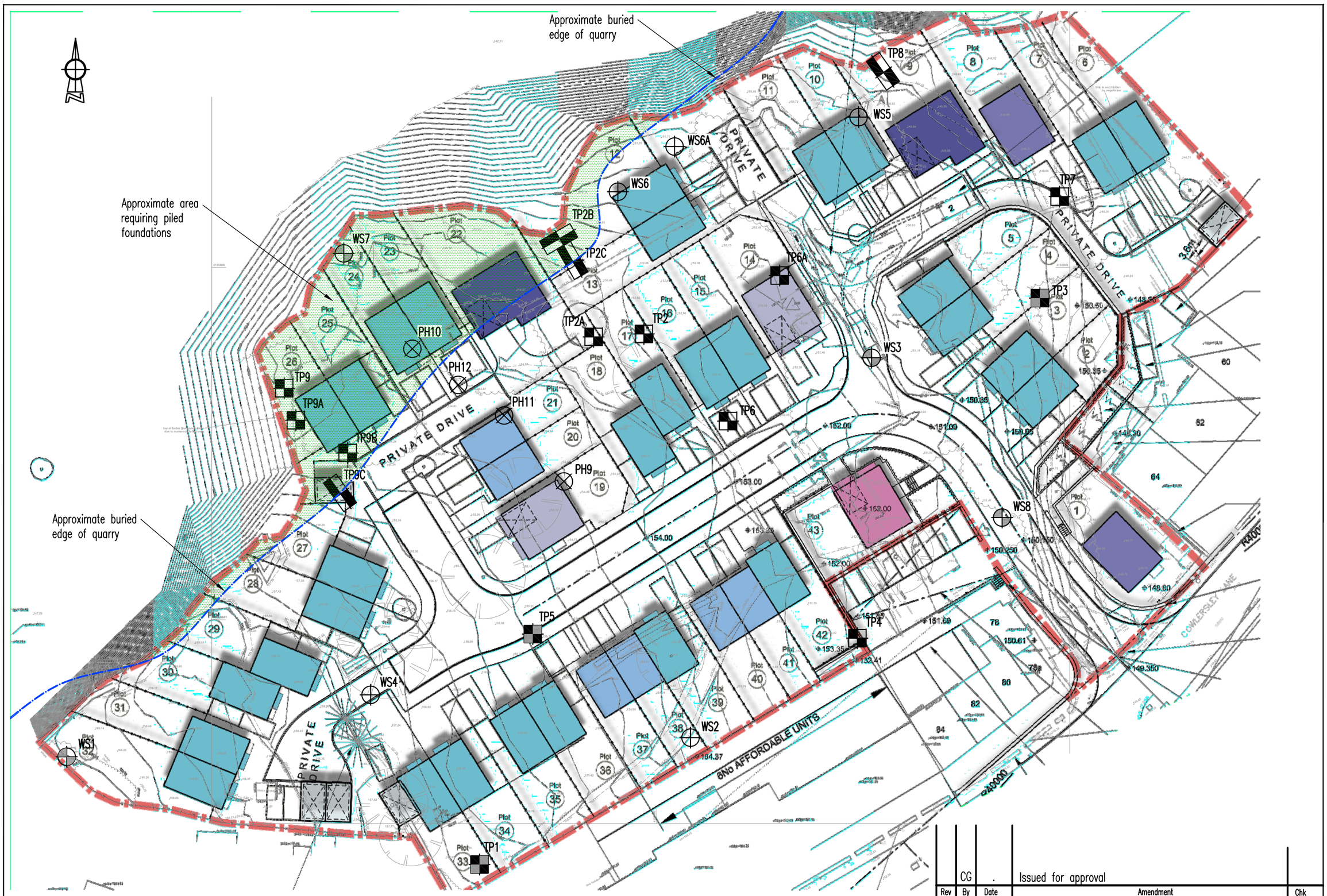

Rev	By	Date	Amendment	Chk
	CG	.	Issued for approval	

Project: COWLERSLEY LANE, COWLERSLEY	Title: APPROXIMATE LINE OF BURIED QUARRY FACE	ARP GEOTECHNICAL LTD CHARTERED CONSULTING ENGINEERS Northwest House • 5/6 Northwest Business Park • Servia Hill • Leeds LS6 2QH Tel: 0113 2458498 • Fax: 0113 2443864 • E-Mail: Leeds@arpassociates.co.uk	Date: OCT 15
Client: MARK OLIVER HOMES (YORKSHIRE)			Scale: 1:500 @ A3
			Drawn: CG
			Chk.: JR
			No: MOY/02/SI.05
			Rev: /

A P P E N D I X K

PROPOSED REMEDIATION METHOD STATEMENT

ARP GEOTECHNICAL LTD

CHARTERED CONSULTING ENGINEERS

CONTAMINATION REMEDIATION STATEMENT

AT

COWLERSLEY LANE, COWLERSLEY
HUDDERSFIELD

ON BEHALF OF

MARK OLIVER HOMES (YORKSHIRE) LTD

DECEMBER 2015

Doc. No: MOY/02rem	Name	Signature	Date
Prepared By:	J Race BSc CGeol FGS EurGeol		3/12/15
Reviewed By:	A Radcliffe BEng CEng MIStructE		3/12/15

ARP GEOTECHNICAL LTD: Northwest House, 5/6 Northwest Business Park, Servia Hill, Leeds LS6 2QH
☎ 0113 2458498 🖷 0113 2443864 ✉ leeds@arpgeotechnical.co.uk 🌐 www.arpgeotechnical.co.uk

MOY/02

M A R K O L I V E R H O M E S (Y O R K S H I R E) L T D

C O W L E R S L E Y L A N E, C O W L E R S L E Y
H U D D E R S F I E L D

DECEMBER 2015

CONTAMINATION REMEDIATION STATEMENT

1.0 Introduction

1.1 This document has been prepared to provide information for the Client and other interested parties, such as the Regulatory Authorities, outlining how contamination encountered on the site will be managed to ensure that the site is environmentally suitable for the intended residential use. The document should be agreed, prior to implementation, with the relevant Regulatory Authorities, usually the local Planning Authority and NHBC or other building control provider.

2.0 The Site

2.1 The ARP Geotechnical Ltd Combined Stage 1 and Stage 2 Desk Study and Geo-environmental Report, dated November 2015 under reference MOY/02r1, makes an assessment of contamination, along with other aspects.

2.2 The conceptual site model is for a residential development with private gardens.

2.3 At the time of the investigation, the site was a derelict piece of land, which included the remains, at ground level, of a former mill. There is a significant amount of waste material, mainly building debris, scattered across the site, associated with more recent garages and sheds, which have now been demolished. Ground levels on the site slope downwards to the northeast with an elevation difference of approximately 15m. The site surface is generally uneven and, in the east (lower part) of the site where the mill was previously located, there are abrupt changes in ground level.

2.4 The site is bounded to the north by a heavily wooded, steeply sloping embankment, which represents the side of a former sandstone quarry. To the north of the site, terraced housing is present at the base of the quarry wall.

2.5 The geological map shows the site to be underlain by Huddersfield White Rock (sandstone) of the Carboniferous Period, with no superficial deposits present. There are no faults shown to affect the site. The site is not within a coal mining area, and is considered stable with regard to coal mining.

2.6 The strata beneath the site are classed as a Secondary A Aquifer. There are no groundwater or surface water abstractions for sensitive uses within 1km of the site.

2.7 No radon protective measures are required for properties constructed on the site. However, there is a landfill 84m to the north. Gas monitoring to date has identified zero CH_4 and 3% CO_2 respectively, along with zero borehole flow rate. Risk assessment indicates that no specific gas protection of properties will be required. However, this will be confirmed by separate letter report on completion of the monitoring.

2.8 Ordnance Survey archive maps show that a cloth mill, including mill pond, was located on the east of the site since before 1854. Sandstone quarries were located to the northwest and north, and encroach onto the northwest of the site. Land in the northwest of the site was later reclaimed by by overfilling the quarried slope. In the 1960s, small buildings (possibly sheds/garages or containers) were located in the centre of the site, after the millpond was infilled.

2.9 The ground investigation revealed the majority of the site to be underlain by made ground topsoil, between 0.1m and 0.6m thick. Deeper made ground (including ash and clinker) is present in the location of the former millpond, proven to a maximum depth of 1.80m and beyond the buried sandstone quarry face in the northwest, where greater than 10m thickness was present. Sandstone bedrock is generally present at depths of between 1m and 2m, with a completely weathered upper horizon of sand, gravel and cobbles.

2.10 The contamination testing revealed the made ground topsoil, and topsoil, where present, to contain elevated concentrations of arsenic, copper, lead, nickel, and PAHs. The highest concentrations of contaminants where recorded in a made ground topsoil sample obtained from WS8, in the area of the former mill, where concentrations of naphthalene and benzo(a)pyrene of 310mg/kg and 400mg/kg were recorded. Elevated arsenic, lead and PAH were also recorded in granular made ground including ash and clinker. Very high PAH concentrations (including naphthalene at 150mg/kg and benzo(a)pyrene at 360mg/kg) were recorded in the location of WS5 in the north. Chrysotile asbestos was detected in ash and clinker in the location of WS3. Some form of remedial action is required to protect the health of future occupants/users of the site. The proposed remedial action is outlined below.

3.0 Remediation Strategy

3.1 Unless further detailed sampling and testing is carried out on a more closely spaced grid, such as 10m, in areas where it is suspected that some of the topsoil may be acceptable, (i.e. in the southwest where no previous industrial use has taken place), it should be assumed that all the topsoil on the site is unsuitable for re-use on a residential development and will require removal from site. It may be possible to reduce the quantity of the topsoil material going off site by screening to remove coarse material such as bricks, for retention.

3.2 With the exception of the made ground at WS5, the existing made ground will not present a risk where present below building footprints or hardstanding. However, where the made ground is present in garden areas, a soil cover blanket will be required above the material. The cover blanket must contain a cohesive content, be clean and uncontaminated, at least 0.6m thick, and incorporating a hard break layer below, to prevent future occupants reaching the material when digging in gardens. Details are provided below.

Thickness mm	Description
Minimum 100	Topsoil
Minimum 500	Subsoil with cohesive content (for example sandy clay, gravelly clay, clayey gravel)
Minimum 100	Hard Break (Coarse Crushed Stone)

3.3 Due to high naphthalene content, which can lead to volatile vapour migration, the material at WS5 should either be removed from site, or be excluded from building footprints, and should not be within a 2m zone outside of the footprints. Alternatively, the material could be left in place below buildings provided that methane gas protection measures are installed. Retention of the material below a cohesive soil cover blanket in garden/landscape areas, or below impermeable hardstanding, should also be acceptable.

4.0 Materials Testing and Validation

4.1 To satisfy the Regulatory Authorities, verification that the above measures have been successfully implemented needs to be independently confirmed, in accordance with the guidance supplied in the document produced by the Yorkshire and Humberside Pollution Advisory Council (YAHPAC): "Guidance on the Verification Requirements for Cover Systems". The measures described below will be required to ensure compliance with the document.

Removal of Unsuitable Topsoil

4.2 The consignment documents, relating to removal of the affected topsoil from site, shall be retained for presentation in a validation report. On completion of the removal works, the area shall be inspected and a photographic record made to confirm removal. A location plan, photographs, and disposal documents, will be included in a Validation Report for submission to the regulatory authorities.

Made Ground at WS5

4.3 If removed from site, the consignment documents, relating to removal of the affected soil from site, shall be retained for presentation in a validation report. On completion of the removal works, the area shall be inspected and a photographic record made to confirm removal of all the affected material. In addition, samples shall be taken from the edges and base of the excavation on an appropriate spacing and tested to confirm acceptability. The results, a location plan, photographs, and disposal documents, will be included in a Validation Report for submission to the regulatory authorities.

4.4 If removed from building footprints only, the inspection detailed above, minus the inclusion of disposal notes, will be required.

4.5 If retained below building footprints, methane impermeable membranes and underfloor venting will be required. The membranes/barriers will need to pass through the cavity wall. The provision of the protection will need to be verified by independent inspection, probably requiring two site visits at the appropriate times. The inspection details will need to be included in the Validation Report.

Imported Soils

4.6 For imported subsoil and topsoil used in the cover blanket, the source will need to be confirmed, and the material tested for the attached suite of contaminants, to comply with the maximum screening values listed. The frequency of testing is given on the table below.

Material Type	**Number of Samples**
Topsoil or subsoil from greenfield site	Minimum 3No. or 1 per 250m^3 (whichever is greater)
Topsoil or subsoil from brownfield site	Minimum 6No. or 1 per 100m^3 (whichever is greater)

4.7 The material should be placed in quarantined stockpiles and once a stockpile has been approved by the Engineer, no further material should be added to the stockpile, and any further import should be stockpiled separately. Any cross contamination of materials should be avoided, and further testing carried out where any cross contamination is suspected to have occurred.

4.8 If space is insufficient on the site to store quarantined stockpiles, cover blanket materials can be placed directly into the appropriate gardens/landscape areas, but samples of each material would need to be tested from each of the validation trial pits discussed in Section 4.9 below.

4.9 Once the cover blanket has been placed in garden areas, trial pits shall be carried out on the basis of one per two plots. This is to confirm the placement of the appropriate thickness of cover blanket materials. The trial pits will be photographed, to include a reference scale, and the photographs included within any report to enable the location on site to be identified.

4.10 The results of all the laboratory analysis, excavation logs, plans, photographs, and import/disposal documents will form part of the Remediation Validation Report.

4.11 In order to enable the scheme to progress and sales of properties to continue throughout the construction of the development, interim Validation Reports may be prepared for specific plots, if required, showing how the contamination has been dealt with. This will enable enquiries during the sales of the properties to be satisfied. On completion of the development, the discharge of any associated planning condition may be achieved by submission of all the interim validation letters, or issuing the information as a single combined Validation Report.

5.0 Unexpected Contamination

5.1 Any unexpected contamination uncovered during the works shall be inspected, sampled and analysed in laboratory for the suite of determinands appended to this Remediation

Statement, and compared to the maximum concentration levels listed on the enclosure. Works on the affected materials shall cease until the appraisal is complete and, if necessary, a revised Remediation Statement is to be prepared and approved by the Planning Authority before work is recommenced.

6.0 Protection of Workers and the Public During Development Works

6.1 Damping down of the site should be implemented during dry periods, and timely placement of contaminated fill below barriers.

6.2 Washing facilities and a clean mess room from which work boots and overalls are excluded, should be provided.

6.3 Site fencing will be provided to exclude access to members of the public, and contaminated material will be contained within the site boundary, and placed below barriers as soon as possible.

6.4 Workers will be educated to use adequate hygiene and PPE.

6.5 Surface water run off should be prevented by minimising open exposure times of contaminated material and using bunds or cut off trenches as necessary.

6.6 Movement of contamination off site on vehicle wheels shall be minimised by cleaning of vehicle wheels and/or use of road sweeper, as required.