

**TRU Hillhouse Construction Compound  
- s73 application  
Appendix G2: Remediation Statement**

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Network Rail

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## 1. INTRODUCTION

### 1.1 General

- 1.1.1 Planning Permission was granted for a temporary strategic construction compound with retaining wall, environmental mitigation measures and a temporary railway platform to facilitate the construction works for the section of the Trans-Pennine Route Upgrade (TRU) between Huddersfield and Westtown (Dewsbury) (the Scheme) at a site off Alder Street, Huddersfield namely the Hillhouse Yard.
- 1.1.2 This report supports the submission under section 73 of the Town and County Planning Act 1990 made on behalf of Network Rail and seeks to vary details of the development set out under paragraph 1.1.1 and consented under planning reference 2021/94337 dated 30 March 2022.
- 1.1.3 It should be noted that certain elements of the proposed development fall under NR's Permitted Development privileges. These did not form part of the approved scheme and were supplied for information only; these include provision of the stabling sidings in the Yard for the train operating company, and the provision of a signing-on /mess facility to serve the sidings in question, along with associated internal access and car parking. It should also be noted that the existing GSM-R mast will remain in situ as part of this temporary works application. There is no change to these elements as part of this submission.

### 1.2 Objectives

- 1.2.1 The land contamination risk assessment presented in the Hillhouse Construction Compound Phase 2 Land Contamination Risk Assessment Report (Network Rail, 2022) concluded that there were no unacceptable risks to human health or controlled waters receptors other than for construction workers. It was identified that the majority of soils could be re-used on site (subject to reuse complying with requirements of a materials management plan (MMP) or environmental permit) and that the risks posed to the underlying bedrock aquifer should be considered during piling design through completion of a piling risk assessment.
- 1.2.2 This report presents the remediation statement that details the activities that should be undertaken prior/during construction, including:
- Sampling/testing strategy for soils to verify re-use of site-won materials and imported soils;
  - Procedure to follow if unexpected ground conditions are encountered;
  - Decommissioning of monitoring wells; and
  - A verification plan.

### 1.3 Information Sources

- 1.3.1 Information has been obtained from the following sources:
- Hillhouse Construction Compound, Phase 1 Land Contamination Desk Study, 2021 (Network Rail, 2021); and
  - Hillhouse Construction Compound; Phase 2 Land Contamination Risk Assessment, 2022 (Network Rail, 2022).

## 1.4 Limitations

The report authors are responsible for selecting and summarising the data supplied by the Client or other parties but cannot be held responsible for any mistakes or inaccuracies or the completeness of third-party data on which it has relied.

As with any point data, ground conditions can only be inferred between test locations and as such localised conditions on site may vary between point locations and groundwater/ground gas conditions may differ from those encountered during the monitoring periods.

This report does not advise on measures to deal with asbestos. Detailed advice should be sought from a specialist contractor.

This report should be read considering the legislation, statutory requirements and/or industry good practice applicable at the time of the report being written. Any subsequent changes in this legislation, guidance or design may necessitate the findings to be reassessed in the light of these circumstances.

## 2. SITE CHARACTERISATION

2.1.1 A summary of the historical and environmental setting of the site is presented in Table 2-1. This information has been summarised from the information included within the Phase 1 Land Contamination Desk Study (Network Rail, 2021).

**Table 2-1 Site Characterisation Summary**

Item	Description
Current site description and use	<p>The site encompasses an area of approximately five hectares (ha) and was recently occupied by a number of commercial and industrial units (including a vehicle repair facility, fuel distributors and suppliers (wood products only), stone quarrying and preparation, garages and a concrete producer and supplier who operated under short-term leases. Gas tanks, oil tanks and miscellaneous tanks were observed during the site walkover undertaken in 2019.</p> <p>The site is bound by residential properties to the north-east, the operational railway to the south-east and Alder Street to the north-west. Listed coal drops and a motorcycle training centre are also located adjacent to the south-west of the site. The northern site boundary is located within 20m of residential properties on Abbey Place and Hammond Street. Residential properties and playing fields are also located beyond the railway line approximately 300m and 200m, respectively, to south-east of the site.</p> <p>At the time of the walkover in 2019 (Network Rail, 2021), approximately 30% of the site is occupied by vegetation, 60% by hardstanding (including concrete, asphalt and stone setts) and buildings and 10% is unsurfaced/ unvegetated ground. Three stockpiles of waste materials are present on site; Stockpile 1 (150 m<sup>3</sup>) is located in the north of the site, Stockpile 2 (300 m<sup>3</sup>) is located in the centre of the site and Stockpile 3 (600 m<sup>3</sup>) is located in the south of the site. All three stockpiles are noted to support vegetation. Approximate stockpile volumes have been obtained from the Adler and Allan report 2014 (Adler and Allan, 2014).</p> <p>Fly tipping has been observed at the site, in particular adjacent to the railway line in the east.</p>
Key historical land uses	<p>The earliest mapping reviewed (1889) indicates that the site contained infrastructure associated with the nearby railway, including buildings, cuttings, railway sidings and an engine shed. Tanks, a wagon repairing shop and unspecified works occupied the site later.</p> <p>The surrounding land has also contained infrastructure associated with the railway, including cuttings (infilled), tramway and railway sidings, engine sheds and a depot. In addition, the surrounding land appears to have mainly used for industrial purposes, with unspecified commercial/industrial works, dye works, mills, brick works, chemical works, refuse heaps, wagon works, foundry, garages, sanitary depot and old coal shafts located within 250 m of the site.</p>
Geology	<p><b>Superficial Deposits:</b> A small portion of the northern part of the site is described as Glaciofluvial deposits, of Mid Pleistocene age. The remainder of the site is recorded as being devoid of superficial deposits.</p> <p><b>Bedrock:</b> Pennine Lower Coal Measures Formation.</p> <p>No geological faults are recorded on the site (British Geological Survey, 2017).</p>
Mining	<p>The site is located within a Surface Coal Resource Area and an area of probable shallow coal mine workings. Two mine entries are shown on or directly adjacent to the site. The Coal Authority online interactive map (The Coal Authority, 2018) shows a near surface coal seam aligned across the southern tip of the site (the BGS appears to show the same coal seam off-site to the west).</p> <p>The Groundsure Report indicates that underground mining of sandstone (Elland Flags) is known or considered likely to have occurred 45 m to the north of the site boundary. The Brit Pits layer contained within the Groundsure Report indicates that there are five Brit Pits located within 250 m of the site, all recorded</p>

Item	Description
	as ceased. The closest Brit Pit, the Fartown Green Pit, is located 30 m north-west of the site.
Hydrogeology	<p><b>Superficial:</b> Secondary A Aquifer  <b>Bedrock:</b> Secondary A Aquifer</p> <p>The site is not located within 250 m of a Source Protection Zone (SPZ). There are four groundwater abstraction licences recorded within 250 m of the site, but only one licence is registered as active. The active licence is located 130 m south west and is registered to the Huddersfield Dying Company and relates to the general use relating to secondary category (medium loss).</p>
Hydrology	<p>Blackhouse Dike, designated by the Environment Agency as a Main River, flows approximately 30 m north of the site boundary into the Huddersfield Broad Canal, which is approximately 100 m south-east of the Site boundary. The canal is not classified by the Environment Agency.</p>
Landfills and Waste	<p>There are four historical landfill sites located within 250 m of the site. The nearest site, Emerald Street Brick and Tile Landfill is located 30 m east of the site and accepted industrial, commercial and household waste. Licence issue/surrender date and input dates are unknown.</p> <p>There are nine licensed waste transfer sites within 250 m of the site, two of which were located on site. The on-site transfer sites were Truckline Services and Able Fuels, with licence issue dates of February 2010 and December 1994 respectively, with the licence associated to the latter site surrendered in 2000. Truckline Services Ltd was a vehicle depollution facility and Able Fuels was a household, commercial/industrial waste transfer station. Works ongoing to surrender the existing licence relating to the Truckline facility and as part of their relocation the super structure was removed from site.</p> <p>There is one Pollution Inventory Waste Transfer site located within 250 m of the site, this facility is located 150 m east of the site and is known as the Suez Recycling and Recovery Kirklees Ltd (Vine Street), associated with the incineration of non-hazardous waste.</p>
Discharge consents	<p>There are no discharge consents to ground located within 250 m of the site boundary. There are two active consents relating to surface water recorded within 250 m of the site, the closest of which is located 150 m east. The consent is associated with trade discharges (process effluent) to Canker Dike.</p>
Pollution Incidents	<p>Three pollution incidents to controlled waters are recorded within the site boundary, with an additional two incidents recorded within 250 m of the site boundary.</p> <p>All three incidences that occurred on site relate to the discovery of asbestos at approximate NGR 414927 418195 in September 2005. The pollution types identified in this incident are specific waste materials (asbestos), general biodegradable materials and waste, and construction and demolition materials and waste, with impact to air and land identified as minor and significant respectively.</p>
Pollution Controls	<p>Several historical and current pollution controls have been identified on-site and within 250 m of the site, including:</p> <ul style="list-style-type: none"> <li>• eight Local Authority Pollution Prevention and Control (LAPPC) sites;</li> <li>• four Integrated Pollution Prevention and Control (IPPC) sites;</li> <li>• one Control of Major Accident Hazards (COMAH) site;</li> <li>• one Hazardous Substance Storage Site;</li> <li>• four List 1 and 2 Dangerous Substance Consents; and,</li> <li>• one Pollution Inventory Substance.</li> </ul> <p>Only one of these activities was located on site: the historical LAPPC permit relating to the use of bulk cement, associated with Hi-Spec Concrete UK.</p>

Item	Description
Trade Directory Entries and Fuel Stations	<p>The Groundsure Report (Groundsure, 2019) was reviewed in order to identify recent land uses that have the potential to represent key contamination sources on site and in the surrounding land, and there were 44 of these sites located on or within 250 m of the site boundary. Seven of these were located on site and relate to the following industrial land uses:</p> <ul style="list-style-type: none"> <li>• container and storage;</li> <li>• vehicle repair, testing and servicing;</li> <li>• vehicle bodybuilders;</li> <li>• fuel distributors and suppliers; and,</li> <li>• stone quarrying and preparation.</li> </ul> <p>One petrol station is located within 250 m of the site , which is operated by Texaco and is located approximately 154 m south-west of the Site on Bradford Road.</p>
Sensitive Land Uses	<p>The site is not located within 250 m of any statutory designated sites for nature conservation (for example, Sites of Special Scientific Interest, National/Local Nature Reserves, ancient woodland, etc.).</p> <p>The Huddersfield Broad Canal, which at the closest point, is located approximately 100m south-east of the Site boundary, is designated as a Local Wildlife Site (LWS).</p>
Radon	<p>The site is located within an area not affected by radon, with &lt;1% of properties affected. No radon mitigation measures are therefore required.</p>
UXO Risk	<p>The Zetica website (Zetica, 2018) indicates the site is at a low risk of unexploded bombs.</p> <p>A detailed unexploded ordnance (UXO) assessment was undertaken by 1st Line Defence for the wider TRU Scheme in February 2018 (1st Line Defence, 2018) using a 'buffer zone' forming a corridor either side of the existing railway. The UXO report concluded the railway was in a low-risk area and recommended site-specific UXO awareness briefings be given to all personnel conducting intrusive works. Further sub-surface assessments, including UXO and utility checks, on areas not covered by the initial assessment of the rail corridor, are implemented through Network Rail Health and Safety contractual requirements with its contractors.</p>

### 3. GROUND INVESTIGATIONS

- 3.1.1 A number of phases of ground investigation have been undertaken within the site boundary to inform the design of the Scheme, including:
- BAM Ritchies 2018 (Bam Ritchies, 2018);
  - BAM Ritchies 2020 (Bam Ritchies, 2020) and Structural Soils 2020 (Structural Soils Limited, 2020); and
  - BAM Ritchies 2021 (Bam Ritchies, 2021).
- 3.1.2 BAM Ritchies and Structural Soils, site investigation contractors, were commissioned to undertake the ground investigation works to obtain information on the geotechnical conditions at the site. In addition to the three phases of ground investigation, three stockpiles were sampled by Alder and Allan in 2014 on behalf of Network Rail (Alder and Allan, 2014).
- 3.1.3 A total of 32 exploratory boreholes, including cable percussive, windowless sampler and rotary cored boreholes, and eight machine dug trial pits were undertaken across the site during all three phases of GI.
- 3.1.4 A summary of the findings of the ground investigation and contamination/gas risk assessments are provided below. Full details are presented within the Phase 2 Land Contamination Risk Assessment (Network Rail, 2022).
- 3.1.5 Ground conditions encountered across the site generally comprised:
- Hardstanding was encountered within five exploratory holes to a maximum depth of 0.20 m bgl.
  - Made Ground comprising both granular and cohesive material was encountered across the site to a maximum depth of 16.45 m bgl. Inclusions within Made Ground comprised sandstone, mudstone, limestone, brick, burnt shale, coal, concrete, clinker, ash and slag.
  - Superficial deposits comprising cohesive clay were encountered at three locations between Made Ground and the underlying bedrock. A maximum clay thickness of 3.50 m was recorded within BH5154.
  - Bedrock of the Pennine Lower Coal Measures was encountered across the site within 16 exploratory holes, with top depths ranging from 0.70 m bgl to 16.50 m bgl. Bedrock was encountered at shallower depths within the north of the site than in the south. Bedrock comprised predominantly of mudstone with interbedded sandstone and siltstone.
  - Coal was recorded within four locations BH5157, BH5158, BH5160 and BH5161. Depths encountered ranged between 12.92 m bgl and 23.50 m bgl, with a maximum thickness of 0.74 m recorded within BH5157. Suspected workings were also recorded within two locations by BAM Ritchie's, ATK BH5301 and BH5158. Workings within ATK BH5301 were described as slightly clayey slightly sandy GRAVEL of mudstone with frequent orangish brown and pale-yellow surface staining at 16.80 m bgl. Within BH5158, a possible anthropogenic timber mine working prop was encountered intact at 17.70 m bgl. No recovery was also recorded within BH5162 between 15.25 and 16.00 m bgl and within BH5165 between 25.35 and 26.05 m bgl. Within BH5165, the exploratory log indicates that the area of no recovery could be possible workings.
  - The three stockpiles at the site were found to comprise the following materials:
    - Stockpile 1: Stones and rubble in the western part of the stockpile and ash and coal in the eastern part;
    - Stockpile 2: Clayey sand and topsoil, stones and rubble.

- Stockpile 3: Stones, rubble, brick, concrete and plastic.

3.1.6 Groundwater strikes recorded during the investigations ranged from 0.80 m bgl within Made Ground to 16.00 m bgl within Siltstone bedrock.

3.1.7 Details of olfactory/visual evidence of hydrocarbon/chemical contamination recorded on logs, within the Made Ground, are outlined in Table 3-1.

**Table 3-1 Summary of visual/olfactory evidence of contamination**

Exploratory Hole	Depth (m)	Strata	Comment
ATKBH5303	10.45 to 16.45	Made Ground	Colliery Spoil
BH5164	12.20 to 12.65	Made Ground	Slight organic odour
BH5165	0.05 to 1.20	Made Ground	Very strong hydrocarbon odour noted associated with large timber fragment
BH5169	Ground level to 0.80	Made Ground - Clinker and coal	Faint hydrocarbon odour noted (timber fragment noted on log).
PL5180	0.15 to 0.30	Made Ground	Hydrocarbon odour noted and two railway sleepers recorded.
PL5183	Ground level to 0.10	Made Ground	Tar planings noted.
WS5300A*	0.40 to 1.10	Made Ground	Hydrocarbon odour and sheen noted on gravel.

\*BH5166 and BH5167 undertaken as part of the 2021 ground investigation were located within close vicinity of WS5300A (within 15 m). No hydrocarbon odours or sheens were noted within either exploratory hole.

3.1.8 No visual or olfactory evidence of contamination were recorded by during the sampling of the stockpiles on site.

3.1.9 Photo-ionisation (PID) tests conducted in the field recorded a maximum reading of 16.20 within ATKBH5303 at 11.50 m bgl within deposits identified as colliery spoil.

3.1.10 Ground gas monitoring undertaken at the site recorded the following maximum concentrations for gases and peak steady state for the flow:

- Carbon Dioxide: 8.2 % v/v
- Methane: 1.2 % v/v
- Hydrogen Sulphide: 4 ppm
- Carbon Monoxide: 28 ppm
- Flow: 9.0 l/hr.

3.1.11 Forty-eight soil samples were retrieved from across the site from the ground investigations and analysed for a range of contaminants. A single exceedance of the human health generic assessment criteria (GAC) was recorded within BH5167 at 0.20 m bgl (for benzo(a)pyrene which marginally exceeded the GAC). The majority of samples recorded determinands below GAC or laboratory detection limits and are unlikely to pose an unacceptable risk to human health. Asbestos was recorded within two samples (ATKBH5300 at 0.20 m bgl, and BH5158 at 0.20 m bgl) collected from across the site from Made Ground, both of which are located in the north-east of the site. Asbestos was also recorded within five samples collected from all three stockpiles located on site.

3.1.12 No obvious sources of volatile contaminants were identified during the ground investigation

or were identified during chemical analysis of soils and groundwater. The initial data indicates ground (and/or possibly mine gas) is present within the upper 5 m, which might pose a risk to workers involved in drainage/foundation excavations.

- 3.1.13 CAT-Waste<sup>SOIL</sup> analysis on soil samples collected from the site indicates the majority of samples tested are likely to be classified as non-hazardous for off-site disposal (if such was required). Twelve samples were indicated to be potentially hazardous due to hydrocarbons, copper and/or zinc. Waste Acceptance Criteria (WAC) analysis was undertaken on soil samples collected from the three stockpiles located on site. Alder and Allan indicated that material from all three stockpiles failed the criteria for inert waste landfill (Alder and Allan, 2014).
- 3.1.14 The findings of the three phases of ground investigation and subsequent risk assessment were used to refine the Conceptual Site Model (CSM) for the site and to inform the assessment of the risk levels posed by the identified potential contaminant linkages. The revised CSM is presented within the Phase 2 Land Contamination Risk Assessment (Network Rail, 2022).

## 4. REMEDIATION STATEMENT

### 4.1 Introduction

4.1.1 The risk assessments presented in the Phase 2 Land Contamination Assessment (Network Rail, 2022) indicated that potentially unacceptable risks to human health and/or controlled waters exist at the site. However, it is considered that through the implementation of the measures outlined below the risks identified can be appropriately mitigated.

4.1.2 The risk posed to construction workers at the site is thought to be high, however through the use of industry best practice and relevant guidance, the risk is likely to be reduced.

### 4.2 Identification of Unacceptable Risk

4.2.1 Overall, the site is considered to pose a moderate/low risk to identified receptors with none considered to be unacceptable to the proposed development or identified receptors; however, it is necessary to undertake the following:

- Identification of potential source associated with hydrocarbon observations (sheen and odour noted) in soil located in the north west of the site (WS5300A) and delineation of hydrocarbon impacted material;
- Asbestos watching brief during earthworks;
- Design of protective mitigation for new potable water supplies with Statutory Undertaker;
- A piling risk assessment in accordance with Environment Agency guidance;
- Use of appropriate chemically resistant concrete;
- Validation of soils for reuse or imported will be required;
- Gas mitigation if required by drainage design;
- Decommissioning of monitoring wells prior to construction;
- Ensure that a procedure is in place for encountering unexpected ground conditions/contamination; and
- Should excess arisings require off-site disposal, in the vicinity of previously identified asbestos and hydrocarbons, these may be classified as hazardous waste and an appropriate duty of care should be followed.

### 4.3 Watching Brief

4.3.1 A watching brief is to be employed throughout earthworks activities (i.e. materials excavation, movement, stockpiling and placement). Details of the requirements of the watching brief will be relayed to site staff by way of “toolbox talks” or other similar processes to ensure all site staff are fully aware of what is required.

4.3.2 All site staff and operatives will be instructed to report any previously unidentified potentially contaminated ground and if such is encountered then the procedure outlined in Section 4.13 will be followed.

4.3.3 Vigilance should be maintained during excavation of service trenches and if putrescible/organic material, suspected old workings or a coal seam are encountered then it is recommended that specialists in gas assessment are consulted to consider whether mitigation measures (e.g. clay stanks) are required to minimise the potential for lateral gas migration to off-site human/building receptors.

4.3.4 The occurrence of such incidents, the type and volumes of material affected, measures taken, test results and final re-use / disposal measure should all be recorded and included

within a verification report.

#### 4.4 Hydrocarbon Location and Removal

- 4.4.1 A hydrocarbon odour and sheen was previously noted within WS5300A between 0.40 and 1.10 m bgl within Made Ground deposits (Network Rail, 2022). BH5166 and BH5167 undertaken as part of the 2021 ground investigation were located within close vicinity of WS5300A (within 15 m). No hydrocarbon odours or sheens were noted within either exploratory hole. It has not been possible to collect a groundwater sample from the vicinity of the hydrocarbon contamination noted around WS5300A, as the window sampler borehole refused on mudstone.
- 4.4.2 Due to the visual and olfactory evidence of hydrocarbons within the soil and perched groundwater in WS5300A during groundworks, further investigation is to be undertaken within this area to confirm the extent and degree of contamination by intrusive delineation using a spiral of trial pitting around WS5300A with soil sampling.
- 4.4.3 Four trial pits will be initially excavated to the Made Ground/mudstone interface (~1.0m-1.5m bgl) starting at the north side and located approximately 1 - 2m from the WS5300A location spirally outwards. If visual/olfactory evidence is still encountered the spiral of trial pits will continue outwards. If found to be localised (approx. 10m x 10m), the hotspot can be removed and validation samples collected from the excavation extents.
- 4.4.4 If the hotspot is found to be more extensive, the procedure outlined in section 4.12 should be followed.

#### 4.5 Confirmatory Testing of Site Won and Imported Materials

##### Verification Sampling Frequency

- 4.5.1 The general frequency of verification testing for site won and imported fill materials is presented in Table 4-1 (or as described in the sites earthworks specification, which will take precedence over Table 4-1).
- 4.5.2 Any soils or soil-forming materials (including topsoil) imported to site should be shown to be suitable for use by way of testing to an appropriate suite and frequency (prior to importation where at all possible). The precise details of the suite and frequencies will depend on aspects such as the nature of the material, volume to be imported, any pre-existing test results, place of use etc. and hence should be agreed with the relevant regulatory parties in advance. Where required advice will be sought from a suitably experienced geo-environmental specialist.

**Table 4-1 Frequency of sampling for verification purposes**

Material Type	Site Won	Imported
Greenfield (no evidence of previous development or mining) and manufactured soils.	1 sample per 500 m <sup>3</sup> (minimum of 3)	1 sample per 250 m <sup>3</sup> (minimum of 3)
Superficial deposits	1 sample per 500 m <sup>3</sup> (minimum of 3)	1 sample per 250 m <sup>3</sup> (minimum of 3)
Made Ground/soils from a brownfield site	1 sample per 250 m <sup>3</sup> (minimum of 3)	1 sample per 100 m <sup>3</sup> (minimum of 3)

- 4.5.3 Notwithstanding the above, as a minimum, three samples shall be collected from each

imported source.

- 4.5.4 Imported top/sub soils will also require testing in accordance with and comply with BS3882 (Topsoil) (British Standards, 2015) and BS8601 (Subsoil) (British Standards , 2013) guidance documents, or as required by the landscape design/specification.
- 4.5.5 If topsoil or superficial deposits need to be imported on to site to meet volumes required for design, then the supplier of these materials will need to provide documentation to demonstrate that they are natural soils and do not contain anthropogenic material or contaminants (originating from activities that might have occurred on the source sites). Such evidence to include desk study confirming site history, detailed soil descriptions (engineer logs/factual report), MMP and/or soil test data.

#### Import criteria (Limiting Values)

- 4.5.6 It is not anticipated that excavated material will be reused within the site. All imported materials must meet the requirements of the scheme's earthworks specification. Materials should be sampled and tested in accordance with the scheme's earthworks specification (and contaminant concentrations should be less than the Limiting Values detailed within the scheme's earthworks specification). If the Limiting Values are exceeded, then advice should be sought from a contamination specialist as further risk assessment will be required.

## **4.6 Asbestos**

- 4.6.1 Asbestos was identified within two exploratory holes and within five samples collected from the three stockpiles located across the site and the revised CSM considered the risk posed to end-users of the scheme would be moderate/low providing the material containing the asbestos is placed beneath hardstanding/cover layer as part of the development. However, the potential risk posed to the workforce and public during excavation/placement will be assessed by an asbestos specialist to confirm what mitigation measures (if any) are required during construction.
- 4.6.2 As with any previously developed land, or where fill has been placed, there is a potential for asbestos to be present and site staff should remain vigilant for potential asbestos containing materials. Should any further asbestos containing material be encountered during construction advice should be sought from an appropriately qualified specialist with regard disposal or re-use options.

## **4.7 Waste Management**

- 4.7.1 All wastes generated at the site that are destined for landfill, if practical should undergo pre-treatment to reduce the volume or hazardous nature of the waste. Treatment may comprise any physical, thermal, chemical or biological processes, including sorting, that changes the characteristics of the waste.
- 4.7.2 Waste will be managed in accordance with the principles set out in the Construction Environmental Management Plan (Document Ref: 151667-TSA-00-TRU-REP-W-EN-001162 July 2022)

## 4.8 Treatment of mine workings

- 4.8.1 The treatment of shallow mine workings (e.g. drill and grout) beneath the scheme is beyond the remit of this report. Treatment requirements and assessment of the potential risk posed by possible displacement of mine/ground gas and/or mine water during mine stabilisation works will be considered within the design of such activities in line with current guidance. The proposed treatment of mine workings at the site has been agreed with the Coal Authority.

## 4.9 Ground/Mine Gas

- 4.9.1 The site is within a high risk zone for mine gas due to presence of shallow workings <20 m bgl that might not be flooded (CL:AIRE, 2021). Carbon dioxide, carbon monoxide and methane have been recorded, with occasional hydrogen sulphide. Depleted levels of oxygen have been regularly recorded in the upper 5m of Made Ground/bedrock (Network Rail, 2022).
- 4.9.2 Where gas protection measures are required, it will be the responsibility of the Contractor to ensure the appropriate level of protection is installed in accordance with BS8485:2019 (British Standards Institution, 2019).

## 4.10 Variations, Uncertainties and Queries Arising

- 4.10.1 During works, should variations to the above become necessary, or should there be uncertainties to queries over required actions, a suitably experienced geo-environmental specialist should be consulted in the first instance.

## 4.11 Unexpected ground conditions

- 4.11.1 Where any unexpected contaminated materials and/or previously unrecorded ground conditions are encountered during construction, works should temporarily cease in the affected area to enable inspection (and sampling/testing if necessary) by a suitably qualified land contamination specialist. The type of contaminated materials include, but not be limited to, any materials showing signs of visual and/or olfactory evidence of contamination, soils impacted by solvents or hydrocarbons, materials suspected of containing asbestos (whether fibrous, board or corrugated material), highly coloured materials or buried areas of biodegradable or domestic wastes.
- 4.11.2 The area shall be fenced off and made safe until an appropriate risk assessment has been undertaken by suitably experienced specialists, who will confirm what alterations to the remedial statement are required and obtained agreement from the contaminated land officers from Kirklees Council and/or the Environment Agency.
- 4.11.3 Details of the location, type and final destination of all previously unidentified materials encountered during the works should be recorded. Stockpiles of unexpected contamination should be segregated from other excavation arisings and be placed on a bunded low permeability liner, covered in plastic to minimise dust generation and surface run-off, with signs placed stating the nature of the material etc. Proposed stockpile areas should be adequately tested prior to and after use.

Any materials that do not meet the re-use criteria will require off-site disposal. Any disposal / transfer of surplus materials must be carried out under appropriate waste management and duty of care requirements.

#### **4.12 Potable Water Supply Pipes**

- 4.12.1 With regard to underground potable water pipes, the advice of the Statutory Water Authority should then be sought who should be provide with a copy of the ground investigation report.

#### **4.13 Buried Concrete**

- 4.13.1 Concrete foundations for the buildings will require an appropriate design of concrete classification based upon the concentrations of sulphate identified within the soils recorded underlying the site.

#### **4.14 Decommissioning Old Monitoring Wells**

- 4.14.1 Groundwater/gas monitoring wells installed historically and recently should be located and decommissioned in accordance with the Environment Agency guidance document 'Good Practice for Decommissioning Redundant Boreholes and Wells', dated October 2012 (Environment Agency, 2012). This must be undertaken prior to commencement of any construction works in the vicinity of the monitoring wells in order to prevent the inadvertent creation of contaminant or ground/mine gas migration pathways.

## 5. VERIFICATION REPORT

- 5.1.1 The verification report shall be prepared by land contamination specialists in accordance with the Environment Agency's Guidance on how to verify remediation contained within the Land Contamination Risk Management Tool (Environment Agency, 2020) and, if required, the verification plan requirements of CL:AIRE's The Definition of Waste: Development Industry Code of Practice, Version 2 (CL:AIRE, 2011). The verification report shall provide a complete record of the above mentioned activities on site and the data collected.
- 5.1.2 Throughout the enabling/construction works it is essential that lines of evidence (e.g. photographs, test results, plans showing material movements/stockpiling, well decommissioning records) should be collected regularly by appropriately experienced personnel to confirm that the remediation statement has been complied with. The verification report for the site should include:
- Experience and qualifications of the persons preparing the report;
  - Background information – project and site details, appropriate site plans, Employer's requirements, summary of previous ground investigation and risk assessments, conceptual model and remediation objectives;
  - Chemical and physical testing results with laboratory/test method accreditation details and confirmation materials pass re-use or import criteria and if it does not, provide details of contingency measures carried out (e.g. additional risk assessment, sampling, etc);
  - Volumes, sources and quality of re-used materials (including survey drawings showing where site-won materials were excavated, stockpiled and placed to enable tracking of materials);
  - Volumes, source and quality of imported materials (including land contamination desk study confirming source sites' history and geology, ground investigation reports, test results and if available MMP details of the source site);
  - Details of any contingency arrangements (e.g. unexpected contamination/ground conditions) and how these were investigated/assessed and confirmation of any revised remedial actions;
  - Details of decommissioning of the monitoring wells;
  - Final site conditions;
  - Third party contacts – correspondence and approvals/agreements from regulators, site visits, statutory guidance, third party agreements, etc;
  - Supporting information – plans, as-built drawings (showing where materials placed), progress photographs and reports, analytical results, H&S, QA, environmental monitoring, method statements, copies of consignment/delivery notes;
  - Details of the verification testing of materials re-used on site and those imported onto site.

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