



INVESTIGATE



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REMEDiation STRATEGY REPORT

**FOR
GRANGE SCHOOL,
MATTHEWS LANE,
LEVENSHULME,
M12 4GR**

**PREPARED FOR
JOHN TURNER CONSTRUCTION GROUP
LTD**

**REPORT NO. 8032C
SEPTEMBER 2025**

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REMEDIAL STRATEGY REPORT FOR GRANGE SCHOOL, MATTHEWS LANE, LEVENSHULME, M12 4GR

CLIENT: JOHN TURNER CONSTRUCTION GROUP LIMITED

ENGINEER: FREDERICK G. MARKLAND ASSOCIATES LIMITED

ARCHITECT: GRATED APPLE LTD

1 INTRODUCTION

Our brief is to provide a Phase III Remediation Strategy Report in accordance with the Planning Application Ref. 141877/FO/2025 dated March 2025 for submission to the Local Planning Authority (Manchester City Council).

We have prepared this Remediation Strategy Report following receipt of Purchase Order No. C1006, dated 19th August 2025, from the Architect on behalf of the Client.

We have previously issued reports for the site, as follows:

- Phase I: Walkover Survey and Desk Study Report, ref. 8032 and dated September 2024.
- Phase II: Ground Investigation Report, ref. 8032A and dated October 2024.
- Phase II: Ground Investigation Report updated with completed ground gas monitoring, ref. 8032B and dated December 2024.

The above reports should be read in conjunction with this report, and summaries are given in Section 2.2 below.

This Phase III Remediation Strategy Report has been prepared in general accordance with the Environment Agency's Land Contamination Risk Management (LCRM) guidance ^[1] and also meets the criteria for a Remediation Statement, as defined in Section 78H of Part 2A of the Environmental Protection Act 1990 ^[2].

1.1 Site Location and Current Status

The site is located at Grange School, Matthews Lane, Levenshulme, Manchester, M12 4GR, as indicated on Figure 1. The approximate National Grid Reference of the centre of the site is 388108, 394936.

As shown on Figure 2, the about 0.18 hectare rectangular shaped site is bound to the north by a playground, to the west by the main school building, to the south partially by a car park and partially by the southern end of the sports hall, and to the east by Mount Road. The site is currently occupied by the northern end of the sports hall and part of a playground.

1.2 Proposed Development

We understand that it is proposed to construct a single storey extension and a mezzanine floor in the existing sports hall, as shown on Figure 3.

1.3 Contact Details of Relevant Organisations

TABLE 1 INVOLVED PARTIES

Developer	Engineer	Architect
John Turner Construction Group Limited 2 Preston Road, Grimsargh, Preston, Lancashire PR2 5SD Tel. 01772 794830 [REDACTED]	Frederick G. Markland Associates Limited Corby House, 38a Chorley New Road, Bolton, Lancashire BL1 4AP Tel. 01204 531208 [REDACTED]	Grated Apple Limited The Piggery, 2 Wigsey Lane, Warburton, Greater Manchester, WA13 9JL [REDACTED] [REDACTED] [REDACTED]

2 SITE ASSESSMENT

2.1 Summary of Previous Reports

2.1.1 Phase I: Desk Study with Walkover Survey Report (ref. 8032)

The Phase I report was undertaken in September 2024.

Site Reconnaissance

The Phase I report included a walkover survey carried out on 27th August 2024.

On the day of the walkover survey the site could be accessed from Mount Road to the east. The site is relatively flat and mainly hard surfaced with some areas of soft landscaping. The site boundaries are marked to the east and south by a metal fence, and to the west by the main school building. The site boundary to the north is not marked and cuts partway through a playground and walkway.

The sports hall is a one to two storey building situated in the centre and south of the site. The interior of the sports hall where the mezzanine floor is proposed has wooden flooring.

The external area is mainly paved with a surface water drain and occasional service manholes. A small area adjacent to the sports hall is bituminous macadam surfaced. There is a playground area to the north of the sports hall.

There are some small rectangular soft landscaped areas with small to medium trees adjacent to the west of the sports hall.

There is a pile of building rubble in the north west of the site.

No visual or olfactory contamination was noted during the walkover survey.

Desk Study

The historical survey starting from the earliest survey in 1848 found the site was initially undeveloped and situated across two fields with a hedge line trending east to west through the north of the site, with the hedge removed by 1890. By 1916 the site was indicated to be within a football ground, then by 1933 a school playing field. By 1974 a small school building was constructed overlapping the northern boundary of the site and school buildings were constructed bounding the site to the north. A sports hall was constructed within the site between 2000 and 2003 and tennis courts were shown to bound the site to the west. Between 2009 and 2013 a large school building was constructed bounding the site to the west and the buildings to and in the north of the site were demolished and replaced with a playground.

The Phase I report indicated that there are no records of made ground beneath the site, however, the site has been developed and therefore some is likely to be present.

The drift deposits were anticipated to be Devensian Till composed of Diamicton (poorly sorted gravelly sandy silty clays), and these were indicated to be a Secondary Undifferentiated aquifer.

The bedrock was anticipated to be the Early Triassic Chester Pebble Beds Formation composed of sandstone, and indicated to be a Principal aquifer.

The preliminary conceptual model identified potential sources of contamination from:

- General contaminants associated with Made Ground (if present) and past and present contaminative processes undertaken on and adjacent to the site including construction and demolition of buildings on and adjacent to the site.
- On-site spillage and leakage of hydrocarbons (oils and fuels) from cars parked in nearby car parks.
- Migrating leachate (contaminated surface and/ or groundwater) from the large landfill indicated to be around 56 metres to the west and closed in 1978.
- Migrating ground gases from the large registered landfill indicated to be present around 56 metres to the west and closed in 1978.
- Accumulated ground gases in on-site confined spaces.

These potential sources result in potential pollutant linkages to site operatives, end users of the site, vegetation, controlled waters and adjacent properties.

The report recommended that an intrusive ground investigation was required to assess the ground conditions and obtain soil samples for contamination analysis and asbestos detection, and where possible, groundwater and surface water samples for contamination analysis.

In addition, it was recommended that gas standpipes be installed and monitored over an extended period of time to allow for an assessment to be made.

2.1.2 Phase II: Interpretive Ground Investigation Report (ref. 8032A/B)

The Phase II report was undertaken in October 2024 and updated with completed ground gas monitoring in December 2024. The investigation comprised of 5 mini boreholes taken down to depths of between 3.41 and 3.45 metres, and 2 hand dug trial pits taken down to depths of 1.15 and 1.20 metres.

In the sports hall a laminate wood flooring was observed to 0.03 metres depth. Then concrete (reinforced) was cored to depths of 0.27 and 0.31 metres depth in M1 and M2 respectively. Underlying the concrete, Made Ground generally comprised of brown very sandy silty fine to coarse gravel sized fragments of sandstone, concrete and occasional brick (hardcore) to a depth of 1.20 metres, overlying soft dark brownish grey ashy slightly gravelly slightly sandy silty clay to 1.50 and 1.70 metres depth respectively.

Bituminous macadam tarmac surfacing was observed in M4, HD1 and HD2 adjacent to the sports hall to depths of between 0.08 and 0.13 metres, generally overlying light greyish brown sandy silty clayey fine to coarse gravel sized fragments of limestone, sandstone, concrete and wood to depths of 0.60, 0.90, and 1.14 metres respectively. Underlying this in M4, Made Ground comprised of soft to firm brown, dark brown and occasionally grey and yellowish brown mottled ashy slightly gravelly slightly sandy clay to 1.65 metres.

In M3 taken out in the planted area west of the sports hall, Made Ground comprised of brownish grey silty clayey fine to coarse sand and fine to coarse gravel sized fragments of sandstone and concrete with some pockets of organic matter to 0.10 metres, overlying dark brown sandy silty slightly clayey fine to coarse gravel sized fragments of sandstone and concrete with occasional cobble sized fragments of sandstone to 1.20 metres, overlying soft to firm dark greyish brown ashy slightly gravelly slightly sandy very silty clay to 1.50 metres depth.

In M5 taken out adjacent to the east of the large school building, Made Ground comprised of flagstone to 0.05 metres, overlying sand to 0.10 metres depth, overlying light brown sandy silty fine to coarse gravel sized fragments of limestone (hardcore) to 0.50 metres, overlying soft friable brownish grey ashy slightly gravelly slightly sandy clay to 1.65 metres depth.

Underlying the Made Ground natural cohesive deposits generally comprised of soft to firm low to medium strength brown and occasionally grey mottled slightly gravelly slightly sandy clay which generally became firm medium strength below around 2.40 to 2.50 metres, stiff high strength below around 2.60 to 2.75 metres, and very stiff very high strength below around 2.85 to 3.15 metres depth.

In M4 and M5 a layer of soft low strength greyish brown clayey silt was observed between 1.65 and 2.00 metres depth.

A groundwater inflow was encountered in HD1 at 0.80 metres. No groundwater was encountered in the remainder of the exploratory holes although it should be noted that they were only left open for a short period of time and groundwater levels and rates of inflow may be subject to seasonal and/ or climatic variations.

Monitoring of standpipes installed in M3, M4 and M5 to a depth of 3.00 metres, found groundwater to be at 0.67 to 1.04, 1.76 to 1.89, and 1.10 to 1.74 metres depth respectively. In addition, the first ground gas monitoring visit undertaken on 9th September 2024 found all standpipes to be dry.

Contamination Assessment

Five soil samples taken from the exploratory holes were analysed for a suite of determinants comprising a range of common contaminants. The results of the soil sample chemical analysis were compared with the guideline values for a standard land use of residential without plant uptake (without homegrown produce).

When compared with the GACs the contamination analysis determined elevated concentrations of arsenic and dibenzo(ah)anthracene as details in Table 2 below:

TABLE 2 ASSESSMENT OF SOIL CONTAMINATION

Determinant	Expl. Hole No.	Depth (m)	Recorded Level (mg/kg)	Published Guideline Value (mg/kg)
arsenic	M3	1.20 – 2.00	48	40
	M5	0.50 – 1.20	48	40
dibenzo(ah)anthracene	M4	1.20 – 2.00	1.1	0.32

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Guideline values for the assessment can be supplied directly to the Regulator, if requested.

The levels of arsenic in two of the samples analysed are elevated against a land use of residential without plant uptake (without homegrown produce). However, as the development is within a school area where most of the ground surface is covered by hardstanding, we consider that it would be appropriate for non-volatile contaminants to also consider the published guideline values for public open space (residential), which for arsenic is 79 mg/kg. As the recorded level is below this, we consider that the above elevations pose a negligible risk to the end users of the site, and no remedial action is necessary.

The ratios of the Polynuclear Aromatic Hydrocarbons (PAHs): benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(123-cd)pyrene, dibenzo(ah)anthracene and benzo(ghi)perylene have been assessed in the tables appended to the contamination analysis results. The profile of the PAHs was found to match the ratio profile of the coal tar test material studied by Culp et al in 1998 allowing PAHs to be assessed against the C4SL for benzo(a)pyrene as a surrogate marker. The maximum determined benzo(a)pyrene level of 3.1 mg/kg is lower than the published C4SL for residential without plant uptake of 5.3 mg/kg and consequently, in our opinion, the level of PAHs, including dibenzo(ah)anthracene, are within acceptable limits.

An asbestos screen was undertaken on five soil samples and no asbestos was detected.

Following the above it was determined that there are no contaminants requiring remediation for the proposed development. However, precautions should be taken by site personnel involved in the development process.

S4ULs, C4SLs and CL:AIRE assume long term contact with contamination and assess chronic health risk. The risk of short term acute exposure to site personnel is dealt with in the remit of the Health and Safety Executive under the Health and Safety at Work Act: 1974 and Regulations made under the Act, including the Control of Substances Hazardous to Health (COSHH) Regulations. The levels of contamination and risk to site personnel should be considered under the Construction Design and Management (CDM) Regulations at the planning stage and in the development of the designers and contractors Health and Safety Plans and Method Statements. The risk of contact with on-site soils should be minimised and the following precautions should be taken as a minimum requirement.

Site personnel involved in earthworks and excavations should wear gloves, overalls, and boots and smoking should be prohibited.

Earthworks undertaken during dry weather might generate dust and in this instance dust should be damped down and dust masks made available to site operatives. In addition, stockpiled materials should be sheeted over to prevent excessive airborne dust being formed.

Should it be necessary for groundwater to be pumped from on-site excavations the groundwater should be sampled and analysed and the groundwater analysis should be submitted to the appropriate waste water authority with a request for a discharge consent. Following receipt of a discharge consent groundwater is likely to be discharged to a sewer or to an off-site licensed discharge point.

Ground Gas Assessment

To assess the risk of ground gases on site, ground gas monitoring standpipes were installed and monitored over an extended period. Six ground gas monitoring visits were undertaken and levels of methane, carbon dioxide and oxygen, as well as flow rate were recorded. The results of the monitoring visits are given in Table 3 below:

TABLE 3 GROUND GAS CONCENTRATIONS AND FLOW RATE

Methane (% vol. In air)	Carbon Dioxide (% vol. in air)	Oxygen (% vol. in air)	Gas Flow Rate (litres/ hour)
0.0 to 21.2	0.2 to 13.6	0.0 to 19.5	<0.1 to -3.3

Elevated levels of methane and carbon dioxide, and depleted levels of associated oxygen were detected. In addition, gas flows were detected in the final two monitoring visits.

Methane gas when present between 5% volume in air (Lower Explosive Limit - L.E.L.) and 15% volume in air (Upper Explosive Limit - U.E.L.) is potentially explosive and inflammable whilst carbon dioxide in conjunction with depleted oxygen is an asphyxiant. Both methane and carbon dioxide are a by-product of the anaerobic and aerobic decomposition of biodegradable materials.

The levels of gas have been assessed in accordance with British Standard 8485, "Code of practice for the design of protective measures for methane and carbon dioxide gasses for new buildings", published in June 2015 and updated in January 2019 (BS.8485:2015+A1:2019).

The characteristic hazardous gas flow rate (Q_{hg}) is calculated by dividing the maximum gas (methane or carbon dioxide) concentration by 100 and multiplying by the maximum flow rate in litres per hour (minimum 0.1 l/hr for Sub Surface monitoring equipment). For this site $Q_{hg} = [21.2 / 100] \times 3.3 = 0.69$ l/hr

Based on the monitoring, BS.8485:2015+A1:2019, Table 2, indicates that the site falls into Characteristic Situation 2 (CS2).

BS.8485:2015+A1:2019, Table 4, indicates that for a CS2 and the type of development proposed a score of 3.5 gives the level of protection and remedial measures required.

BS.8485:2015+A1:2019 Tables 5, 6 and 7 indicate that a combination of the following protection and remedial measures should be considered to achieve the required score:

Table 5.1	precast suspended segmental sub-floor slab (block and beam). (Score 0.0)
Table 5.3	reinforced cast in-situ suspended floor slab with minimal penetrations. (Score 1.0)
Table 5.4	additionally reinforced cast in-situ suspended floor slab with minimal penetrations – slab of minimum 150mm thickness with reinforcement at the bottom and the top (Score 1.5)
.....	
Table 6.1	pressure relief pathway (low fines gravel blanket/ thin geocomposite blanket/ strips terminating in gravel trench external to the building) (Score 0.5)
Table 6.2	passive sub floor ventilation/ dispersal layer (clear void/ polystyrene void former/ geocomposite void former/ no fines gravel layer with gas drains/ no fines gravel layer) of very good performance. (Score 2.5)
Table 6.3	passive sub floor ventilation/ dispersal layer (clear void/ polystyrene void former/ geocomposite void former/ no fines gravel layer with gas drains/ no fines gravel layer) of good performance. (Score 1.5)
.....	

Table 7	gas resistant membrane meeting the following criteria: • sufficiently impervious to gases with a methane gas transmission rate of <40.0 ml/day/m²/atm (average) for sheets and joints (tested in accordance with BS.ISO.15105-1 manometric method). • sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions. • sufficiently strong to withstand in-service stresses due to say settlement if placed below a floor slab. • sufficiently strong to withstand the installation process and following trades (penetration from steel fibres in fibre reinforced concrete/ penetration from reinforcement ties/ tearing due to working above it or dropped tools) until covered. • after installation being capable of providing a complete barrier to the entry of the relevant gas. • verified in accordance with CIRIA C735 [N1]. (Score 2.0)
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In road, hardstanding and car park areas over-site concrete and/or bituminous macadam surfaces will prevent ground gas escaping naturally to the atmosphere. It would be advisable to provide vent pipes through which ground gases are able to escape. These vent pipes might be placed in adjoining landscaped areas or incorporated in lamp posts or other similar furniture.

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

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

2.2 Environmental Setting

2.2.1 Topography

The area of investigation and the immediate surroundings are relatively flat. The topography of the wider area slopes gently up from west to east.

2.2.2 Ground Conditions

The likely geology beneath the site has been determined using the British Geological Survey (BGS) Geology of Britain Viewer accessed on 15th September 2025.

The superficial deposits beneath the site were anticipated to be Devensian Till composed of Diamicton (poorly sorted gravelly sandy silty clays) and have been designated by the Environment Agency as a Secondary Undifferentiated aquifer, this designation is assigned in cases where strata likely comprise interbedded high and low permeability layers.

The bedrock beneath the site is anticipated to comprise the Chester Formation composed of sandstone and has been designated as a Principal aquifer comprising strata of high intergranular and/ or fracture permeability, usually providing a high level of water storage and may support water supply and/ or river base flow on a strategic scale.

2.2.3 Hydrogeology, Hydrology & Other Receptors

British Geological Survey and Environment Agency data indicates that the site is not within a 1km grid where solution features are present that will enable rapid movement of a pollutant to groundwater.

Environment Agency data indicates that the site is not in an area where additional local information indicates that groundwater is vulnerable to pollution.

According to data provided by the Environment Agency there are twelve groundwater abstraction licences, no surface water abstraction licences, and no potable water abstraction licences within 2000 metres of the site boundary. The nearest being a historical groundwater abstraction around 427 metres south east. The nearest active groundwater abstraction is around 1920 metres north.

There are no Source Protection Zones, set up to protect a water source within 500 metres of the site of boundary, present according to the environmental data report.

The nearest sensitive surface watercourse is an inland river around 72 metres south east.

2.3 **Source Pathway Receptor Linkages**

Potential sources of contamination identified in the desk study and confirmed by the Phase II investigation are:

2.3.1 Sources

Potential sources of contamination identified in the desk study and confirmed by the Phase II investigation are:

1. Operation of construction plant, machinery and vehicles during the construction process.
2. Elevated arsenic within the Made Ground
3. Elevated levels of methane and carbon dioxide gases.

2.3.2 Pathways

Potential pathways between sources and receptors for the proposed development are:

1. Direct contact with and ingestion of contaminated soil
2. Inhalation of dust
3. Lateral migration of contaminants offsite
4. Vertical migration of contaminants to the underlying aquifer
5. Environmental deposition of airborne pollutants
6. Ingress of permanent ground gases into enclosed spaces.

2.3.3 Receptors

Potential receptors for the proposed development are:

Construction Phase

1. Site workers during any demolition and construction phases
2. Adjacent properties and local residents

Post Development Phase

1. The end users of the site
2. Adjacent properties and local residents
3. Controlled waters including the underlying Secondary Undifferentiated and Principal aquifers.

2.3.4 Potential Pollutant Linkages

Construction Phase

- Direct contact with and ingestion of contaminated soil and inhalation of dust by site workers during construction
- Inhalation of ground gases by site workers in confined spaces during construction.
- Inhalation by local residents of dust generated during construction.

Post Development Phase

- Inhalation by local residents of airborne dust arising from exposed soil in any soft landscaping
- Direct contact with and ingestion of contaminated soil and inhalation of dust arising from exposed soil in any soft landscaping by the end users of the site.
- Ingress and accumulation of ground gas and subsequent inhalation by residents
- Ingress and accumulation of ground gas and subsequent ignition

2.4 Updated Conceptual Ground Model

The conceptual ground model of a site has been updated with regards to contamination sources, pathways and receptors, following the ground investigation, as follows:

TABLE 4 UPDATED CONCEPTUAL MODEL

Potential Source	Nature of Hazard	Contaminants Associated with the Source	Pathway	Receptor	Suggested Mitigation Action
Made ground	Contaminants in made ground	General Contaminants Arsenic	Ingestion of soil	Site Operatives	Limit contact with soil by wearing adequate clothing and PPE.
			Ingestion of dust		
			Ingestion of contaminated vegetable produce	End Users	Negligible risk – no mitigation required.
			Dermal contact		
			Inhalation of dust		
			Inhalation of vapours		
			Uptake via contaminated groundwater	Vegetation	Negligible risk – no mitigation required.
			Vertical and lateral movement of mobile contaminants to surface water and groundwater	Controlled Waters	Groundwater should be discharged to a sewer or licensed discharge point subject to approval by the Waste Water Authority
			Direct contact	Structures and Services	
Landfill (registered)	Ground Gas (Asphyxiation, fire and explosion)	Methane Carbon Dioxide	Inhalation of gas Ignition of gas	Site Operatives	Check gas levels before entering confined spaces.
				End Users	Provide gas protection measures as recommended.

3 OPTIONS APPRAISAL

An options appraisal has been undertaken to determine the feasibility of contamination treatment and remediation techniques for the site, in general accordance with the Land Contamination Risk Management Guidance [1]. The options appraisal takes into account effectiveness, time and monetary costs, and sustainability.

The primary risk drivers are methane and carbon dioxide most likely derived from the large, registered landfill indicated to be present around 56 metres to the west and closed in 1978. The following remediation techniques are considered effective in mitigating the risks from these gases:

3.1.1 Vertical Barrier Pathway Intervention

A vertical barrier (normally comprising a gravel trench lined on the side nearest to the properties with an impermeable gas barrier membrane) can be an effective to mitigate gas risks where there is a known point source and clearly defined pathway from the source to the receptor. However, this approach is considered unviable for the following reason:

- Given the extent of the gas source remedial measures incorporated into the proposed floor slab will be more reliable and more cost effective.

3.1.2 Ground Gas Barrier

The most common way to deal with CS₂ ground gas risk is to incorporate a gas barrier membrane into the floor slab.

This approach is likely to be the easiest and cheapest strategy to implement and is relatively straightforward to verify.

3.2 Chosen Remedial Measures

After careful consideration of the risks and benefits, timeframes, costs and sustainability of the available remedial options the Client has decided to adopt the following remedial measures:

- Ground Gas Barrier

4 GROUND GAS REMEDIATION & VERIFICATION STRATEGY.

4.1 Remediation Objectives

The Phase II ground investigation found a potential risk to buildings constructed on the site and the end users from ground gases. Remedial measures are therefore required to prevent the ingress of ground gases into enclosed spaces within the proposed development.

The aims of the remediation strategy are:

- To provide a remediated site that is safe and suitable for the proposed end use (public Type B building).
- To ensure the remediation is undertaken in a sustainable manner in compliance with current guidelines and with a suitably robust verification plan.
- To satisfy the requirements of the Local Planning Authority (Manchester City Council)

4.2 Ground Gas Remediation: Membrane.

4.2.1 Ground Gas Remediation Methodology

We understand that after consideration of the remedial options presented in BS.8485:2015+A1:2019 ^[3] the following remedial measures have been chosen:

Table 5.4 additionally reinforced cast in-situ suspended floor slab with minimal penetrations – slab of minimum 150mm thickness with reinforcement at the bottom and the top
(Score 1.5)

Table 7 gas resistant membrane meeting the following criteria:

- sufficiently impervious to gases with a methane gas transmission rate of <40.0 ml/day/m²/atm (average) for sheets and joints (tested in accordance with BS.ISO.15105-1 manometric method).
- sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions.
- sufficiently strong to withstand in-service stresses due to say settlement if placed below a floor slab.
- sufficiently strong to withstand the installation process and following trades (penetration from steel fibres in fibre reinforced concrete/ penetration from reinforcement ties/ tearing due to working above it or dropped tools) until covered.
- after installation being capable of providing a complete barrier to the entry of the relevant gas.
- verified in accordance with CIRIA C735 [N1].

(Score 2.0)

4.2.2 Verification Plan

The membrane installation will be subjected to verification inspections by a suitably qualified person to ensure that the correct installation procedures have been followed.

The verification methodology should include the following as a minimum:

- Verification that the chosen membrane meets the required specification.
- Inspection of the membrane immediately after installation to ensure there are no puncture risks, gaps or breaches in the membrane.
- Inspection of the taping and sealing of the membrane and details of where it crosses the wall cavity and door openings.

Photographs should be taken during the inspections and technical data sheets for the membrane and sealing tape, etc. should be provided for inclusion in the Phase IV verification report.

5 RISKS TO SITE OPERATIVES

Measures need to be put in place to prevent site operatives coming into direct contact with contaminated materials either by skin contact or by breathing in dust due to the elevated concentrations of arsenic.

Site personnel involved in earthworks and excavations should be made aware of the hazards of working with contaminated materials found on site. Strict personal hygiene should be observed and gloves, overalls and boots should be worn. Washing and messing facilities should be made available on site and smoking should be prohibited.

Consideration needs to be given to site operatives who may be at risk from elevated levels of methane and carbon dioxide and/or depleted levels of oxygen in confined spaces below ground. All excavations of greater than 1.20m depth should be routinely checked for air quality prior to man entry and appropriate precautions taken. Any manholes, inspection chambers or other void spaces formed beneath the sites ground surface are potential ground gas traps. Precautions, as per the excavations above, should be taken.

6 ENVIRONMENTAL MITIGATION MEASURES & WASTE MANAGEMENT

6.1 Earthworks

Earthworks undertaken during dry weather might generate dust and in this instance dust should be damped down and dust masks made available to site operatives. In addition stockpiled materials should be sheeted over to prevent excessive airborne dust being formed which could potentially migrate off site.

If groundwater is to be pumped out of excavations, then contamination analyses should be undertaken for groundwater to be disposed of, and the results submitted to the appropriate authority or a waste disposal operator to determine the most cost effective method of disposal. Groundwater should not be discharged to a sewer without firstly obtaining a discharge consent from the appropriate authority.

6.2 Controlled Waters

Given the low concentrations of potential contaminants, the presence of relatively low permeability cohesive strata beneath the site, and the distance to the nearest sensitive watercourse (an inland river around 72 metres south east), the risks to controlled waters including groundwater were determined to be negligible.

The proposed remedial measures will not significantly alter the groundwater regime on site and in our opinion the risks to controlled waters do not warrant any further consideration.

6.3 Waste Soil Management

If it is necessary to reduce levels to accommodate the proposed remediation scheme, then classification of the waste soil arisings should be undertaken prior to removing it to a licensed waste disposal or treatment facility.

All vehicles carrying contaminated material should be securely sheeted and the wheels and undercarriages cleaned before leaving site to ensure that hazardous materials are not dropped onto public roads.

Transfer documentation for each load of contaminated material exported from the site will be obtained and made available for the Phase IV Validation Report.

7 CAVEATS, ASSUMPTIONS AND CONTINGENCY PLAN

It should be appreciated that only a small proportion of the area to be developed has been sampled and consequently the recommendations made and opinions expressed in our reports can only be applied to such conditions as were encountered in the exploratory holes.

The exploratory holes indicate a nature and degree of similarity to the extent that we consider them likely to be representative of the natural ground conditions. However, no guarantee can be given. For the purposes of this remediation strategy it is assumed that the findings of the Phase I and Phase II investigations are representative of the site conditions, however with any site it is possible that unrecorded potentially contaminative activities may have taken place, or that zones of contamination exist which have not been encountered by the intrusive investigation.

We recommend that a contingency plan is put in place to deal with unforeseen contaminated ground being found. In this regard a “watching brief” should be employed during earthworks and the following procedure followed if unforeseen ground conditions are encountered:

- Cease earthworks.
- Liaise with the Client and/ or Regulator.
- Agree revised course of action with the Client and/ or Regulator.
- Revise Remediation Statement, if necessary.

8 VERIFICATION REPORT

On completion of the remedial works a Phase IV Verification Report should be produced by the independent suitably qualified person. The report should include records of on-site observations together with contamination analysis certificates, transfer notes, discharge consents, specifications etc.

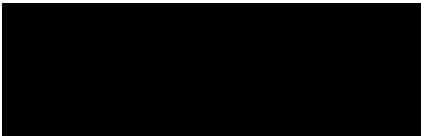
9 GENERAL

This Remediation Statement should be submitted to the Regulator, for approval in writing, prior to commencement. On completion of the actions set out in the Phase III Remediation Statement and receipt of an instruction, we would be happy to validate the remedial works and prepare a Phase IV Validation Report.

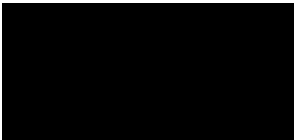
Should the proposed development of the site be undertaken in stages, we would be happy to provide a Phase IV Validation Report at each stage of the development.

We trust that this report fulfils your present requirements but if you have any queries or we can be of further assistance please contact the undersigned or Mr Ben Osborne at our Preston office.

SUB SURFACE CONSULTANTS LIMITED
REPORT No. 8032C
SEPTEMBER 2025



L. A. W. McCall - Bhakta B.Sc.(Hons.)
Geotechnical Engineer
For and on behalf of
Sub Surface Consultants Limited



C. A. Marsden B.Sc.(Hons.), C.Eng., M.I.C.E.
Director
For and on behalf of
Sub Surface Consultants Limited.

10 REFERENCES

- [1] Environment Agency, "Land Contamination Risk Management," 2025. [Online]. Available: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>.
- [2] UK Government, "Environmental Protection Act," 1990. [Online]. Available: <https://www.legislation.gov.uk/ukpga/1990/43/contents>.
- [3] British Standards Institute (BSI), "BS 8485:2015+A1:2019 Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings.," 2015.

TECHNICAL DATA SHEETS



GP[®]1



GP[®]1 proprietary gas resistant damp proof membrane (DPM) is a multi-layer, low density polyethylene membrane, reinforced with a polypropylene reinforcing grid with an integral aluminium foil. GP[®]1 is specifically designed and manufactured to perform as a methane, carbon dioxide, radon, ground gas, air & moisture protection system.

Thickness	0.6 mm
Width	Various m
Length	Various m
Weight	370 g/m ²

TITANTECH[®]

For developers of brownfield and contaminated sites the TITANTECH[®] family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Handling

Roll weights can be in excess of 20 kg and hence appropriate care and equipment is required for unloading and handling.

Storage

Rolls of GP[®]1 should be stored on stable/level ground and stacked not more than five rolls high, with no other material stacked on top. The rolls can be stored outdoors when packaged, but should be protected from exposure to UV.

Installation

GP[®]1 should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015.

Certifications



Please
Scan



Rev 2024



Feature	Characteristics	Test Method	GP [®] 1
Physical Properties	Thickness	EN 1849-2	0.6 mm
	Thickness - between Scrim	BS EN ISO 9863-1:2016	0.4 mm
	Width	EN 1849-2	Various m
	Length	EN 1849-2	Various m
	Weight	EN 1849-2	370 g/m ²
Hydraulic Press	Water Column	EN 20811	> 300
	Resistance to Water Penetration	EN 13967, EN 1928	Pass
	Water Tightness	EN 11296, EN 1367, EN 1928	Pass
Mechanical Properties	Resistance to Static Load	EN 12730-B	20 kg
	Tensile Strength (MD)	EN 12311-1	600 N/50mm
	Tensile Strength (CMD)	EN 12311-1	480 N/50mm
	Tensile Elongation (MD)	EN 12310-1	20%
	Tensile Elongation (CMD)	EN 12310-1	20%
	Puncture Resistance	EN 12236	1.25 kN
	Resistance to Tearing (Nail Shank) MD	EN 12310-1	330 N
	Resistance to Tearing (Nail Shank) CMD	EN 12310-1	400 N
Durability and Chemical Resistance	Transmission Rate of Volatile Liquids - Diesel	ISO 6179:2010 (B)	0.246 g/m ² /h
	Transmission Rate of Volatile Liquids - Xylene	ISO 6179:2010 (B)	0.571 g/m ² /h
	Transmission Rate of Volatile Liquids - Toluene	ISO 6179:2010 (B)	0.583 g/m ² /h
	Transmission Rate of Volatile Liquids - Petrol	ISO 6179:2010 (B)	0.135 g/m ² /h
Gas Permeability	Methane Permeability	BS EN ISO 15105-1	< 0.09 ml/m ² /day/atm
	Carbon Dioxide Permeability	BS EN ISO 15105-1	< 0.09 ml/m ² /day/atm
	Radon Permeability	K124/02/95	8.0 x 10 ⁻¹⁵ m ² /s
	Hydrogen Sulphide Permeability	BS EN ISO 15105-1	< 0.1 ml/m ² /day/atm
Compliance and Certification	CE Mark - EN13967:2012 (A1 2017)		
	NHBC Standards Compliant		
	Conforms to BS 8485:2015 + A1 2019		
	BBA Certified - Certificate No. 20/5728		

JUTA UK

Please contact JUTA
UK Directly for more
information on GP[®]1

Jointing and Sealing

It is recommended GP[®]1 be heat welded where possible, with welding carried out by competent personnel with suitable qualifications in accordance with best practice, and guidance contained within BS 8485:2015.

Accessory Products

- GP[®]1 Starter Band
- GP[®] Tape
- GP[®] Self Adhesive Membrane
- GP[®] Primer
- GP[®] Top Hats and Preformed Corners
- GP[®] Protection Fleece
- GP[®] Void Vent (24/40mm)



GP[®]1 SAM

GP[®]1 SAM, gas protection self adhesive membrane, is a bituminous gas proof and water proof sheet, composed of self-adhesive SBS polymer modified bitumen incorporating GP[®]1 with an upper surface finish of black reinforced LDPE, and a lower surface finish of siliconized release film. GP[®]1 SAM is used for the gas/waterproofing of underground structures where harmful ground gasses are anticipated, and as a self adhesive accessory to GP[®]1.

Thickness	1.2 mm
Width	0.9 m or 0.3 m
Length	20 m
Weight	1100 g/m ²

TITANTECH[®]

For developers of brownfield and contaminated sites the TITANTECH[®] family of products represent a major step forward in safeguarding projects against gaseous and chemical contamination.

Handling

Roll weights can be in excess of 20 kg (approx 33 kg/roll) and hence appropriate care and equipment is required for unloading and handling. This product is non-toxic nor flammable.

Storage

Rolls of GP[®]1 SAM should be stored on in a cool, dry place, and be protected from exposure to rain, sun, heat and cold temperatures prior to installation. Exposure to sunlight for extended period of time could cause difficulty with removal of the release film.

Certifications



Please
Scan



Rev 2024



Feature	Characteristics	Test Method	GP [®] 1 SAM
Physical Properties	Thickness	EN 1849-2	1.2 mm
	Width	EN 1849-2	0.9 or 0.3 m
	Length	EN 1849-2	20 m
	Weight	EN 1849-2	1100 g/m ²
Hydraulic Press	Water Tightness	EN 1928	Pass
	Water Vapour Transmission	EN 1931	0.013 g/m ² /day
Mechanical Properties	Tensile Strength (MD/CMD)	EN 12311-2 (A)	500 N/50mm
	Elongation (MD/CMD)	EN 12311-2 (A)	> 12 %
	Resistance to Static Load	EN 12370	20 kg
	Joint Strength	EN 12317-2	> 30 N
	Durability and Water Tightness (Ageing and Chemicals) 60 kPa	EN 1847	Pass
	Resistance to Nail Tear (MD/CMD)	EN 12310-1	> 300 N
	Resistance to Fire	EN 13501	F Euro Class
Gas Permeability	Methane Permeability	EN ISO 15105-1	< 0.68 ml/m ² /day/atm
	Carbon Dioxide Permeability	EN ISO 15105-1	< 2.81 ml/m ² /day/atm
	Radon Permeability	K124/02/95	8.0 x 10 ⁻¹⁵ m ² /S
Compliance and Certification	CE Mark - EN13967:2012 + A1:2017 Type (A/T)		
	BS 8485:2015 Compliant (Methane and Carbon Dioxide Barrier)		

JUTA UK

Please contact JUTA UK Directly for more information on GP[®]1 SAM

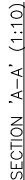
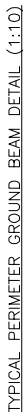
Installation

GP[®]1 SAM should be installed in accordance with the product installation guidelines, and in accordance with BS 8485:2015, and/or BS 8102:2009.

It is recommended that GP[®]1 SAM is not applied in temperatures below 10°C, in colder weather the material can be warmed slightly to aid adhesion.

Accessory Products

- GP[®] Primer
- GP[®] Protection Board
- GP[®] Protection Fleece

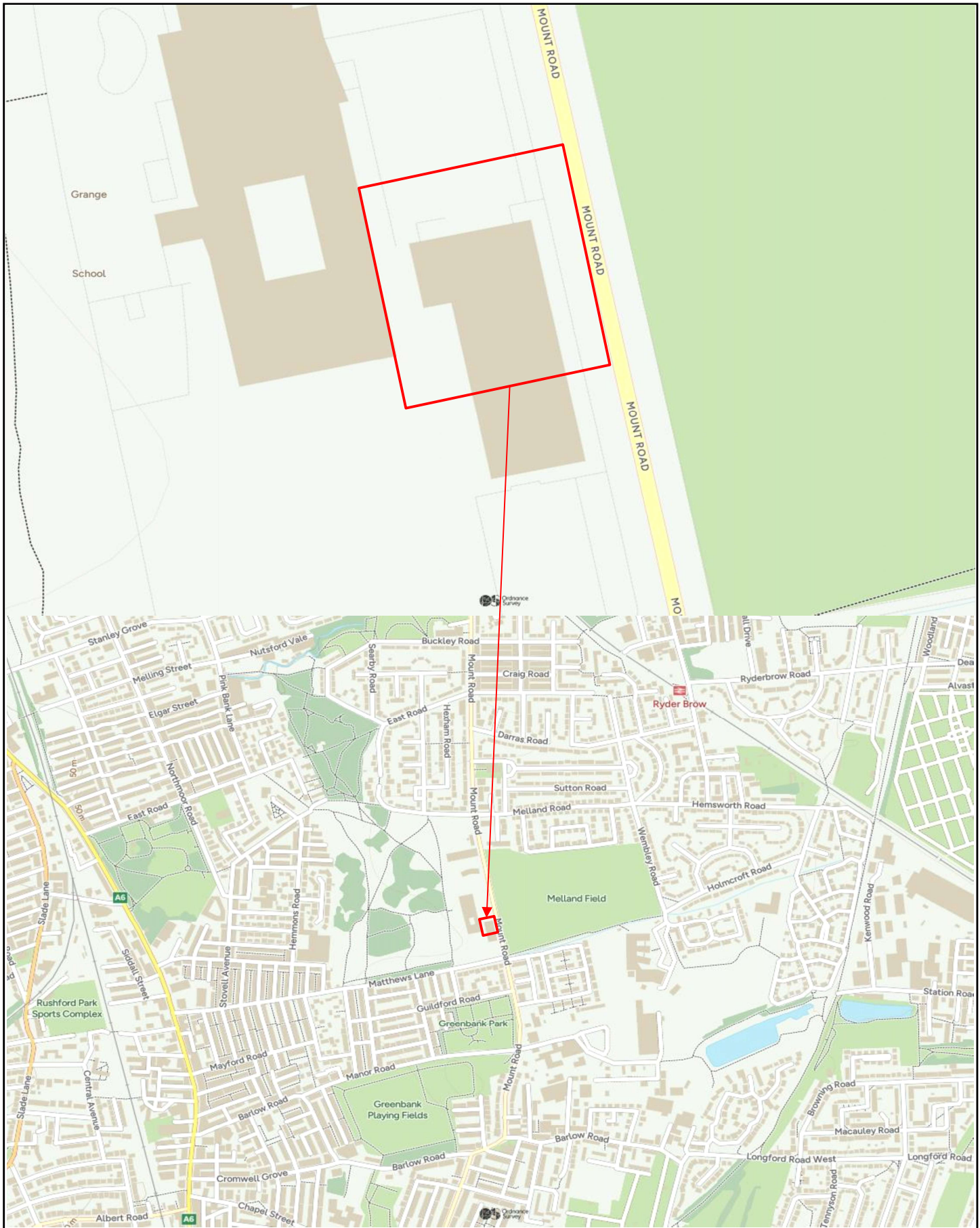


GSE-FGM-ZZ-ZZ-DR-S-11104 | CUZ

REFER TO DRAWING No. GSE-FGM-ZZ-FN-DR-S-11101 FOR PILED FOUNDATION LAYOUT.

COUL-1 0101

FIGURES



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SUB SURFACE

SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Site
**GRANGE SCHOOL, MATTHEWS LANE, LEVENSHULME,
MANCHESTER, M12 4GR**

Client
JOHN TURNER CONSTRUCTION GROUP LTD

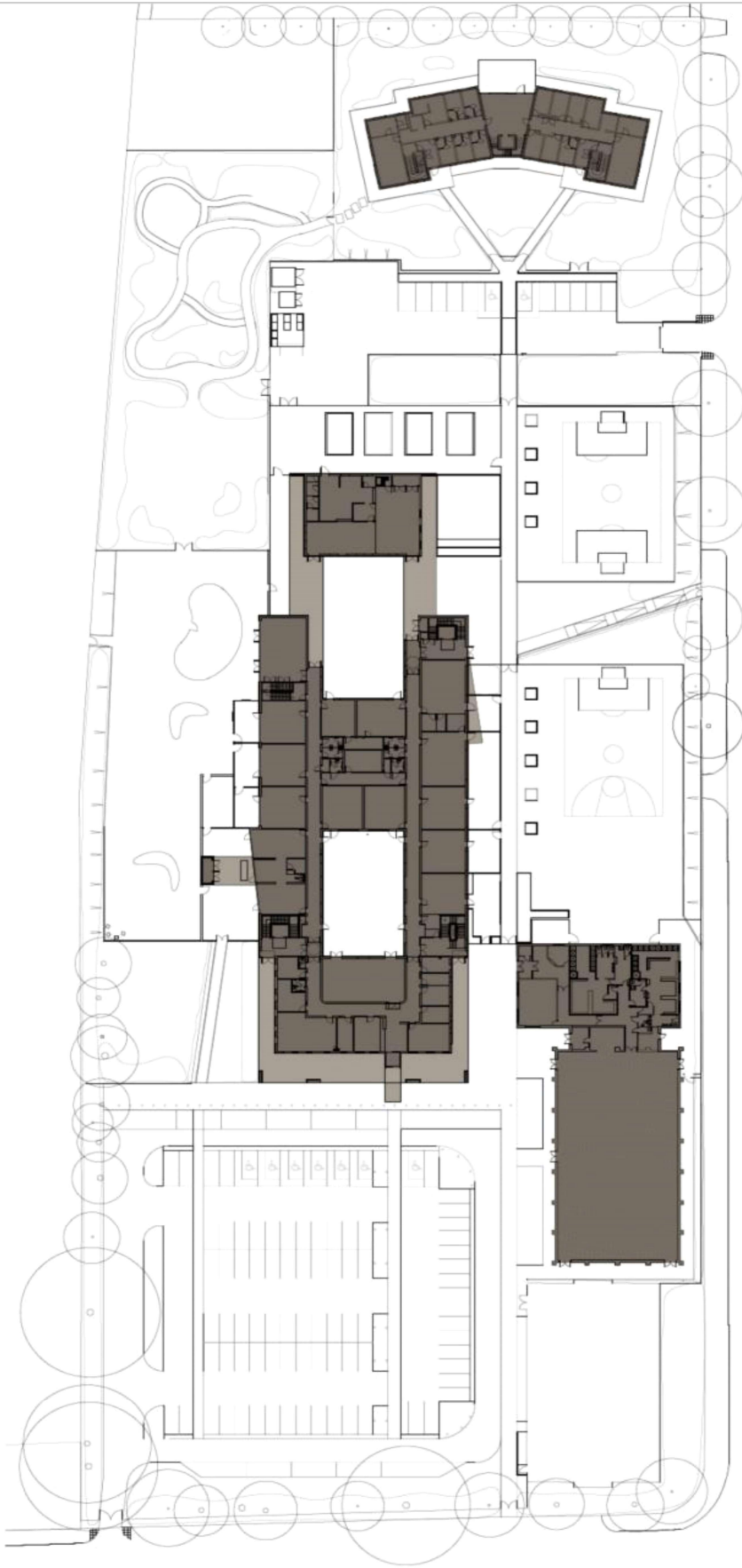
General Site Location

Date Drawn 15-Sep-25	Date Checked	Orientation 	Job No. 8032C
Drawn By LMB	Checked By	Scale —	Figure No. 1

EXISTING SITE PLAN

TOILETS (not counting Sports Hall)

Early Years:	2 existing, enough for	20 pupils
Pupils:	21 existing, enough for	420 pupils
Staff:	8 existing, enough for	175 staff



3



SUB SURFACE

SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Site Location

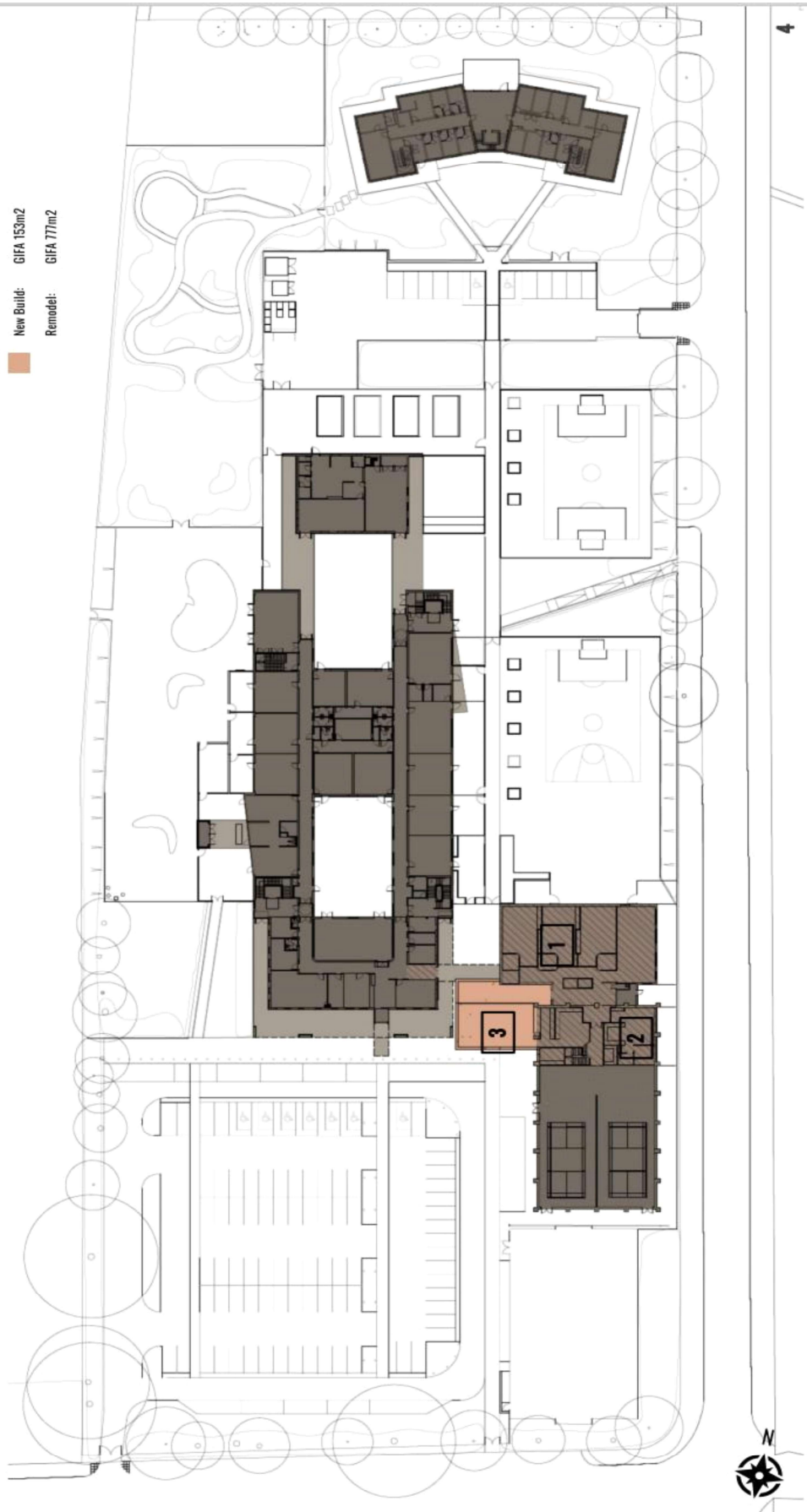
Site	Date Drawn	Date Checked	Orientation	Job No.
GRANGE SCHOOL, MATTHEWS LANE, LEVENSHULME, MANCHESTER, M12 4GR	15-Sep-25			8032C
Client	Drawn By	Checked By	Scale	Figure No.
JOHN TURNER CONSTRUCTION GROUP LTD	LMB		—	2

PREFERRED OPTION

Site Plan

- Existing
- New Build: GIFA 153m2
- Remodel: GIFA 77m2

- SIXTH FORM CENTRE
- LIFE SKILLS FLAT
- BREWING CAFE



SUB SURFACE

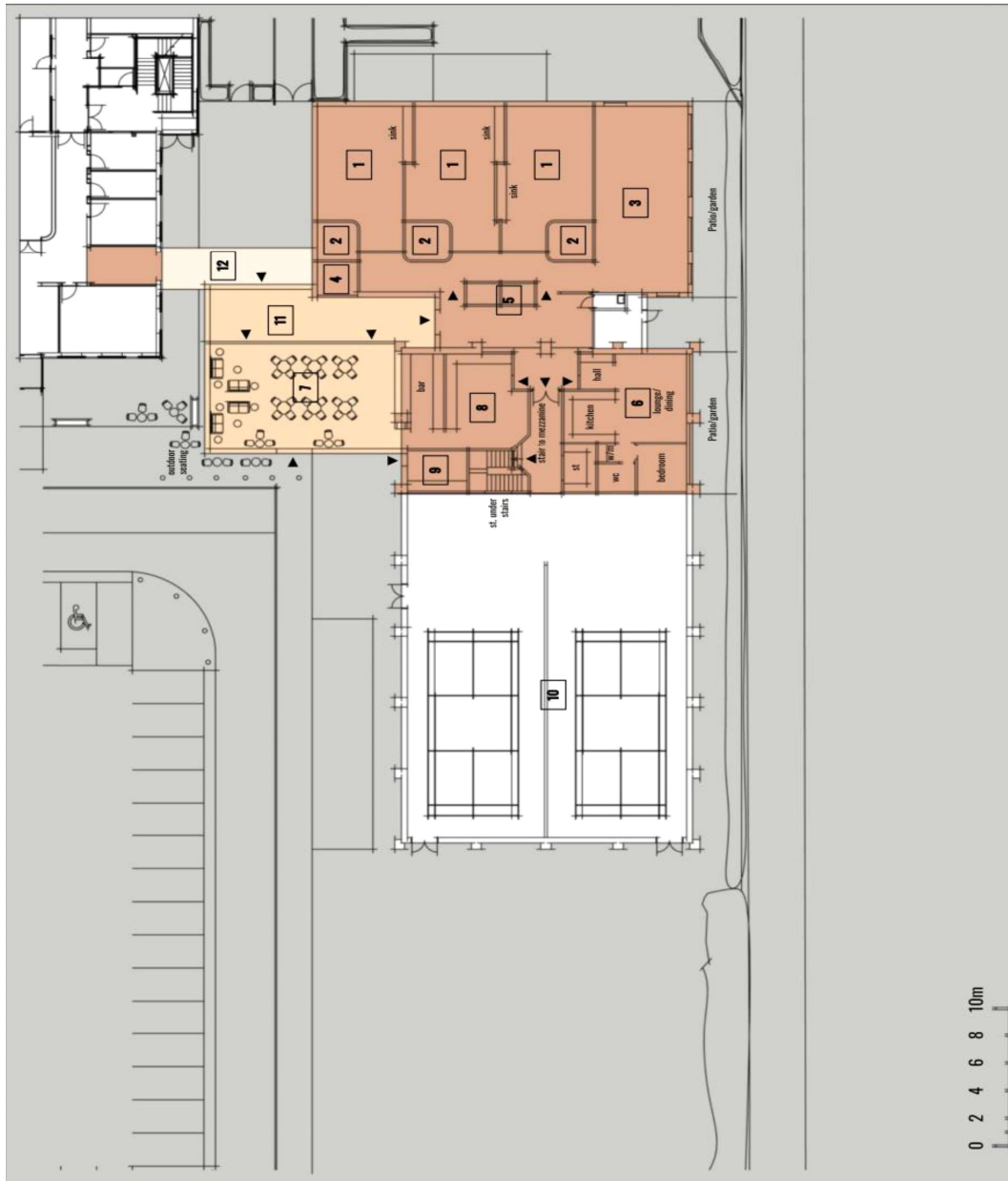
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3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Site
GRANGE SCHOOL, MATTHEWS LANE, LEVENSHULME,
MANCHESTER, M12 4GR

Client
JOHN TURNER CONSTRUCTION GROUP LTD

Proposed Development Plan

Date Drawn 15-Sep-25	Date Checked	Orientation 	Job No. 8032C
Drawn By LMB	Checked By	Scale —	Figure No. 3a



PREFERRED OPTION

Ground Floor Plan_ Sixth Form, Brewhog Café and Life Skills Flat

1. CLASSROOM: 55m²
2. BREAK OUT ROOM: 8m²
3. COMMON ROOM: 85m²
4. STAFF OFFICE/BASE: 6m²
5. WC: 2x AWC
6. FLAT: 80m²
7. CAFÉ: 98m²
8. KITCHEN/BAR: 52m²
9. MAINTENANCE OFFICE/WORKSHOP: 12m²
10. REDUCED SPORTS HALL, AS EXISTING
11. CIRCULATION
12. CANOPY



SUB SURFACE

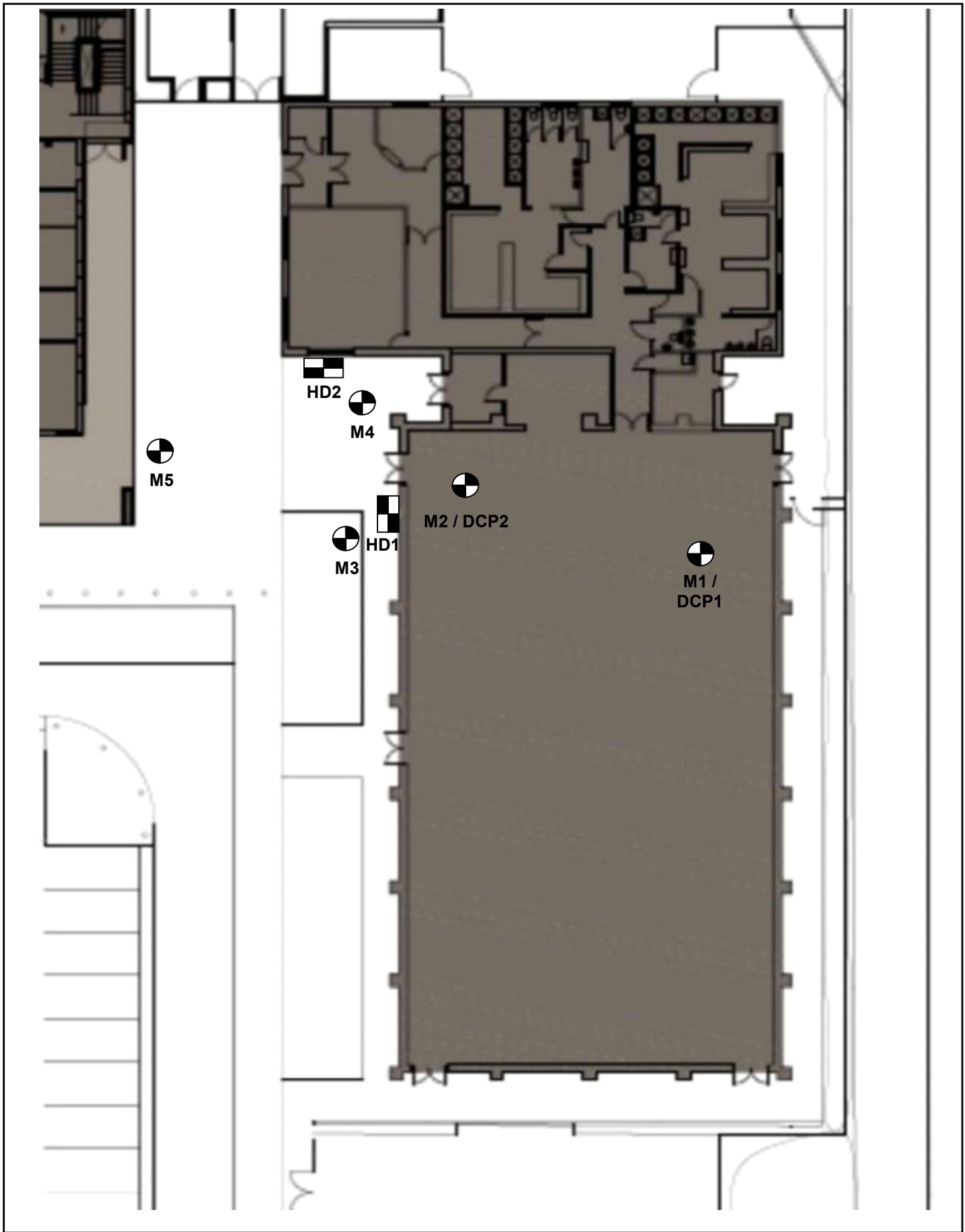
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3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Site
GRANGE SCHOOL, MATTHEWS LANE, LEVENSHULME,
MANCHESTER, M12 4GR

Client
JOHN TURNER CONSTRUCTION GROUP LTD

Proposed Development Plan

Date Drawn 15-Sep-25	Date Checked	Orientation 	Job No. 8032C
Drawn By LMB	Checked By	Scale -	Figure No. 3b



 SUB SURFACE SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907	Exploratory Hole Location Plan			
Site GRANGE SCHOOL, MATTHEWS LANE, LEVENSHULME, MANCHESTER, M12 4GR	Date Drawn 15-Sep-25	Date Checked	Orientation 	Job No. 8032C
Client JOHN TURNER CONSTRUCTION GROUP LTD	Drawn By LMB	Checked By	Scale —	Figure No. 4