

PHASE 3 REMEDIATION METHOD STATEMENT

Site

**PALMERS AUTOCENTRE TYRES,
TURNERS HILL ROAD, CRAWLEY DOWN,
WEST SUSSEX RH10 4HQ**

Client

J W STRATTON LTD

Report Ref

25/12836/B/GO

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The following foreword should be read in conjunction with this report. Any variations on the general procedures outlined below are indicated in the text.

FOREWORD

The recommendations made and opinions expressed in this Report are based on the strata conditions revealed by the fieldworks as indicated on the exploratory records, together with an assessment of the data from in situ and laboratory tests. No liability can be accepted for conditions which have not been revealed by the fieldworks, for example, between exploratory positions. While this Report may offer opinions on the possible configuration of strata, both between the excavations and below the maximum depth achieved by the investigation, these comments are for guidance only and no liability can be accepted for their accuracy. The data obtained relate to the conditions which are relevant at the time of the investigation.

The groundwater observations entered on exploratory records are those noted at the time of the investigation. The normal rate of progress does not usually permit the recording of any equilibrium water level for any one water strike. It should be noted that groundwater levels are prone to seasonal variation and to changes in local drainage conditions. The word 'none' indicates that groundwater was sealed off by the borehole casing or that no water was observed in the exploratory hole upon completion.

It should be appreciated that this report does not constitute a Geotechnical Design Report (GDR) as defined in Eurocode 7 and no aspect of this report constitutes a design. Specific sections of this report are generally in line with the guidance set out in Eurocode 7 for a Ground Investigation Report (GIR), as defined within BS EN 1997:-2 (2024). This provides guidance on the number and spacing of investigation positions, methods of investigation and sample quality class to be achieved which may not have been met by this investigation.

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REPORT REF: 25/12836/B/GO
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1 INTRODUCTION

1.1 Scope

Albury S.I. Limited has been commissioned by J W Stratton Limited (“the Client”) to produce a Phase 3 Remediation Method Statement (RMS) for the site Palmers Autocentre Tyres, Turners Hill Road, Crawley Down.

This Remediation Method Statement or Stage 3 Remediation Strategy has been prepared in line with the Land Contamination: risk management (LCRM) guidance (2020), to provide the details of the procedures to be adopted during construction and measures to be implemented to ensure the development is suitable for use.

1.2 Proposed Development

The Client proposes to construct 5 no two storey detached dwellings following the demolition of the existing structures, which will include areas of soft landscaping and private gardens. The proposed layout plan is included as Figure 1.

1.3 Previous Reports

A Phase 1 Desk Study was initially undertaken in March 2024, with an intrusive Phase 2 investigation carried out in May 2024 and reference should be made to both of these reports when considering this RMS. The Conceptual Site Model is also included in these previous reports. The site has had historical use as a motor repairs garage and earlier a wheelwright. An historic landfill has also been identified north west of the site.

Briefly, the previous investigation revealed that elevated levels of PAH and heavy metals were present within the shallow near surface made ground. The results of additional testing confirmed that the exceedances were restricted to depths of 0.10-0.30m. The ground conditions encountered consisted of made ground which was proved to depths of between 0.20m and 0.80m, which rested upon very silty clay over sandy silt at depth which is typical of the Upper Tunbridge Wells Sand Formation. The site has no useable topsoil and evidently clean soils are required to be imported to act as a growing medium within gardens and soft landscaped areas.

Ground gas monitoring was undertaken on two return visits and low levels of ground gases were recorded. Due to the relatively shallow groundwater of less than 1.00m depth, the presence of cohesive soils and the concentrations of ground gas recorded, no further monitoring was deemed necessary and specialist precautions with regards to ground gases are not required.

2 REMEDIATION PROPOSALS

The following remedial measures are proposed to protect future occupiers from long term exposure to residual soil contamination. Where areas of permanent hardstanding or structures are proposed then remedial measures will not be required, as the pathway between source and receptor will effectively be broken.

2.1 Discovery Strategy

The majority of the site was covered by existing asphalt and structures at the time of the intrusive investigation, which can conceal historic contamination. It was recommended that a discovery strategy or watching brief be maintained for the duration of the enabling works and demolition. Photographic evidence of all stages of the development, particularly of any excavations, should be routinely kept and retained. If any suspected contamination is identified then additional investigation may be required and the following remediation proposals may require review and updating.

2.2 Gardens and Landscaped Areas

Within the private gardens the impacted soils should be excavated to a minimum depth of 600mm below garden formation level and replaced with 450mm of, clean (non-waste), subsoil and an upper layer comprising certified topsoil of 150mm thickness to act as a growing medium. The final thickness of topsoil will be dependent upon the proposed landscape scheme and additional topsoil can be substituted for the subsoil, as long as the total soil thickness is maintained, taking into account the settlement and compaction of the topsoil/subsoil over time. It is not recommended, however, that greater than 400mm thickness of topsoil is used due to the risk of anaerobic zones forming.

Within the areas of limited soft landscaping such as the planting beds at the front and sides of the dwellings, where significant excavation into the cover system by end-users is unlikely to occur, it is considered that a cover system of 300mm would be sufficient.

Table 1 - Proposed Cover System

Component	Minimum Thickness (mm) Private Gardens	Minimum Thickness (mm) Soft Landscaping
Topsoil	150	150
Subsoil	450	150

This measure of incorporating clean cover will adequately reduce the risk to future receptors. To ensure the integrity of the capping layer/growth medium, placement should commence after the installation of any drainage works or new service trenches.

Any imported materials should be from a certified source, with supplier geochemical certification or independent validation testing. Relevant export dockets (muckaway) and import delivery tickets should be retained to form part of a final Validation Report. Once placed, verification testing of the soils should be undertaken to confirm that the soils comply with the enclosed import specification. It would be prudent to review any geochemical data for any material to confirm its suitability prior to it being imported to site.

The imported materials should be certificated by the supplier as being clean and are to be compared with current available guidance prior to importation to site. The chemical specification will comprise the Category 4 Screening Levels [C4SLs] (DEFRA, 2014) and Suitable for Use Levels [S4ULs] (LQM/CIEH, 2014) that are derived using the CLEA software. A table detailing the chemical specification for imported soils is included in Appendix 1. The assessment will be made on the basis of the proposed use, which is Residential (with the Consumption of Home-Grown Produce). An assessment will also be made for the presence of the phytotoxic metals: zinc, copper and lead published by DEFRA (2005) and BS 3882.

The imported subsoil should be from a naturally quarried or 'greenfield' source, which should be well graded and no independent chemical testing is envisaged on this material. Confirmation will be provided by the supplier that it is from a naturally quarried or 'greenfield' source with importation carrier notes stating the source site and tonnage. Other materials from non-greenfield sources, such as screened, blended, or recycled sources are discouraged due to the risk of being rejected on import and would require on-site testing or increased frequency of sampling to confirm its suitability for use.

2.3 Buried Services

Given the historic use of the site the requirements of the water supply company should be sought with regard to their requirements for incoming potable water supply pipes. It is likely that hydrocarbon resistant barrier pipe will be required for new incoming water mains.

2.4 Soakaways

The ground conditions encountered would be a poor drainage medium and alternative means of surface water disposal should be considered. The presence of a shallow groundwater table also implies that traditional soakaways will be unsuitable at this site.

2.5 Health and Safety

It is considered that any risks to site operatives and ground workers can be managed through the use of appropriate PPE, safety procedures and precautions such as hand washing facilities. Further information can be found in the publication (CL:AIRE, 2016) "Control of Asbestos Regulations 2012 - Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials: Industry guidance". Care should be taken to minimise the generation and off-site migration of dust during site works, which could be considered a nuisance to residential neighbours. For example soils should be dampened down, as necessary, and activity will be minimised in extremely windy conditions to prevent dust nuisance. Moreover, an adequate supply of water should be maintained on site at all times to allow for dust suppression to be carried out at short notice.

3 MONITORING AND MAINTENANCE

An ongoing scheme of monitoring and maintenance of the long-term effectiveness of the remedial measures outlined above is not required. A verification report to demonstrate the implementation of the cover system will be produced and the details are outlined below. The implementation of the cover system will act to break active pollutant linkages and the unsuitable made ground will be removed, therefore long-term monitoring or future maintenance is not necessary.

4 VALIDATION AND VERIFICATION

This report should be submitted to the Local Authority for their comment and approval prior to implementation. Once all the remedial works and site inspections have been completed, a validation statement will be issued detailing the works completed and providing a declaration that the development is now suitable for the intended use.

The following documentation should be retained for inclusion in a final validation statement:

- Records of site visits, inspections and photographs of the development stages.
- Duty of care waste transfer and disposal notes, as well as details of any waste carrier licences.
- Details of any imported soils and accompanying geochemical test results.
- Confirmation of capping layer thickness and geochemical testing of materials used to form the capping layer.

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LIST OF ABBREVIATIONS

AOD	-	Above Ordnance Datum
ACM	-	Asbestos-containing Material
AST	-	Above-ground Storage Tank
BGS	-	British Geological Survey
BH	-	Borehole
BRE	-	Building Research Establishment
BSI	-	British Standards Institution
BS	-	British Standard
C4SL	-	Category Four Screening Level
CIRIA	-	Construction Industry Research and Information Association
CP	-	Cable Percussive
DPH	-	Dynamic Probing Heavy
DPSH	-	Dynamic Probing Super Heavy
EA	-	Environment Agency
GAC	-	Generic Assessment Criteria
LL	-	Liquid Limit
mAOD	-	Metres Above Ordnance Datum
mBGL	-	Metres Below Ground Level
mOD	-	Metres Ordnance Datum
OS	-	Ordnance Survey
PAH	-	Polycyclic Aromatic Hydrocarbons
PCB	-	Polychlorinated Biphenyl
PID	-	Photo Ionisation Detector
PL	-	Plastic Limit
PSD	-	Particle Size Distribution
SGV	-	Soil Guideline Value
SOM	-	Soil Organic Matter
SPT	-	Standard Penetration Test
SPZ	-	Source Protection Zone
SVOC	-	Semi-volatile Organic Compounds
TPH	-	Total Petroleum Hydrocarbon
UST	-	Underground Storage Tank
UXB	-	Unexploded Bombs
UXO	-	Unexploded Ordnance
VOC	-	Volatile Organic Compound

FIGURE 1

LANDSCAPING PROPOSALS

APPENDIX 1

SOIL GENERIC ASSESSMENT CRITERIA

Soil Generic Assessment Criteria (GAC) for Human Health

Determinand	GAC (mg/kg ⁻¹)	
	Commercial Use	Source
Asbestos (ACM)	None detect	
Arsenic	640	C4SL (2014)
Beryllium	12	S4UL (2014)
Boron	240000	S4UL (2014)
Cadmium	190	S4UL (2014)
Chromium III	8600	S4UL (2014)
Chromium VI	33	S4UL (2014)
Copper	See PTE Table below	DEFRA, 2005
Lead	2330	Category 4 [C4SL] (2014)
Mercury	320	S4UL (2014)
Nickel	See PTE Table below	DEFRA, 2005
Selenium	12000	S4UL (2014)
Vanadium	9000	S4UL (2014)
Zinc	See PTE Table below	DEFRA, 2005
Total Petroleum Hydrocarbons (TPH)		S4UL (2014)
Benzene	(27, 47, 90)	S4UL (2014)
Toluene	(56000, 110000, 180000)	S4UL (2014)
Ethylbenzene	(5700, 13000, 27000)	S4UL (2014)
Xylenes - m, o or p	(5900, 14000, 30000)	S4UL (2014)
PAH Compounds		
Acenaphthene	(84000, 97000, 100000)	S4UL (2014)
Acenaphthylene	(84000, 97000, 100000)	S4UL (2014)
Anthracene	(520000, 540000, 540000)	S4UL (2014)
Benz[a]anthracene	(170, 170, 180)	S4UL (2014)
Benzo[a]pyrene (only)	(35, 35, 36)	S4UL (2014)
Benzo[b]fluoranthene	(44, 44, 45)	S4UL (2014)
Benzo[ghi]perylene	(3900, 4000, 4000)	S4UL (2014)
Benzo[k]fluoranthene	(1200, 1200, 1200)	S4UL (2014)
Chrysene	(350, 350, 350)	S4UL (2014)
Dibenz[ah]anthracene	(3.5, 3.6, 3.6)	S4UL (2014)
Fluoranthene	(23000, 23000, 23000)	S4UL (2014)
Fluorene	(63000, 68000, 71000)	S4UL (2014)
Indeno[123-cd]pyrene	(500, 510, 510)	S4UL (2014)
Naphthalene	(190, 460, 1100)	S4UL (2014)
Phenanthrene	(22000, 22000, 23000)	S4UL (2014)
Pyrene	(54000, 54000, 54000)	S4UL (2014)

Values in brackets indicate GAC for SOM (1%, 2.5%, 6%)

Potentially Toxic Elements [PTE]	Maximum permissible levels of toxic elements in soil (mg/kg-1) (Grassland figures in brackets)			
	pH 5.0<5.5	pH 5.5<6.0	pH 6.0-7.0	pH >7.0
Zinc	200	200	200	300
Copper	80 (130)	100 (170)	135 (225)	200 (330)
Nickel	50 (80)	60 (100)	75 (125)	100 (180)

Based upon levels of PTE in soil following application of sewage sludge to agricultural soil (DEFRA, 2005) & BS 3882

The above GAC are presented above for reference only and should be considered with their respective technical notes.
The technical notes are commercial in confidence and are not reproduced here.

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