



Geo-Environmental

REMEDIATION STRATEGY AND VERIFICATION PLAN

For the land at

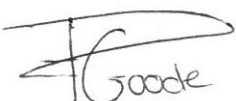
NETLEY FIRS, KANES HILL, SOUTHAMPTON SO19 6AJ

on behalf of

HI-ACRE CIVILS





Report:	REMEDICATION STRATEGY AND VERIFICATION PLAN
Site:	LAND AT NETLEY FIRS, KANES HILL, SOUTHAMPTON SO09 6AJ
Client:	HI-ACRE CIVILS
Date:	15/01/2026
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FIGURES

FIGURE 1 Site Location Plan



1.0 INTRODUCTION

1.1 General

Following intrusive investigation undertaken by Geo-Environmental Services Limited ('Geo-Environmental'), Geo-Environmental was appointed by Hi-Acre Civils to formulate a Remediation Strategy in relation to Land at Netley Firs, Kanes Hill, Southampton, SO19 6AJ, herein referred to as 'the site' (Figure 1).

The site has been subject to intrusive investigation undertaken by Geo-Environmental. The findings of this investigation are summarised in Section 2.1.

The remedial strategy has been developed to reflect the findings from the assessment undertaken on this site to date.

1.2 Objectives

The Remediation Statement and Verification Plan (RSVP) sets out the proposed remedial works to be undertaken on the subject site to support its development for a proposed commercial use (mixture of Class B1 and B2 employment units) with external hard surfaced access road, parking areas and associated infrastructure.

1.3 Planning Permission

It is understood that the site benefits from planning permission approved by Eastleigh Borough Council under Planning Reference O/18/82750 dated 4th March 2021. The following planning condition relating to land contamination has been attached to the application:

20. No work shall commence on site until a detailed site specific remediation strategy for remedial works and measures to be undertaken to avoid the risk from contaminants and/or gases when the site is developed and proposals for future maintenance and monitoring has been submitted to and approved in writing by the Local Planning Authority. The remediation strategy should include the site specific measures required to address the risks identified in Geo-Environmental's Ground Appraisal Report for Land at Netley Firs, Kanes Hill (ref GE18367-GAR-OCT19 Version 1.0, dated 15.10.19), specifically details of the ground gas mitigation to protect the buildings and occupiers from the risks of ground gases and a discovery strategy to ensure that any abnormal conditions (geotechnical or potential contamination) are identified and their potential impact on the proposed development assessed prior to determining any potential mitigation measures. In addition it shall include nomination of a competent person to oversee the implementation of the works.

Reason: To ensure that risks from land contamination to the future users of the land and neighbouring land are minimised, together with those to controlled waters, property and ecological systems, and to ensure that the development can be carried out safely without unacceptable risks to workers, neighbours and other off site receptors.



2.0 BACKGROUND

This Remediation Strategy and Verification Plan (RSVP) has been developed from the findings of Geo-Environmental's intrusive investigation at the site as presented in a Ground Appraisal Report, ref. GE18367-GAR-OCT19 Version 1.0, dated 15.10.19.

An overview of salient findings of this investigation is presented below. For further information, the original report should be referred to directly.

2.1 Previous Reports

A single phase of investigation work has been undertaken at the site by Geo-Environmental with the findings and results detailed in a Ground Appraisal Report as referenced above.

The report included a desk study and an account and interpretation of an intrusive investigation comprising 4No. machine excavated trial pits with soakage testing, 6No. dynamic sampler boreholes and the installation of 3No. monitoring standpipes. A programme of 4No. gas monitoring visits over a two month period was also undertaken.

The investigation revealed ground conditions comprising a mantle of either Topsoil or Made Ground overlying very gravelly sandy clay, sandy gravel and gravelly sand of the River Terrace Deposits, with sandy silty clay of the Wittering Formation present at depth. Groundwater was not encountered in exploratory holes during the intrusive investigation, nor in monitoring wells installed in WS04 and WS05 during subsequent monitoring. Water was recorded standing at depths in the range 1.45-2.54m bgl in WS06a during the monitoring period.

Soil samples were submitted for geochemical laboratory analysis with the results screened against the assessment criteria. All of the results were noted to be below the respective assessment criteria for a commercial end use, therefore further assessment was not considered necessary in the respect of soil contamination.

Laboratory based sample screening identified Asbestos within samples recovered from two exploratory holes (TP04 at 0.20m bgl and WS06 at 0.35m bgl). Both of these locations were within proposed hard cover and it was considered that, providing the soils were not disturbed during development, the permanent hard cover served to break potential exposure linkages, thereby mitigating the risk of harm for site users.

A period of 'spot' gas monitoring was undertaken to assess the site's gassing regime. This comprised four visits over a two month period in line with best practice for a commercial development. The results of the monitoring indicated gas protection measures would be required for the proposed development at the site.

2.2 Site Context

At the time of the site walkover, August 2019, the site comprised an irregularly shaped parcel of land occupied by a commercial building/warehouse in the northern portion of the site along with an area used as part of the cement production works, including an aggregate storage area, cement loading bay, water storage tank and washout cleaning pit. A small brick-built toilet block was located to the west of the warehouse building with the remainder of the site open and undeveloped. The site was located at NGR 447889, 112131 and extended to approximately 2.1Ha.

The northern portion of the site was occupied by two large workshop type buildings. The buildings were steel framed structures with corrugated sides and roofing, the roofing was noted possibly to comprise Asbestos Containing Material (ACM). The interiors of the buildings were not accessed at the time of the walkover, but they were understood to be occupied by a joinery and the reception and storage area of the cement facility.

The yard area in the north of the site was laid to hard standing and comprised an aggregate storage area, for sand



and gravel, a plastic above ground tank storing water, a cement loading area, with the cement contained within a metal tank and an open washout pit for washing out the lorries. The area to the east of the buildings was used for waste storage comprising a large container skip and other assorted waste items. In the adjacent wooded area asbestos sheeting was observed at surface. Further east of this area and near to the site boundary was a fenced off area which contained Japanese Knotweed.

An ESSO pipeline ran along the eastern boundary of the site in a north-south direction and was marked with white marker posts. To the south of the building vehicles were being stored along with an assortment of other waste items and a stockpile of soil.

The southern portion of the site was open vegetated land which was relatively overgrown with grass at approximately waist height.

Historic mapping from 1869 showed the site to have comprised an open field and woodland, until a building (storage) was shown to be present on the site on the 1965 mapping, this building however was not present on the 1970-71 mapping or any subsequent mapping. Three buildings were shown in the northern portion of the site on the 1986 mapping, the southern two in-line with the buildings on the site at the time of the investigation. The southern portion of the site was shown to have remained undeveloped throughout the mapping period.

The surrounding land was also shown mainly to comprise fields and woodland, which became developed as residential housing through the mapping period. In more recent times, the M27 motorway was shown to have been constructed to the east of the site, and a gravel pit was shown in woodland approximately 50m south west of the site.

The desk study identified several former landfill sites, sand and gravel pits and infilled ground (unknown infill) proximal to the site as well as numerous trade/industrial uses within and close to the site.

The River Terrace Deposits and Wittering Formation were both classified as Secondary 'A' Aquifers. The site was not located within a groundwater Source Protection Zone.

2.3 Proposed Site Use

The planning decision notice described the proposed development as *the demolition of existing buildings and erection of 23 employment units (up to 5,905 sq.m.) with units 12-20 for Use Class B1 (b) and (c) and units 1-11 and 21-23 for Use Class B2, with associated car parking and access.*

It is understood that the development will include several new buildings, external yard, access and parking areas and amenity soft landscaping.

2.4 Conceptual Site Model

Assessment of the investigation findings identified potential hazards which were considered to require intervention (remediation) to mitigate the risk of harm at the site. Remediation works are proposed to break the identified plausible pollutant linkages associated with ground gases only.

The remediation works will comprise the inclusion of ground gas protection measures within the proposed structures at the site.

This Remediation Strategy and Verification Plan for the site will be updated and amended in response to any unexpected contamination uncovered as part of the discovery strategy for the site.



3.0 GROUND GASES

The desk study identified potential sources of ground gas proximal to the site and potential for Made Ground to be present and represent an on-site gas source. The preliminary risk assessment could not rule out potential contaminant risk linkages associated with ground gas.

Spot monitoring was undertaken within wells installed within window sampler boreholes WS4, WS5 and WS6A. A period of spot monitoring was then undertaken comprising 4No. visits over a 2 month period.

Based on the gas monitoring undertaken it was considered that the site's gassing regime was representative of Characteristic Situation 2 (CS2) under BS and CIRIA guidance based on the hazardous gas concentration for carbon dioxide exceeding the 5% threshold for CS1 on several occasions within each of the boreholes.

Given the non-residential use of this development, the risk from ground gases was assessed using BS8485:2015+A1:2019. Based on the concentrations of carbon dioxide encountered to date, the use of conservative gas protection measures in accordance with Characteristic Situation 2 is planned within the proposed building.

In accordance with BS8485, the proposed development is considered to comprise a Type C building (Commercial/Public), this assumption has been made to allow for the inclusion of any smaller less well ventilated rooms within the proposed building i.e. toilets, and thus, with a gassing regime of CS2, any gas protection measures installed within the proposed buildings are required to achieve a cumulative score of at least 2.5 (Table 4 BS8485:2015+A1:2019).

Various potential mitigation options in accordance with BS8485 and CIRIA C665 were outlined in the Ground Appraisal Report for the site. Three options are considered below relating to a ground bearing floor slab; a reinforced cast- in-situ suspended slab; and a suspended floor slab solution.

Ground bearing floor slab

For this scenario, it is assumed that a cast in-situ reinforced concrete slab would be used for the floors within the buildings and that this would be ground bearing (cast on a granular fill blanket). As such, the following ground gas risk mitigation measures would be required in order to achieve the required level of protection scoring) in line with BS8485.

Structural Barrier

- Cast in situ monolithic reinforced ground bearing raft floor slab within minimal penetrations. (to achieve a score of 1.5 the slab should be well reinforced to control cracking and have minimal penetrations cast in) – **score 1.5**

Ventilation

- Ground bearing with no subfloor ventilation – **score 0**

Membrane

- Suitable gas resistant membrane meeting the following criteria for a BS8485 - **score of 2**:
 - sufficiently impervious to the gases with a methane gas transmission rate <40.0 ml/day/m²/atm (average) for sheet 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 (e.g. settlement if placed below a floor slab);



- sufficiently strong to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools, etc);
- capable, after installation, of providing a complete barrier to the entry of the relevant gas;
- verified in accordance with CIRIA C735.

A cast in-situ monolithic reinforced concrete slab and gas resistant membrane within the floor construction (all services penetrations and joints sealed and bonded to a gas resistant DPC installed by a suitably competent person) would derive a BS8485 score of **3.5**.

Cast in-situ reinforced suspended slab

For this scenario, it is assumed that a cast in-situ reinforced concrete slab would be used for the floors within the buildings and that this would be suspended such that a sub-floor void is present which could ventilate passively to atmosphere via perimeter vents. As such, the following ground gas risk mitigation measures would be required in order to achieve the required level of protection scoring) in line with BS8485.

Structural Barrier

- Reinforced cast in situ suspended floor slab within minimal penetrations. (suspended floor must be sufficiently reinforced to control cracking and have minimal penetrations cast in) – **score 1.5**

Ventilation

- Passive floor dispersal layer. Assume a clear void providing good performance. – **score 1.5**

Membrane

- Minimum score of 2.5 achieved by slab and ventilated sub-floor void. Membrane not included. – **score 0**

A suspended cast in-situ monolithic reinforced concrete slab and passively ventilated sub-floor void would derive a BS8485 score of **3.0** without any gas resistant membrane. Services penetrations must be cast into the slab and routed via sub-floor ducting which should be sealed where it rises through the slab.

Precast suspended floor

In the event that the form of construction comprises suspended floors (accounting for depth of Made Ground and shrinkable soils as encountered in the investigation, the following measures would be required to achieve the require BS8485 score:

Structural Barrier

- Precast suspended segmental subfloor (i.e. beam and block) – **score 0**

Ventilation

- Passive floor dispersal layer. Assume a clear void providing good performance. – **score 1.5**

Membrane

- Suitable gas resistant membrane meeting the following criteria for a BS8485 **score of 2**:
 - sufficiently impervious to the gases with a methane gas transmission rate <40.0 ml/day/m²/atm (average) for sheet 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 (e.g. settlement if placed below a floor slab);



- sufficiently strong to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools, etc);
- capable, after installation, of providing a complete barrier to the entry of the relevant gas;
- verified in accordance with CIRIA C735.

A suspended floor solution incorporating passively ventilated sub-floor void and gas resistant membrane within the floor construction (all services penetrations and joints sealed and bonded to a gas resistant DPC installed by a suitably competent person) would derive a BS8485 score of **3.5**.

Validation of gas protection measures employed will be undertaken by the Environmental Consultant or other appropriate independent party. Inspection of the protection measures will include key stages of the build process for the proposed structure.



4.0 SOILS

4.1 Development Users and Occupants

Based on the findings of the ground investigation, it is considered that no remedial action would be warranted to protect receptors from soil contamination.

However, this assumes that asbestos detected in soil samples is either removed as part of the development of the site, or the positions are encapsulated under hard cover (e.g. building footprint, or external yard/parking areas).

4.2 Site Workers

It is the responsibility of the Principal Contractor and their appointed sub-contractors to implement and manage safe systems of work and prepare their own risk assessments in accordance with Health and Safety legislation in order to protect persons in their employ, as well as mitigate the risk of harm to others due to works in their control. Special consideration should be given to the provisions of the Construction (Design & Management) Regulations 2015, Health and Safety at Work Act and the Control of Substances Hazardous to Human Health regulations to protect the safety of persons in their employment. Additional guidance can be sought from the CIRIA publications entitled "A Guide for Safe Working on Contaminated Sites" and "Environmental Good Practice on Site Guide (fourth edition)".

In addition to the safe systems of works to be implemented alongside appropriate risk assessments and method statements, all site personnel shall benefit from on-site hygiene facilities including wash area, toilets and drying room. Separate canteen areas and welfare facilities should be provided. All eating and drinking should be restricted to the canteen area and only once site personnel have removed outer PPE and washed exposed skin.

In the event of dry spells, or where the exposed surface becomes dry, regular damping down of the surface of the site will be required to prevent the release of soil dust which could impact on site operatives or migrate off-site, thereby mitigating both off-site exposure and nuisance for neighbours.

4.3 Built Environment

Buried plastics laid in contact with contaminated soils may be susceptible to attack by aggressive chemicals; therefore, potable water supplies may potentially become contaminated or tainted. At this time, subject to further confirmation, it is considered unlikely that specific protection measures are required for potable water supply at the site. However, if pipes are to be laid through the positions of TP4 and/or WS6, it is recommended that the pipe trenches are over-excavated and clean backfill is used such that construction and future maintenance workers are not exposed to asbestos detected in soils in these locations. Over-excavation at WS6 would also remove a marginal exceedance of Total Petroleum Hydrocarbons in the C10-16 range with respect to standard polyethylene pipe.

It is recommended that the results of the investigations at the site be presented to the water utility company as soon as reasonably practicable in order to confirm the pipe material.

As a matter of good practice and to maximise the protection to maintenance workers, clean, granular backfill should be used in service runs and marker tapes for all buried services.

**5.0 CONTROLLED WATERS**

No remedial works are considered necessary to protect controlled waters.

5.1 Monitoring Well Decommissioning

Where gas and groundwater monitoring wells have been installed on the site as part of the ground investigation works these should be decommissioned in line with best practice and in line with Environment Agency Guidance prior to or as they become redundant on site and prior to any development works where they are situated on site. The decommissioning should comprise the removal of the well and backfilling of the location with bentonite, in order to ensure that a pollution pathway does not remain on the site.



6.0 WASTE

6.1 Waste Classification and Segregation

Waste may be defined as any substance or object in Annex 1 of the Waste Framework Directive which the holder discards, intends to discard, or is required to discard. The holder of waste is anyone in possession of waste or generates it and therefore both the contractor and ultimately the developer are responsible for safe disposal of waste. Specific Waste Acceptance Criteria (WAC) testing was not undertaken as part of the investigation as potential waste soils could not be confirmed at that stage.

Asbestos was identified within two locations on site, TP4 and WS6. Quantification of this asbestos was undertaken and based on these results the soils within these areas would have an initial classification of Non-Hazardous for waste disposal purposes. However, if/where asbestos is visible in excavated soils, the soil mass would be classified as Hazardous Waste (also applies where asbestos content exceeds 0.1%).

Once soils for disposal have been identified, further testing of these specific soils will be required in order to confirm their waste classification.

Natural, uncontaminated soils may be suitable for retention and re-use within the development scheme. In such circumstances, a simplified Materials Management Plan (MMP Lite) should be prepared to document the formulate the re-use strategy.

It is recommended that once materials for disposal have been identified, then further WAC testing should be undertaken to further clarify the materials for the purpose of disposal. Depending on the contaminants present, it is possible that ex-situ treatment could be used to remediate the soil to lower the waste classification.



7.0 DISCOVERY STRATEGY

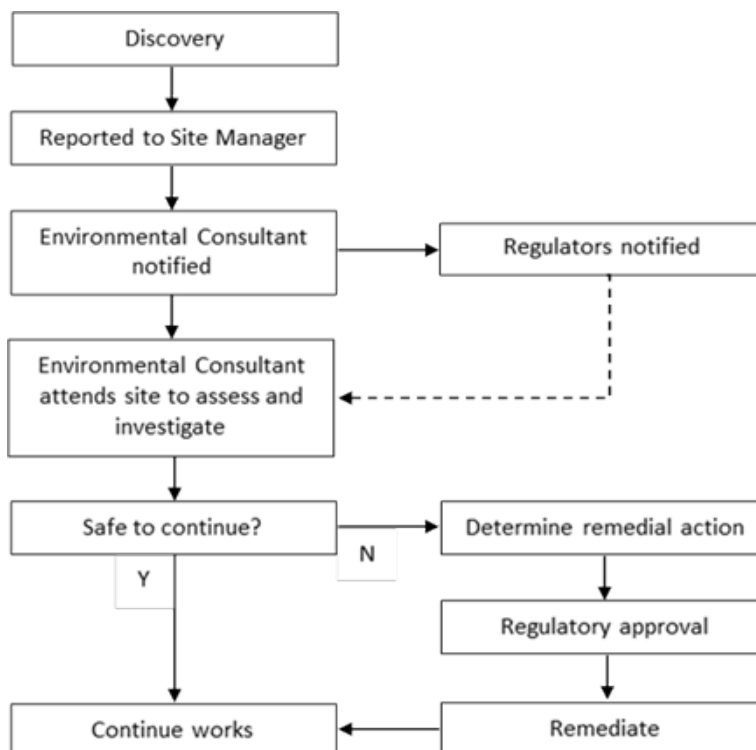
Whilst the site has been the subject of an investigation and assessment, it remains possible that previously unexpected soil conditions may be encountered during the process of site preparation and construction.

Examples may include oily pockets within the soil, pockets of cement boarding or fibrous materials within the soil, black ashy materials, soils exhibiting strong odours, brightly coloured materials, and former structures or brickwork.

Should previously undiscovered contamination be encountered during the demolition/construction of the new buildings the following course of action must be adhered to:

- Works in the area of the suspected contamination should cease immediately. The ground workers must report any suspected contamination immediately to the Client's site supervisor. The supervisor must contact Geo-Environmental (the Competent Person), who will visit the site to assess the extent of the suspected contamination.
- Geo-Environmental shall make records of their inspection, and pass details of these to the Local Authority.
- Where the conditions revealed differ from those previously anticipated, Geo-Environmental shall take samples as deemed appropriate to be dispatched for appropriate chemical testing.
- Depending on the results of the testing either: 1) no further work will be required; 2) a further detailed risk assessment will be required; and/or 3) localised specific remedial measures will be necessary. Appraisal criteria will vary depending on the nature of the assessment.
- The results of any such testing will be sent to the Regulatory Authority for consultation. If further remediation is required, the Regulatory Authority will be informed of the date and time of the proposed works.
- Any further remediation will be undertaken in accordance with a method statement submitted to the Local Authority for approval. The works shall be supervised by Geo-Environmental who shall provide a Verification Report for the Local Authority's purposes.

The process is summarised overleaf:



A copy of this strategy must be lodged on site, and provisions made to ensure that all workers are made aware of their responsibility to observe, report, and act on any potentially suspicious or contaminated materials they may encounter.



8.0 VERIFICATION

Verification is required to be undertaken throughout the course of the remediation works. The Verification Report will be submitted to the Client and Local Authority for formal approval.

The Verification Report will refer to the works as set out within this remediation strategy and verification plan and as required by the relevant planning conditions. The report will include records from site inspections including:

- Inspection of the exposed formation surface prior to installing gas barrier membrane;
- Validation of gas membrane installation, including jointing and sealing, though visual inspection;
- Inspection of any blinding cover above membrane;
- Visual inspection of floor slab (assumed cast-in-situ monolithic reinforced concrete slab).

If the construction includes a sub-floor void, this will also be recorded as part of visual site verification works.

A summary of verification proposals is presented in Table 8.1 below.

The Contractor will be required to deploy a competent person to manage the works and ensure that relevant records are kept in relation to construction of the gas protection measures, disposal of any waste soils and pre-important compliance testing for any imported soils. In addition, the remedial works will be inspected and validated on behalf of the Client by Geo-Environmental in order to present independent verification.



Reference	Principal requirements	Design or construction related	Site visit required by Qualified Geo-Environmental Engineer	Supporting documentation
1.0 Verification general principles	Geo-Environmental are supervising remedial works for the site at Netley Firs, Kanes Hill, SO19 6AJ. These works require the installation of ground gas protection measures. The aforementioned work is in line with the findings from site investigation and risk assessment previously undertaken by Geo-Environmental in respect of the development.	Construction	Yes – See below	Details of construction programme to be provided by client/contractor.
2.0 Gas protection measures	Gas Protection Measures to be included within proposed development in line with Characteristic Situation 2 (CIRIA and BS).	Design and Construction	Yes - 5 days' notice required	Regular visits to site required to confirm works being undertaken and to validate the various stages of installation across the site.
2.1 Formation preparation				
2.2 Gas membrane installation				
2.3 Concrete blinding installation				
2.4 Subfloor void				
2.5 Floor slab				
3.0 Waste Management	Any waste soils arising from site will be disposed of appropriately. Waste tickets for the removal of arisings should be compiled for submission as part of the verification report for the development. The waste tickets will be required to demonstrate that the approximate amount of material being removed is equal to the summed volume on the waste tickets.	Design and Construction	No (unless further WAC testing required where 5 days' notice required)	Chemical test results (WAC) Waste tickets

Table 8.1 Details of verification visits required on site



FIGURES





Project:	Netley Firs, Kanes Hill, Southampton, SO19 6AJ			Title	Site Location Plan	
Client:	Hi-Acre Civils			Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net	 Geo-Environmental	
Ref No:	GE23110	Revision:	0			
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Figure:	1	Scale:	Not To Scale			

