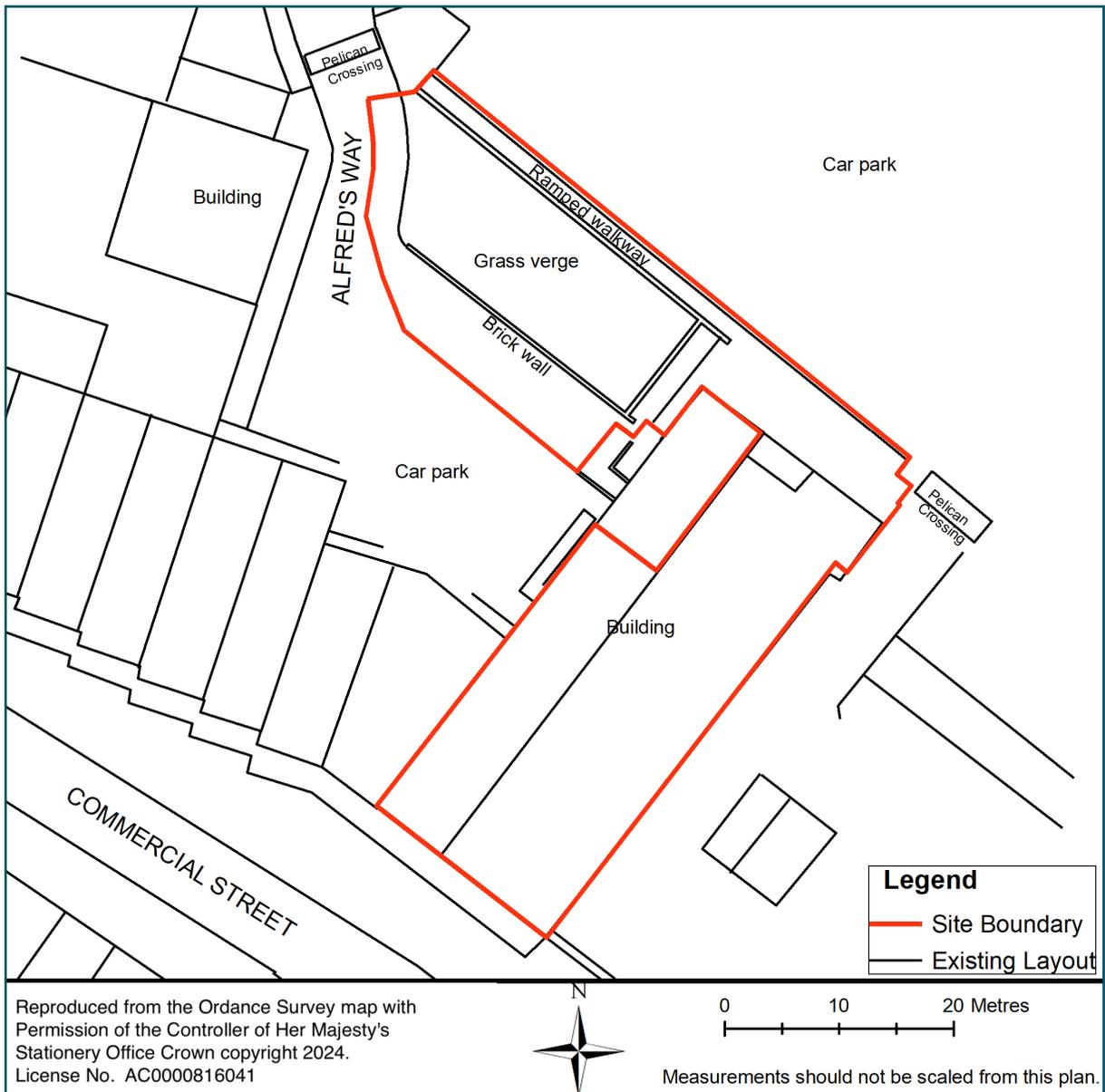


FIGURE 2 - SITE PLAN

Vehicular access to the site is from Alfred’s Way in the north-western corner of the site. Pedestrian access is also possible via the north-eastern corner, from the adjacent supermarket car park.

The site is bound by a large supermarket car park to the north and east. The south-west corner of the site is bound by a section of Batley Shopping Centre, comprising retail shops and takeaway restaurants. Commercial Street is situated to the south of the site, with more retail shops beyond.

4. PREVIOUS INVESTIGATION

4.1. Historical Setting

The historical setting of the site was outlined in detail in a previous Phase 1 Desk Study report prepared by Solmek (Ref: S200312, dated April 2020), summarised below for ease of reference.

4.1.1. The Site

The earliest OS map of 1854 shows that a mill occupied the northern part of the site. The mill is labelled 'Batley Mill (Woollen)', which is renamed as 'Old Mill (woollen)' by 1890.

The southern part of the site at this time consists of a road and some residential terraced housing. Some of this housing, which bounds Commercial Street, is redeveloped in the 1950's to a similar layout of the current day buildings.

During the 1960's, the remaining residential housing is also demolished to leave open space between the Old Mill and the buildings on Commercial Street.

The mill remains on site until the map of 1982, when it has been replaced with new buildings in the footprint of the current day Batley Shopping Centre. This leaves the northern section of the site as open space, and the southern section as a large unlabelled building.

4.1.2. Surrounding Area

The earliest map of 1854 shows that Batley is well developed and the area surrounding the site is developed with residential, industrial and commercial uses. A Dye Works is shown on the 1854 map c. 50m north-west of the site.

The 1890 map shows a Mill Pond less than 20m east of the site, which is centred between the Old Mill on site, and two others in the vicinity. Perseverance Woollen Mill is shown c. 90m north-west of the site and Toadpipe Woollen Mill, c. 100m east of the site. Bank Foot Foundry (Iron) and Branch Road Mills are shown c. 125m and c. 200m respectively north-west of the site. The area to the south and west of the site at this time is mostly residential or commercial.

The 1922 map shows Toadpipe Mill has doubled in size and renamed to Anchor Mills (Flock and Woollen) and two areas outside this mill (c.100m east of the site) which are used for storage of Tanks.

The 1956 map shows a Carpet Works has been developed 85m north of the site. A Rag Warehouse is shown 15m east of the site, and a Printing Works 20m east of the site.

During the 1960's and 1970's, the majority of the mill buildings were either demolished or replaced with warehouses.

Detail of mapping reduces on later maps, and most buildings are not labelled, however there are still numerous large buildings within 250m, potentially used for industrial purposes.

4.2. Intrusive Ground Investigation

Fieldwork was undertaken on 1,8 and 9 June 2021. For detailed description of the strata encountered the previously prepared Ground Investigation report (Ref: 487003GI, dated July 2021) should be consulted. However, a summary of the intrusive investigation works is given below for ease of reference.

The locations of exploratory holes, as shown on Figure 3, were restricted due to the presence of services and existing buildings that were present at the time of undertaking the intrusive works.

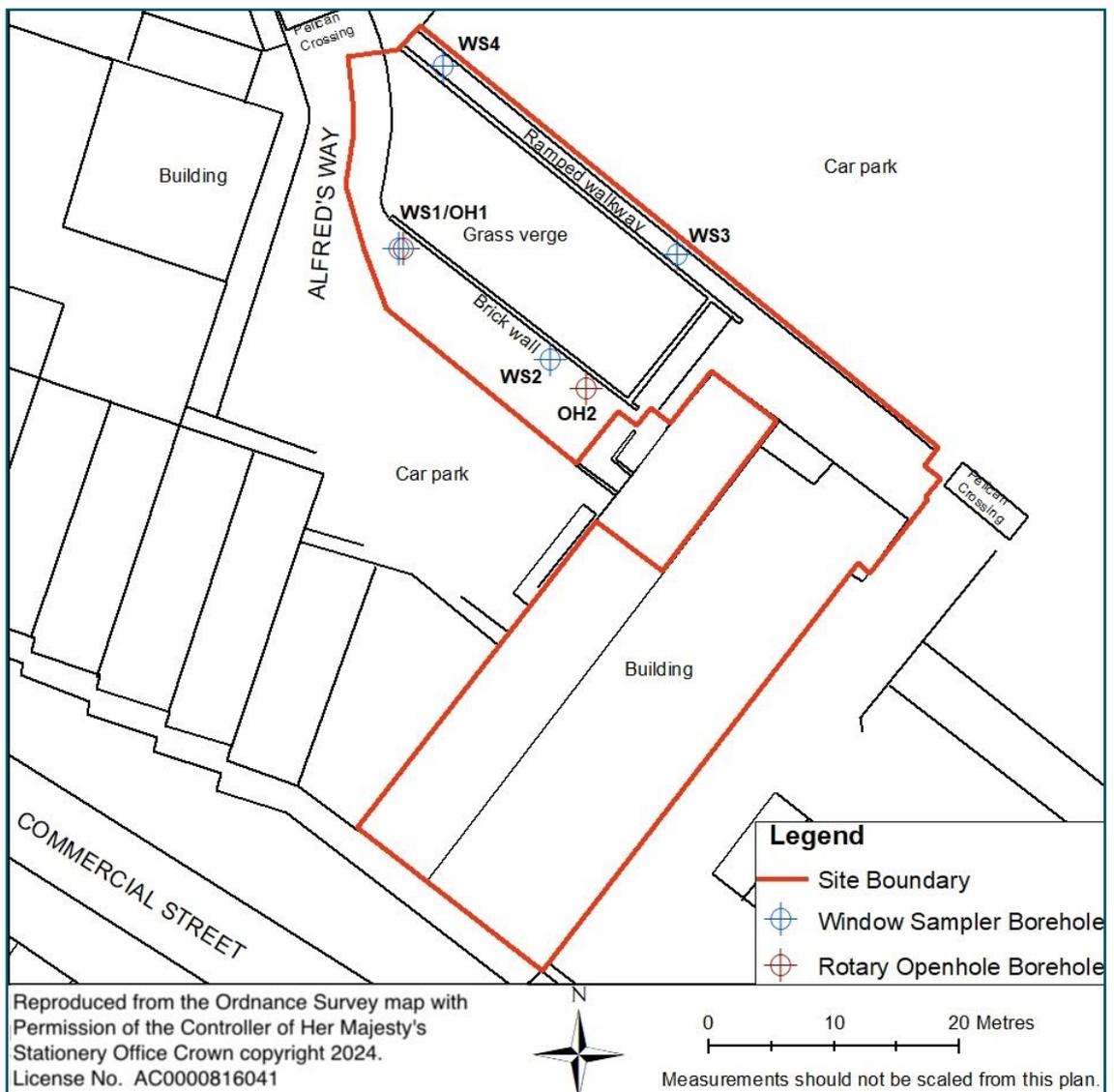


FIGURE 3 - EXPLORATORY HOLE LOCATIONS

The Ground Investigation consisted of four window sample holes to confirm the shallow ground conditions and allow representative samples of the underlying soils to be taken. The exploratory holes were extended to depths of between 1.02m and 4.15m below ground level (bgl).

The exploratory holes identified made ground from the surface to a maximum depth of 1.93m bgl. Beneath the made ground, firm to stiff sandy gravelly clay was encountered to depths of between 3.10m and 4.15m bgl. Between 3.10-3.49m bgl coal was encountered in WS1.

To provide information on the presence of shallow coal seams or associated mine workings two rotary openhole boreholes (OH1 and OH2) were drilled to a depth of 30m bgl using a tracked top driven rotary drilling rig with a down the hole hammer, using water flush.

4.3. Generic Quantitative Risk Assessment (GQRA)

No obvious visual or olfactory signs of potential contamination were identified during any of the intrusive investigation undertaken.

As part of the Ground Investigation five samples of the made ground soils were sent for chemical analysis, as these soils were highlighted as the biggest source of potential contamination on the site. The chemical levels in the soils were compared against current GQRA guideline values for a commercial end use.

No elevations were recorded in any of the samples tested.

4.4. Ground Gas Risk Assessment

Monitoring standpipes were installed in five of the exploratory holes, with subsequent gas monitoring undertaken on five occasions.

No methane (CH₄) was recorded during the gas monitoring, with a peak carbon dioxide (CO₂) of 3.5% identified from the monitoring well installed in OH1. A maximum flow rate of -11.3 l/h was recorded.

In accordance with BS 8485:2015 a Ground Gas Screening Value of 0.3955 l/h was calculated using the above peak CO₂ concentration and maximum flow rate from across the site, categorising the site as Characteristic Situation 2 (CS2). Gas protection measures will therefore need to be installed into the new retail unit to protect future site users from potential hazardous gas concentrations, in accordance with BS8485:2015.

5. GROUND GAS PROTECTION MEASURES

The proposed building is most likely representative of a Type A building in accordance with BS8485:2015, which would require a minimum gas protection score of 3.5 points for a CS2 risk classification. Gas protection points will be awarded based on the construction design of the new buildings.

We understand that construction drawings are still being produced, so we have included below the scope of ground gas protection measures that will need to be considered in order to meet the minimum requirements outlined in BS8485:2015.

5.1. Floor Construction

At this stage it is unclear whether the proposed new retail unit will have a suspended floor or a cast in-situ ground bearing floor slab. If a suspended floor construction was utilised this would not provide any structural barrier to the ingress of potential ground gases into the building, however a ground bearing floor slab would provide a structural barrier and could be afforded a minimum 0.5 gas protection score in accordance with BS 8485:2015.

5.2. Passive Ventilation

Providing passive ventilation of any subfloor area allows dilution of any ground gases and a means of allowing ground gases to escape to the external atmosphere. If a suspended floor construction is used this should have a minimum 150mm clear void that is ventilated using air bricks or telescopic vents depending on the level of finished floor levels compared with external ground levels.

If a ground bearing floor slab is used then a void former should be installed below the floor slab, which can then be passively ventilated using air bricks or telescopic vents depending on the floor level relative to external ground levels.

Depending on the performance of the passive ventilation system a gas protection score of 1.5 or 2.5 can be achieved.

5.3. Gas Resistant Membrane

As a final measure against ingress of any potential ground gases into the proposed building, a proprietary gas resistant membrane will need to be installed directly above the proposed beam and block floor. Providing the membrane meets all of the criteria set out in BS 8485:2015, including validation in accordance with CIRIA C735, a gas protection score of 2 can be achieved.

If a suspended floor construction is used the membrane should be installed directly on top of the suspended floor, and then proposed floor insulation installed on top of the membrane.

Before the membrane is laid the beam and block floor should be swept so that it is clear of any debris that may otherwise puncture the gas membrane.

In accordance with CIRIA C735:2014 the gas membrane will need to be protected against any follow-on damages within 48 hours of the membrane being inspected; ideally immediately. This could either be by placing a cement screed over the membrane or laying any proposed floor insulation directly over the gas membrane. The Validation Engineer shall be present when this is scheduled to occur, to carry out a final visual inspection and ensure that there

are no obvious defects before it is no longer possible to inspect the gas membrane.

All penetrations, service entries and laps in membrane sheets would need to be fully sealed to ensure that they do not allow ground gases to ingress into the new building. Confirmation would be needed in due course regarding whether any membrane sheets will be sealed using double sided butyl tape or be heat welded.

Combined with the passive underfloor venting, the use of a suitable gas resistant membrane will provide the necessary minimum protection to meet the Gas Protection Score required by BS8485:2015.

6. VALIDATION OF GAS PROTECTION MEASURES

6.1. Overview

Yorkshire And Lincolnshire Pollution Advisory Group (YALPAG) and CIRIA report C735:2014 provide guidance on suggested levels of verification and, if deemed necessary, integrity testing, following installation of gas protection systems, to confirm that they have been installed to a sufficient standard to provide protection against the ingress of ground gases.

At this stage no information is available regarding the actual materials to be used in the gas protection system, including how the gas membrane will be jointed and what techniques will be employed to seal any service entries.

We understand that the membrane will be installed by the main contractor and according to the guidance even if the gas membrane is installed by a qualified and experienced installer, it will need to be independently verified.

6.2. Good Construction & Installation Practises

Prior to laying of the gas membrane the floor should be swept to remove any debris that may penetrate through the gas membrane.

All joints and penetrations will need to be fully sealed to ensure that there is no leakage of any potential ground gases into the new building. Self adhesive gas membrane should be used to ensure a good seal wherever possible.

If any defects are observed that are considered to be due to poor construction practises or workmanship, such as penetrations through the membrane or poorly sealed membrane joints, the Abbeydale BEC Validation Engineer will hold a toolbox talk with the installation staff to reinforce the importance of good working practising when installing the gas membrane.

6.3. Validation Visits

As outlined in CIRIA 735 and YALPAG guidance, validation visits will need to be undertaken by an appropriately experienced independent Validation Engineer.

Independent validation visits will be undertaken by Abbeydale BEC Validation Engineer Richard Saville, who is experienced in overseeing remediation works and has attended and passed CL:AIRE training course: Verification of Gas Protection Systems.

During each visit the Abbeydale Geoscience Validation Engineer will complete a pro forma record sheet as per the example provided in Appendix A5 of CIRIA 735. Relevant photograph records will be taken; where required these will include any defects observed and further photographic evidence once any necessary corrective measures have been applied to allow validation of the membrane installation. If any follow-on validation is deemed necessary this will be clearly highlighted on the pro forma record sheet(s).

6.4. Contractor's Quality Assurance (CQA)

The installation contractor will provide sign-off sheets and photographic records to confirm that the gas protection measures have been installed correctly and with due care and skill. The sign-off sheets will be appended to the Verification Report as a line of evidence and deemed to constitute verification for the relevant plots.

6.5. Integrity Testing

The choice of integrity testing would depend partly on the jointing system used, and also how quickly the gas membrane is protected against any potential follow-on damage after it has been installed.

Any integrity testing would be carried out by an independent specialist contractor, with all integrity test results provided to Abbeydale BEC for inclusion in the Verification Report.

If a welded jointing system is used then mechanical stress point testing of seams would be undertaken by the Abbeydale BEC Validation Engineer as an initial check that seams are sealed adequately. Independent air lance testing would also be undertaken to ensure that the joints are adequately sealed unless the joints were pre-fabricated and certification of the joints provided by the membrane manufacturer. Air lancing testing would need to be undertaken before lap tape is used to hold down any overlapping sections of membrane.

Where joints in the gas membrane are sealed using a taped system, the sealing would need to be observed on site by the Validation Engineer, and should not be undertaken during periods of inclement weather where the sealing tape may not adhere properly to the gas membrane.

If visual inspection of the membrane does not identify any areas of potential concern, and the membrane is protected immediately after installation before any follow-on trades, then the need for further integrity testing is minimal. However, if follow-on works are undertaken before the gas membrane is protected, or if the gas membrane is left exposed after it is installed, further integrity testing is likely to be needed to confirm that the membrane has not been damaged and remains impervious to gases. This could be done either by

dielectric porosity testing or tracer gas testing depending on recommendation of the independent specialist integrity testing company.

7. VERIFICATION OF REMEDIATION WORKS

On completion of the remedial works a Verification Report will need to be compiled and submitted to the Local Authority, confirming that the agreed remedial works have been undertaken as proposed and that no residual risks are present to future residents / receptors.

All sign-off sheets for the installation of the gas membrane provided by the contractor will be presented in the Verification Report alongside validation visit pro forma sheets and photographic records kept by the Abbeydale BEC Validation Engineer. Where relevant photographic records will be taken of any defects observed during the validation visits, followed by photographs of any corrective measures undertaken to ensure the correct installation of the protection measures.

Any non-compliances with the agreed Remediation Method Statement shall be highlighted, along with any corrective measures undertaken to ensure that the resultant risks to future site users have been mitigated.

8. UNEXPECTED GROUND CONDITIONS

If any unexpected or unusual ground conditions are encountered during the course of the remedial works further geo-environmental advice should be sought, including further investigation and environmental assessment should be undertaken if deemed necessary.

9. WASTE DISPOSAL

Any waste arising from development of the site, such as excess soil or material deemed unsuitable for retention on site, should be disposed of in accordance with the Duty of Care Regulations. If any soils are being disposed directly to a landfill site Waste Acceptance Criteria (WAC) analysis may be required in addition to basic environmental screen testing to determine the most appropriate disposal facility for the waste, in accordance with the requirements of the current Landfill Directive.

10. REGULATORY APPROVAL

The conclusions and recommendations in this Remediation Method Statement cannot be guaranteed to gain regulatory approval. Prior to implementation of any remediation measures it should be passed to Kirklees Council and any other regulatory bodies for their comment and approval.

APPENDIX A - PROPOSED LAYOUT DRAWING

