

Asbestos in Soils Risk Assessment and Management Plan

Site: The Barns, Halewood

Reference: 18-365-R2-1

Date: February 26



E3P

Taylor Road
Trafford Park
Urmston
Manchester
M41 7JQ

+ 44 (0) 161 707 9612
<https://e3p.co.uk>

Registered in England
CRN: 08725262

QUALITY ASSURANCE

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WRITTEN BY	QUALIFICATIONS	POSITION
Harriet Mason	BSc (Hons), FGS	Project Manager

REVIEWED BY	QUALIFICATIONS	POSITION
Andrew Garrity	BSc, MSc, FGS, MEnvSc, CSci	Associate Director

AUTHORISED BY	QUALIFICATIONS	POSITION
Andrew Edgar	BSc, MSc, PISEP, MEnvSc, CEnv	Director





EXECUTIVE SUMMARY

Site Address	Land North of Lower Road, Halewood, Liverpool, L26 2XA.
Grid Reference	E 345770, N 385891
Current Site Use	The site currently comprises a large lake in the centre of the site, which is used for fishing, as several small piers are present around the lake. A hardstand car park is present in the southwest of the site, with gravel tracks leading from this around the edge of the lake. Denser overgrown vegetation is present around the boundaries of the site.
Proposed Development	Mac Roofing & Contracting Ltd intends to construct a low-rise residential development comprising circa 12 dwellings with associated estate roads and ancillary infrastructure.

ASBESTOS RISK ASSESSMENT

Assessment Conclusions	Visual inspection and chemical laboratory analysis to date have indicated the asbestos containing material (ACM) to comprise amosite and chrysotile loose fibres and board. The works would therefore be categorised as non-licensed work and the following would be required: ✚ EN149 type FFP3 disposable RPE ✚ Manual localised dust suppression ✚ Localised and personal decontamination facilities The presence of unspecified insulation board would deem the works Notifiable Non-Licensed Work (NNLW) and will require notification to the HSE. Should lagging or asbestos insulation board (AIB) be identified and confirmed to be present, the works would become Licensed Work (LW) and will require supervision/excavation by a licensed contractor in the localised area where the material is identified. Such materials have not been identified to date. The findings of the JIWG qualitative receptor risk assessment predicted the following: ✚ Medium risk for an off-site neighbour (residential). ✚ High risk for on-site construction workers. The asbestos management plan herein should be followed for all works involving the disturbance of asbestos impacted soils. If the appropriate mitigation measures are adopted to prevent unacceptable occupational exposure for the construction worker, these actions will also be suitable to prevent unacceptable environmental exposure to off-site receptors.
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TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1. INTRODUCTION	4
1.1. Background	4
1.2. Proposed Development.....	4
1.3. Limitations	4
1.4. Confidentiality	5
2. SITE SETTING	6
2.1. Site Details	6
2.2. Current Site Use	6
3. PREVIOUS WORKS	7
4. SCOPE OF E3P WORKS	7
4.1. Summary of Asbestos Samples Taken to Date	8
5. ASBESTOS RISK ASSESSMENT	8
5.1. Receptors of Asbestos Contamination	8
5.1.1. On-Site Receptors	8
5.1.2. Off-Site Receptors.....	8
5.2. Possible Asbestos Contamination Linkages	9
5.3. Qualitative Risk Assessment	9
5.3.1. Methodology	9
5.3.2. Stage 1 – Hazards	10
5.3.3. Stage 2 – Exposure Factors	11
5.3.4. Stage 3 – Pathway and Receptor Sensitivity	12
5.4. Assessment of the Potential Receptor Impact.....	13
6. ASBESTOS MANAGEMENT PLAN	14
6.1. Specific Requirements for Working with Asbestos	14
6.1.1. Applicability.....	14
6.1.2. Control of Asbestos Regulations 2012	14
6.1.3. Determining if the Work is Licensable	14
6.1.4. Training for Work with Asbestos	15
6.1.5. Plan of Work.....	15
6.2. Asbestos Risk Assessment	15
6.3. Precautions for Earthworks in Asbestos Impacted Made Ground	16
6.3.1. Re-profiling Earthworks	16
6.3.2. Earthworks Methodology	16
6.3.3. Precautions to Control Dust.....	16
6.3.4. Air Monitoring	17
6.3.5. Decontamination Unit.....	17
6.3.6. Unexpected Discovery of Contamination	17
6.4. General Requirements During the Earthworks.....	18
6.4.1. Unforeseen Ground Conditions	18
6.4.2. Segregation of Material Types.....	18
6.4.3. Disposal of Soils	18
6.4.4. Reuse of Site-Derived Made Ground.....	19
6.4.5. Retention Of Asbestos Impacted Made Ground At The Site.....	19
6.4.6. Asbestos Register.....	21





APPENDIX I LIMITATIONS

APPENDIX II GLOSSARY

APPENDIX III DRAWINGS

APPENDIX IV JIWG WORKING GROUP ASSESSMENT





1. INTRODUCTION

1.1. BACKGROUND

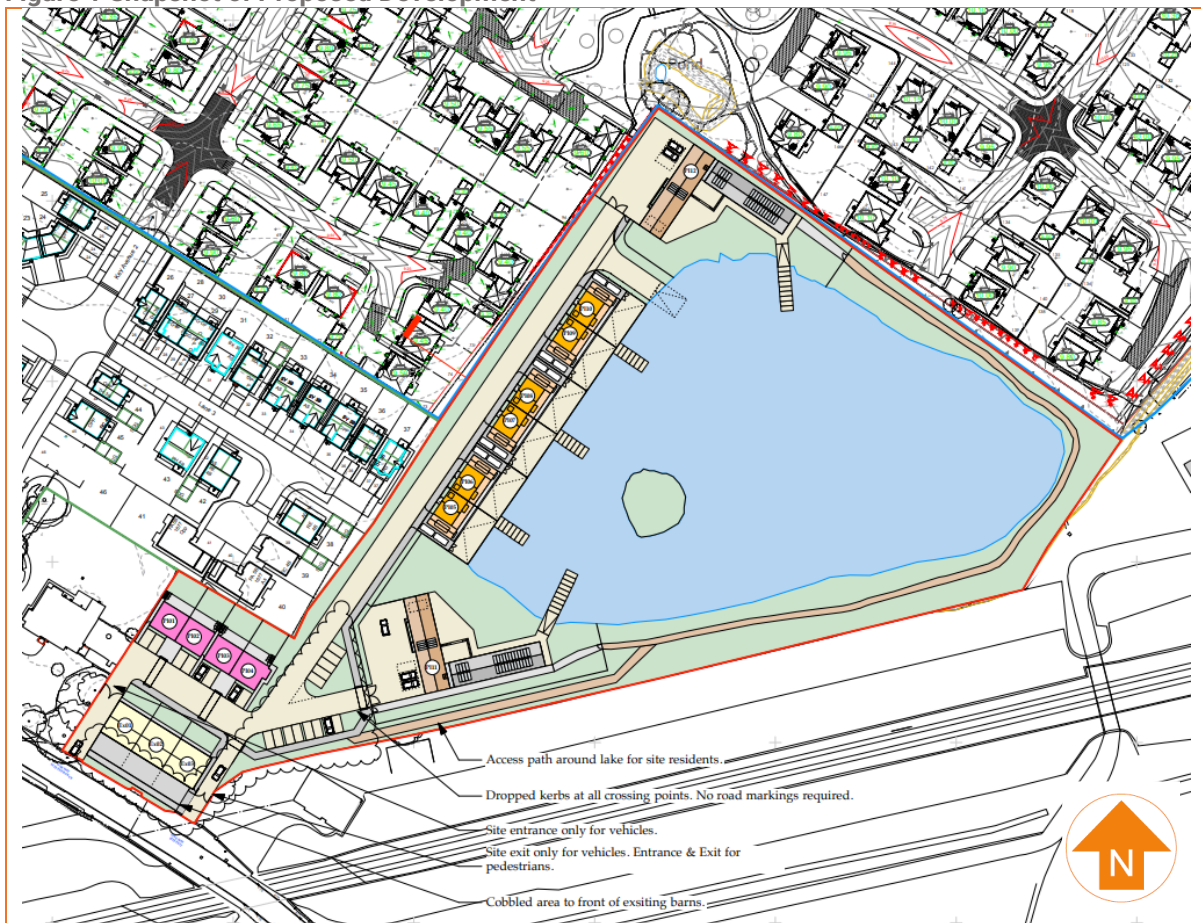
E3P has been instructed by Mac Roofing & Contracting Ltd to complete a working methodology to assess the risk of asbestos impacted soils during the construction of residential development at The Barns, Halewood.

1.2. PROPOSED DEVELOPMENT

Mac Roofing & Contracting Ltd intends to construct a low-rise residential development comprising circa 12 dwellings with associated estate roads and ancillary infrastructure.

Figure 1 indicates the proposed development layout which is included within Appendix III.

Figure 1 Snapshot of Proposed Development



1.3. LIMITATIONS

The limitations of this report are presented in Appendix I.





1.4. CONFIDENTIALITY

E3P has prepared this report solely for the use of the client and those parties with whom a warranty agreement has been executed or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from E3P; a charge may be levied against such approval.





2. SITE SETTING

2.1. SITE DETAILS

Table 1 Site Details

Site Address	Land north of Lower Road, Halewood, Liverpool, L26 2XA.
National Grid Reference	E 345770, N 385891

All acronyms used within this report are defined in the Glossary presented in Appendix II.

A site location plan is presented in Appendix III as Drawing 18-365-001.

2.2. CURRENT SITE USE

E3P has undertaken a desk-based walkover assessment of the entire site, and a description of the key findings is summarised in Table 2.

Table 2 Site Description

Current / Historical Land Use	The site is a triangular shaped parcel of land located north of Lower Road, Halewood, occupying approximately 2.14 Ha.
	The site was historically vacant undeveloped land with a pond in the northernmost part of the site. The site remained vacant until circa 1890-1893, when a building was noted to be present in the west of the site and railway sidings were present on the southern boundary. No further changes on-site occurred until circa 1967 when an additional building was added to the east of the existing building in the west of the site.
	The site remains unchanged until circa 2000, when a large lake was noted to be present within the centre of the site. Trucks, trailers and gravel trucks were also present on-site in the west and southwest. The buildings were demolished circa 2016 and a hardstand car park built in its place.
	The site currently comprises a large lake in the centre of the site which is used for fishing as several small piers are present around the lake. A hardstand car park is present in the southwest of the site with gravel tracks leading from this around the edge of the lake. Denser overgrown vegetation is present around the boundaries of the site.
Asbestos-Containing Material (ACM) within soils	Asbestos in the form of amosite and chrysotile was identified during the BEK Consulting Site Investigation within TP9 at 0.20m. Quantification confirmed the soils to contain <0.001%. Board was also encountered within TP9 at 0.20 m bgl with a quantification of 0.079%.





3. PREVIOUS WORKS

Table 3 summarises the previous geoenvironmental assessments that have been prepared for the site.

Table 3 Summary of Previous Works

ORGANISATION	TITLE	DATE	REFERENCE	PREPARED FOR
Geo-Ventures Limited	Phase 1 Desk Study/Preliminary Risk Assessment Report	June 2021	-	-
BEK Geoenvironmental Consulting	Site Investigation & Ground Assessment	November 2023	BEK-23116-2	Mac Roofing & Contracting Ltd
BEK Geoenvironmental Consulting	Ground Gas Risk Assessment	February 2024	BEK/23116/280224/3	
E3P	Remediation and Enabling Works Strategy	February 2026	18-365-R1	

The above reports should be read in conjunction with the report.

4. SCOPE OF E3P WORKS

The BEK Consulting Phase II Geo-Environmental Assessment found detectable chrysotile and amosite asbestos fibres in one location (TP9 at 0.20m). Quantification confirmed concentrations were <0.001. Board was also encountered within TP9 with a quantification of 0.079%.

E3P has undertaken a qualitative asbestos risk assessment for off-site human receptors based on the soil conditions encountered to date. This has been undertaken utilising the Joint Industry Working Group (JIWG) Decision Support Tool for the Qualitative Risk Ranking of Work Activities and Receptors Involved in or Exposed to Asbestos in Soil and Construction and Demolition Materials (v2.1 March 2017) in conjunction with the Society of Brownfield Risk Assessment (SoBRA) Conceptual Framework for Asbestos Risk Assessment & Control.

Given the uncertainty in the asbestos in soil concentrations within the Made Ground at the site and the requirement under the Control of Asbestos Regulations 2012 (CAR 2012) to prevent asbestos exposure so far as is reasonably practicable, an Asbestos Management Plan has been prepared.

The Asbestos Management Plan details the precautions and controls that contractors shall adopt during the enabling earthworks and construction. Contractors shall use the asbestos risk assessment and management plan as the basis for preparing their CAR 2012 compliant Plan of Work and Risk Assessment.





4.1. SUMMARY OF ASBESTOS SAMPLES TAKEN TO DATE

Further to the above, a summary of the positive asbestos samples identified during the E3P investigations and remediation works is provided in Table 4.

Table 4 Summary of Asbestos Impact

REPORT REF	LOCATION	DEPTH (m bgl)	ASBESTOS TYPE	ASBESTOS FORM	CONCENTRATION (%)
BEK Consulting Investigation	TP9	0.20	Amosite & Chrysotile	Loose Fibres	< 0.001
				Board	0.079

5. ASBESTOS RISK ASSESSMENT

5.1. RECEPTORS OF ASBESTOS CONTAMINATION

The following potential human receptors of asbestos ground contamination have been identified:

-  On-site construction worker.
-  Off-site receptors/neighbours.

The duration of asbestos exposure is restricted to the enabling and construction phase of the development, and there will be no plausible migration pathway for asbestos to impact receptors upon completion of the development.

5.1.1. ON-SITE RECEPTORS

Of the above receptors, the on-site construction workers are considered likely to be close to the source of the asbestos-impacted ground, although their exposure is likely to be restricted to working hours.

5.1.2. OFF-SITE RECEPTORS

Residential properties on the western and southern boundaries of the site have been identified as potential receptors. The potential exposure to these receptors is lower than site construction workers due to their distance from the groundwork activities.

Greater exposure to airborne asbestos is likely to occur during periods of high disturbance, excavation and earth moving; nevertheless, exposure could occur outside of working hours from windblown asbestos fibres at the ground surface.

Identified receptors and distances are summarised in Table 5.

Table 5 Receptors

RECEPTOR	DISTANCE & DIRECTION FROM SITE BOUNDARY	DISTANCE & DIRECTION FROM CLOSEST ASBESTOS IDENTIFIED	CLOSEST EXPLORATORY HOLE / LOCATION WHERE ASBESTOS IDENTIFIED
Residential Buildings	Western and southern boundary	35 m	TP9 – Chrysotile <0.001%, and amosite board 0.079%





5.2. POSSIBLE ASBESTOS CONTAMINATION LINKAGES

The following possible contaminant linkages are associated with asbestos ground contamination.

Table 6 Contaminant Linkage

CONTAMINANT SOURCE	PATHWAY	RECEPTOR
Asbestos Impacted Made Ground	Inhalation (outdoor air)- dust and fibres	Construction works Site Neighbours
	Inhalation (indoor air)- dust and fibres	Nearby Residential User

5.3. QUALITATIVE RISK ASSESSMENT

5.3.1. METHODOLOGY

The risk assessment has been undertaken utilising the *Joint Industry Working Group (JIWG) Decision Support Tool for the Qualitative Risk Ranking of Work Activities and Receptors Involved in or Exposed to Asbestos in Soil and Construction & Demolition Materials (v2.1 March 2017)*.

The decision support tool comprises an Excel spreadsheet to assist practitioners in the risk rank activities and receptors as part of a preliminary risk assessment under LCRM. The aim of the tool is to provide the industry with a consistent decision-making format that is aligned with UK health and safety and environmental regulatory policies.

The hazard and risk ranking approaches take influence from the material and priority scoring systems presented in the Health and Safety Executive Guidance *A Comprehensive Guide to Managing Asbestos in premises HSG227 2002* and qualitative risk assessment methods presented in NHBC *Guidance for the Safe Development of Housing on Land Affected by Contamination R&D66 2008*.

The JIWG tool supports Stage 2 and Stage 3 of the Society of Brownfield Risk Assessment (SoBRA) Conceptual Framework for Asbestos Risk Assessment & Control (April 2015) and identifies key hazard and risk factors that are relevant to the management of risk from exposure to asbestos-contaminated soils, Made Ground or construction and demolition materials.

The JIWG decision support tool has been used to assess the potential risk to health of the following human receptors from the potential inhalation of airborne asbestos generated during the re-profiling earthworks at the site.

Two scenarios have been modelled based on the following receptors identified in the conceptual site model:

Table 7 Impact Scenarios

SCENARIO	RECEPTOR	PROXIMITY OF SOURCE
Scenario 1	Site construction worker	Employee working on the site
Scenario 2	Site neighbour (worst case)	10 m from site boundary

The output sheets from the DST (Decision Support Tool) risk ranking exercise are enclosed in Appendix VI.





5.3.2. STAGE 1 – HAZARDS

Based on the investigations undertaken to date, quantification of the free dispersed fibres in the soils of TP9 has confirmed trace levels (<0.001%), however board fragments have also been identified in TP9 with a maximum concentration of 0.079%.

The asbestos contamination sources have therefore been modelled and hazard rankings determined using the most appropriate and conservative dropdowns options in the spreadsheet as follows:

Table 8 Hazard Factors – Loose Fibres

CATEGORY	SELECTED OPTIONS	SCORE
ACM Type	Free dispersed fibres/fibre bundles	2
Extent of Degradation of ACMs	Disaggregated (dominated by loose fibrous material; extreme degradation in CAM and/or free asbestos fibres/fibre bundles)	4
Friability and degree of bonding by ACM matrix	Friable ACM or ACM with fibres not linked to any matrix (free dispersed fibres and fibre bundles)	4
Distribution of visible asbestos across affected area	Occasional/random occurrences of visible contamination by ACMs	1
Amount of asbestos fibre in selected ACM	>0.05 to <0.1% wt/wt	3
Sub-total		14
Hazard Ranking		Medium

Table 9 Hazard Factors – ACMs

CATEGORY	SELECTED OPTIONS	SCORE
ACM Type	Unspecified fibrous board	2
Extent of Degradation of ACMs	Weathered (slight degradation in ACM; material still remains basic integrity)	2
Friability and degree of bonding by ACM matrix	Non-friable ACM or ACM with fibres firmly linked in a matrix	0
Distribution of visible asbestos across affected area	Occasional/random occurrences of visible contamination by ACMs	1
Amount of asbestos fibre in selected ACM	>0.05 to <0.1% wt/wt	3
Sub-total		8
Hazard Ranking		Low





5.3.3. STAGE 2 – EXPOSURE FACTORS

Based on the findings of the combined investigations undertaken to date, the following emission factors were modelled using the most appropriate and conservative dropdown options in the spreadsheet as follows:

Table 10 Exposure Factors

CATEGORY	SELECTED OPTIONS	SCORE
Anticipated airborne fibre concentration	<0.001 fibres/ml	0
Anticipated exposure duration	>2 hours in a 7-day period and up to 10 hours in a day (e.g. full-time occupational exposure)	4
Respirable fibre index for ACM – RIVM report 711701034 (2003)	Very Low	1
Activity type and effect on deterioration of ACMs	Not low intensity, significant deterioration expected	4
Best description of primary host material	Made Ground	4
Sub-total		13
Exposure Ranking		Medium

Based on the above assessment, the works would be categorised as **Non-Licensed Work** and the following would be required:

- ✿ EN149 type FFP3 disposable mask
- ✿ Manual localised dust suppression
- ✿ Localised and basic personal decontamination facilities

Note: Where materials that are normally regarded as non-licensed have an increased risk of fibre release during removal due to becoming friable, or the material will be damaged, and the matrix degraded during removal, works will become Notifiable Non-Licensed Work (NNLW).

Examples of Notifiable Non-Licensed Work include work which disturbs more friable materials such as AIB, asbestos cement products where the material has been substantially damaged or broken up or wherein the removal will damage the cement sheeting and release significant amount of dust containing asbestos fibres. Under these circumstances, the HSE would need to be notified. However, given the sampling and analysis completed to date, this is not anticipated.





5.3.4. STAGE 3 – PATHWAY AND RECEPTOR SENSITIVITY

SCENARIO 1 - ON-SITE CONSTRUCTION WORKER

The following receptor risk ranking for construction workers has been completed using the above hazard and exposure assessment.

Table 10 Scenario 1 Assessment – Construction

CATEGORY	SELECTED OPTIONS	SCORE
Receptor Category	Construction	N/A
Age of Receptor	Adult (>24 and <60)	1
Duration of exposure/ site occupancy	> 1hr <10 hr daily exposure	3
Sub total		4
Receptor Ranking		Low
Combined hazard, exposure and receptor ranking		Medium
Pathway: distance of receptor from source	Within 10 m of area of disturbance	4
Pathway: Depth to impacted material	Material visible at surface, likely to be disturbed.	E
Sub-total		4E
Pathway ranking		High
Overall Ranking		High

SCENARIO 2 – NEARBY RESIDENT

The main risk to site neighbours during the works is release and inhalation of airborne fibres. The assessment has therefore been completed using free dispersed fibres/fibre bundles of very low quantities (0.001-0.01% wt/wt based on the soils assessment to date) and slightly weathered non-friable ACM which retains its basic integrity (i.e. low hazard, medium exposure).

The worst-case receptor age of infant under five years of age has been chosen given the potential for parents with infants to be present within residential gardens bordering the site.

Table 11 Scenario 2 Assessment

CATEGORY	SELECTED OPTIONS	SCORE
Receptor Category	Residential	No score required
Age of Receptor	Infant under 5 (worst case)	4
Duration of exposure/ site occupancy	>10 hours per day (e.g. 24-hour residential exposure)	4
Sub total		8
Receptor Ranking		High
Combined hazard, exposure and receptor ranking		Medium
Pathway: distance of receptor from source	>10 m distance from edge of area of disturbance	3
Pathway: Depth to impacted material	Material visible at surface, likely to be disturbed.	E
Sub-total		3E
Pathway ranking		Medium
Overall Ranking		Medium





5.4. ASSESSMENT OF THE POTENTIAL RECEPTOR IMPACT

Based on the asbestos hazard present at the site and the migration pathways, the JIWG decision support tool has determined the following overall risk estimation of the probability of significant airborne asbestos fibre impacting the identified receptors:

Table 12 Receptor Assessment Summary

RECEPTOR TYPE	OVERALL RISK RANKING
Site construction worker	High
Nearby site user (residential)	Medium

Depending upon the overall risk ranking for receptor impact, the SoBRA *Conceptual Framework for Asbestos Risk Assessment and Control* recommend the following actions based on the predicted overall risk ranking:

Table 13 Risk Ranking

OVERALL RISK RANKING	REQUIRED PRIMARY ACTION	SECONDARY ACTION
Negligible Risk	N/A	-
Very Low	N/A	-
Low Risk	N/A	-
Medium Risk	Mitigation measures mandatory Q _L RA mandatory	Quantitative EMMP Advised
High Risk	Mitigation and receptor Q _N RA mandatory	Quantitative EMMP Mandatory
Very High Risk	Mitigation and receptor Q _N RA mandatory	Quantitative EMMP Mandatory

Notes:

Mitigation = site actions and personal protective equipment

Q_LRA = qualitative risk assessment

Q_NRA = quantitative risk assessment

EMMP = Environmental Monitoring Management Plan

The findings of the qualitative risk assessment predicted an overall low risk ranking for an off-site receptor indicating that no mitigation measures (site actions) are required.

For the on-site construction worker an overall **high risk** ranking has been predicted indicating that a Q_NRA and environmental monitoring management plan will be required. This is presented in Section 6.

It is considered that if appropriate mitigation measures are adopted to prevent unacceptable occupational exposure for the construction worker, these same actions will also be suitable to prevent unacceptable environmental exposure to off-site receptors.





6. ASBESTOS MANAGEMENT PLAN

6.1. SPECIFIC REQUIREMENTS FOR WORKING WITH ASBESTOS

6.1.1. APPLICABILITY

As the Made Ground materials at the site have been identified as being contaminated with asbestos fibres, and areas of abundant cement-bound ACM, any construction activities that will involve the handling or disturbance of the Made Ground (such as re-profiling earthworks) will be subject to the following specific requirements which must be adopted by all contractors and sub-contractors.

All the Made Ground materials on the main site should be considered to have the potential to contain asbestos.

6.1.2. CONTROL OF ASBESTOS REGULATIONS 2012

Working with asbestos is governed by the Control of Asbestos Regulations 2012 (CAR 2012). These regulations are primarily aimed at work with asbestos in buildings, however, CAR 2012 does refer to debris containing asbestos, so asbestos contaminated soil is also covered by the regulations.

CAR 2012 relates to protection of workers at premises and includes both buildings and their surrounding land. All construction activities that will involve the handling or disturbance of the Made Ground are to be undertaken in full accordance with these regulations.

6.1.3. DETERMINING IF THE WORK IS LICENSABLE

Certain types of work with asbestos containing materials (ACMs) can only be done by those who have been issued with a licence by the Health and Safety Executive (HSE). Licensable work (LW) is defined in regulation 2(1) of CAR 2012 and in summary involves work with higher risk friable ACMs such as asbestos coatings, asbestos insulation, and asbestos insulation board (AIB) materials. In most cases only those with a licence should work with these materials unless the work is of short duration and the exposure will not exceed the control limit.

If the work activity with asbestos does not require a licence, it is non-licensable work (NLW).

All LW and certain NLW activities require prior notification to the HSE prior to commencing the work. Small scale NLW work activities with non-friable ACMs in good condition are not normally notifiable, however, if the ACMs are of a longer duration and are in poor condition this work is typically notifiable and referred to as notifiable non-licensed work (NNLW).

The Contractor shall determine whether the works constitute licensable work (LW), notifiable non-licensed work (NNLW) or non-licensable work (NLW) under CAR 2012.

Given that the asbestos is present in the Made Ground as fragments of intact asbestos cement and as low concentrations of free fibres in the soil, **it is considered that the work shall comprise Non-Licensed Work.**

Although NLW and NNLW can be undertaken by those without a licence from the HSE, the work will still need to be carried out following the requirement of CAR 2012.





6.1.4. TRAINING FOR WORK WITH ASBESTOS

The workers engaged in earthwork activities, or handling asbestos-impacted soil should have undergone formal training for asbestos awareness plus task-specific NLW training. The staff shall be face fit tested for respiratory protective equipment (RPE) and shall be subject to a medical examination under CAR 2012.

6.1.5. PLAN OF WORK

In accordance with CAR 2012, the Contractor shall prepare a work plan before the commencement of the work. The plan of work should include:

- ✿ The nature and probable duration of the work;
- ✿ The number of people involved in the work;
- ✿ The address and location where the work is to be carried out;
- ✿ The methods to be used to prevent or reduce exposure to asbestos, e.g. prevention and control measures and arrangements for the handling and disposal of asbestos waste;
- ✿ The type of equipment, including PPE and RPE, used for:
 - Protecting and decontaminating those carrying out the work
 - Protecting other people present at or near the worksite
- ✿ It should also include the site layout with a description of the location and nature of the asbestos.

The plan of work should be submitted to E3P for approval prior to commencement of earthworks on the main site.

6.2. ASBESTOS RISK ASSESSMENT

In accordance with CAR 2012, the Contractor shall prepare a plan of work and a suitable and sufficient risk assessment prior to the commencement of the work. To be suitable and sufficient, the risk assessment should include:

- ✿ For non-licensable work, a statement of why the work meets the criteria for non-licensable rather than licensable work, and whether it is NNWL;
- ✿ A description of the work being carried out and the expected scale and duration;
- ✿ A description of the type, quantity, size and condition of asbestos;
- ✿ The predicted exposure concentration of asbestos fibres likely to be present, including the source for this information;
- ✿ Whether they are liable to exceed the control limit and the number of people likely to be affected;
- ✿ The level of expected exposure, so that suitable personal protective equipment (PPE) and respiratory protective equipment (RPE) can be selected;





- ✿ The measures taken to control exposure to the lowest level reasonably practicable e.g. controlled wetting.
- ✿ The risk assessment should be submitted to E3P for approval prior to commencement of earthworks on the main site

6.3. PRECAUTIONS FOR EARTHWORKS IN ASBESTOS IMPACTED MADE GROUND

6.3.1. RE-PROFILING EARTHWORKS

The construction of the development will involve re-profiling of soils containing ACM and fibres.

Following excavation and sorting, the processed Made Ground will be placed and compacted in accordance with an earthwork's specification.

6.3.2. EARTHWORKS METHODOLOGY

Prior to the commencement of earthworks in asbestos impacted Made Ground, the working area is to be securely fenced off to prevent unauthorised access and the appropriate warning notices displayed. Only authorised staff wearing appropriate RPE and PPE should enter the fenced working area. Excavator and dumper drivers (and other plant operators) in sealed cabs could potentially adopt a lower standard of RPE and PPE as determined by the plan of work and asbestos risk assessment, although this is not advised.

Where significant quantities of asbestos materials are encountered within the dig, the disturbance of which could present a risk to the health of construction workers, then hand removal of these materials into asbestos waste bags by appropriately trained operatives wearing full personal and respiratory protective equipment will be required. In this event, bagged asbestos waste is to be placed in a locked fully sealed skip within the fenced working area and disposed of off-site as hazardous waste.

6.3.3. PRECAUTIONS TO CONTROL DUST

The Contractor shall dampen down exposed soil using a water bowser and spray during the excavation works. Given that occasional amosite (in addition to chrysotile) has been encountered to date, the spray shall comprise water along with a surfactant to suppress amphibole fibres (including amosite) which are hydrophobic and are not suppressed by water alone. The impacted soil is to be excavated with care to minimise disturbance and release of asbestos fibres.

In the event of any temporary stockpiling of the contaminated soils near the site boundary, the Contractor shall take appropriate measures to prevent the generation of airborne asbestos fibres and the migration of asbestos-contaminated surface water run-off. Potential mitigation measures could include the provision of a suitably thick polythene membrane laid onto the ground surface and/or a sacrificial clean soil separating layer to protect the underlying uncontaminated clean soils from cross-contamination with the stockpiled soils. Other potential mitigation measures could include covering the stockpile with thick polythene sheeting to restrict infiltration of precipitation and subsequent run-off and the generation of airborne asbestos fibres from wind-blown dust.





6.3.4. AIR MONITORING

The Contractor is to provide air monitoring for asbestos fibres by a UKAS accredited analyst for the first two days of the earthworks, then once per week thereafter, assuming that the results are below 0.010 f/ml. The air monitoring shall comprise the personal air monitoring of workers within the restricted working area, plus background air monitoring at the downwind perimeter of the restricted working area.

Where earthworks are to be undertaken on the site with 50 m of any off-site receptor (e.g. residential property or commercial premises) then perimeter air monitoring is to be undertaken each day throughout the duration of the earthworks.

The results of the personal air monitoring shall be compared with the control limit for asbestos of 0.1f/ml. If airborne fibre concentrations greater than the control limit are recorded within the restricted working area, then the earthworks are to cease immediately, and the methods of working reviewed and revised accordingly with additional control measures adopted as necessary.

The background perimeter air monitoring is to be compared to the clearance indicator of 0.01f/ml. If airborne fibre concentrations greater than 0.01f/ml are recorded at the perimeter of the working area, then the earthworks are to cease immediately, and the methods of working reviewed and revised accordingly with additional control measures adopted as necessary.

Perimeter monitoring completed to date has confirmed airborne fibre concentrations to be <0.010 f/ml, indicating the implemented control measures to be effective. Full results are included in Appendix VII.

In the event that the control limit or clearance indicator is exceeded then the frequency and duration of the monitoring would be subject to amendment. Commencement of the excavation and/or removal of asbestos contaminated soil shall not be permitted unless air monitoring is taking place at locations directed by the Supervising Engineer given the nearby residential housing. The UKAS accredited analyst shall carry out the fibre counting on-site in a mobile laboratory.

6.3.5. DECONTAMINATION UNIT

The Contractor is to provide a decontamination unit suitable for work with asbestos and in accordance with HSE guidance, which must be present on-site and fully operational prior to the commencement of the works. The decontamination unit shall be positioned close to the entrance to the fenced-off working area.

Inside the working area all personnel shall wear suitable PPE and RPE. All disposable PPE and RPE is to be double bagged inside and placed into the lockable asbestos skip for off-site disposal or left inside the dirty end of the decontamination unit and not worn outside the working area. A boot wash is to be provided outside the dirty end of the decontamination unit and used before entering the decontamination unit.

6.3.6. UNEXPECTED DISCOVERY OF CONTAMINATION

During the redevelopment of the site, should ground conditions differ significantly from those encountered during the course of this investigation, including the discovery of any odorous or visible contaminants, works should be suspended in these areas until the suspect materials can be inspected and assessed by the Supervising Engineer. Under no circumstances should unexpected contaminants be mixed with uncontaminated material.

In the unlikely event that asbestos insulation, asbestos coating and/or asbestos insulation board is identified, this may be considered to be licensable work (LW) requiring a 14-day notification period to the HSE. In these circumstances, the Contractors is to liaise with the Supervising Engineer to establish whether the activity is LW or not.





6.4. GENERAL REQUIREMENTS DURING THE EARTHWORKS

6.4.1. UNFORESEEN GROUND CONDITIONS

During the redevelopment of the site, should ground conditions differ significantly from those encountered during the course of this investigation, then works should be suspended immediately and E3P notified. An assessment of the suspect materials shall then be made, and no further works carried out until a specification detailing a scheme for dealing with the suspected contamination has been submitted to and agreed with all parties.

6.4.2. SEGREGATION OF MATERIAL TYPES

During the redevelopment of the site, including the earthworks and placement of the capping layer, the Contractor will employ all reasonable measures to ensure segregation of the contaminated and 'clean' soils. Similarly, the Contractor shall employ all reasonable measures to prevent cross contamination during the handling of the 'clean' and contaminated soils particularly during the loading and movement of wagons.

6.4.3. DISPOSAL OF SOILS

Loading of vehicles shall be performed in an organised manner so as to prevent the spread of contaminants. All vehicles are to be sheeted and 'clean', prior to leaving site. The Contractor shall take all reasonable and applicable measures to prevent the escape of material during transportation.

All materials removed from the site should be disposed of at either an appropriately permitted landfill or exempt facility in line with relevant legislation and duty of care requirements. Where it is proposed to remove soils from the site, it is recommended that the classification of the waste as inert, non-hazardous or hazardous is confirmed and then discussed with the receiving waste management facility prior to disposal. In the case of inert and hazardous waste, this should identify whether further waste acceptance criteria (WAC) testing is required.

If the waste is classified as hazardous, then the site should be registered with the Environment Agency as a hazardous waste producer. All waste types should only be transported by Environment Agency registered waste carriers.

There is a legal requirement to treat all waste (including contaminated soil) prior to disposal to landfill. Originating from the Landfill Directive, this legislation seeks to reduce the amount of waste going to landfills and reduce the impact of the waste when landfilled. Treatment is defined as "physical, thermal, chemical or biological processes, including sorting, that change the characteristics of waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery".

Prior to removal of the contaminated materials, the Contractor shall supply E3P with details of the receiving waste disposal site. The Contractor shall ensure that sufficient information (including laboratory results of soil testing) is provided to the receiving waste disposal site prior to site works for waste classification purposes. On completion of disposal of the contaminated materials, the Contractor shall provide E3P with copies of the waste consignment notes.





Should any soils be disposed of at landfill, landfill tax will apply. Environment Agency Technical Guidance WM3 'Guidance on the classification and assessment of waste' (1st edition 2015) provides advice with respect to wastes containing asbestos. WM3 indicates that the assessment of asbestos containing waste considers both the presence of asbestos as:

-  Fibres that are free and dispersed; and
-  Identifiable pieces of asbestos containing material.

WM3 states that if the waste contains fibres that are free and dispersed, then the waste will be hazardous if the waste as a whole contains 0.1% or more asbestos.

Where the waste contains identifiable pieces of asbestos-containing material (i.e. any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye), then WM3 states that these pieces must be assessed separately. The waste is hazardous if the concentration of asbestos in the piece of asbestos containing material is 0.1% or more.

6.4.4. REUSE OF SITE-DERIVED MADE GROUND

Re-profiling earthworks will be undertaken under the Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Development Industry Code of Practice (version 2).

Under the Code of Practice, such soils should not be a waste if they are retained on the site provided the re-use is "**certain**", the soils "**are suitable for use without any treatment**" and "**only the quantity necessary for the specified works**" as noted at the planning stage of the project is re-used.

The Code of Practice requires the preparation of a Materials Management Plan (MMP), which needs to be signed off by a Qualified Person and the subsequent preparation of a Verification Plan and Verification Report.

The Code of Practice is supported by an Environment Agency Position Statement, which indicates: "If materials are dealt with in accordance with the Code of Practice, we consider that those materials are unlikely to be waste at the point when they are to be used for the purpose of land development."

The contractor will prepare and register an MMP for the site, which includes re-use of site won materials.

6.4.5. RETENTION OF ASBESTOS IMPACTED MADE GROUND AT THE SITE

It may be possible to retain the asbestos impacted Made Ground at the completed development if safely encapsulated beneath buildings and hard surfacing or in POS areas beneath a suitable clean capping layer.

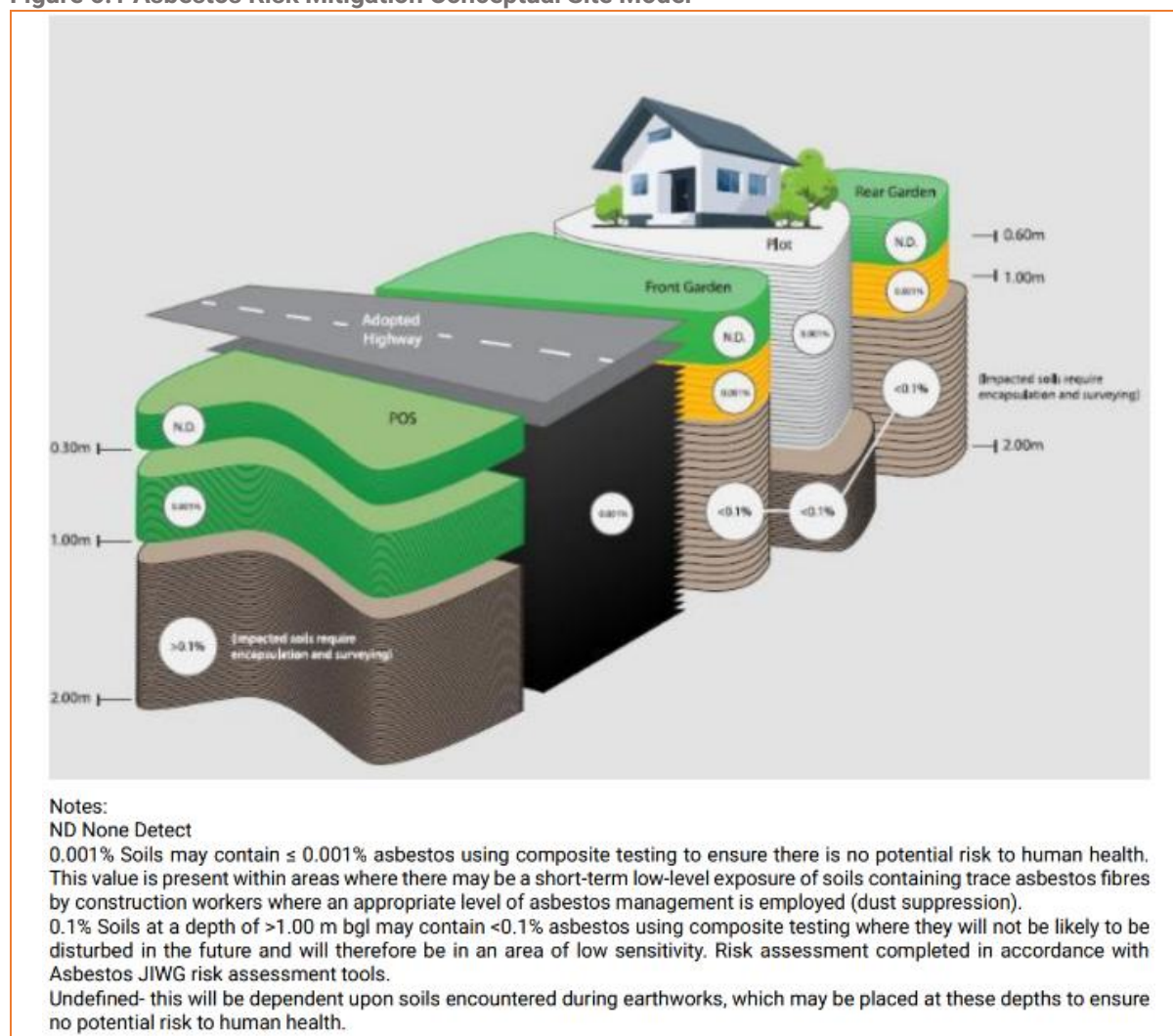
All ACM-impacted soils must be managed so as to ensure no airborne fibre release during construction or placement of impacted material in such a manner as to ensure no future exposure risk.

Impacted soils should be managed in accordance with the E3P Asbestos Risk Mitigation Conceptual Site Model, as shown in Figure 6.1, and placed in areas of no unacceptable future risk.





Figure 6.1 Asbestos Risk Mitigation Conceptual Site Model



If any visible pieces of asbestos-containing material are identified within the material, this material must be dealt with in strict accordance with the Control of Asbestos Regulations (CAR) 2012, UK Waste Management Legislation and the Environmental Protection Act 1994. Asbestos in air monitoring in accordance with HSG248 may be required to confirm that no asbestos fibres have been generated from the enabling works activities.

This will be undertaken intermittently throughout the duration of the works at a frequency to be determined by the contractor, entirely dependent on whether asbestos-impacted soils are being handled at any given time. In general terms, during anyone monitoring period, ten standard monitoring pumps will be run throughout the day, for the appropriate time period to achieve the required limit of detection. These slides will be analysed by a UKAS-accredited laboratory. Once any monitoring has been analysed by the UKAS-accredited laboratory, the results will be delivered to the resident engineer who will then follow the correct site procedure. The results will then be included within the verification report.

Should off-site disposal be required, then additional asbestos quantification and waste classification testing should be undertaken to ensure that it is classified correctly and disposed at a suitably licensed facility.





6.4.6. ASBESTOS REGISTER

The presence of encapsulated asbestos impacted Made Ground beneath non-domestic premises (such as public roads, footpaths and any other buildings) should be documented in an asbestos register/management plan and supplied to the appropriate parties (such as for future road and services maintenance) as required by CAR 2012.



APPENDIX I

LIMITATIONS



1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between E3P and the Client as indicated in Section 1.3.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover, reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover, no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials, this is for indicative purposes only and do not constitute or replace full and proper surveys.
8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
9. E3P cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by E3P is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by E3P in this connection without their explicit written agreement there to by E3P.
10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.



APPENDIX II

GLOSSARY



TERMS

ACM	Asbestos-containing material	MMP	Materials management plan
ADS	Acoustic design statement	ND	Not detected
AST	Above-ground storage tank	NDP	Nuclear density probe
BGS	British Geological Survey	NMP	Noise management plan
BSI	British Standards Institute	NPSE	Noise policy statement for England
BTEX	Benzene, toluene, ethylbenzene, xylenes	NR	Not recorded
CA	Coal Authority	PAH	Polycyclic aromatic hydrocarbon
CBR	California bearing ratio	PCB	Polychlorinated biphenyl
CIEH	Chartered Institute of Environmental Health	PI	Plasticity index
CIRIA	Construction Industry Research Association	PID	Photo ionisation detector
CLEA	Contaminated land exposure assessment	POS	Public open space
CML	Council of Mortgage Lenders	PPE	Personnel protective equipment
CoC	Contaminants of concern	ProPG	Professional practice guidance
CSM	Conceptual site model	QA	Quality assurance
DNAPL	Dense non-aqueous phase liquid (chlorinated solvents, PCB)	SGV	Soil guideline value
DWS	Drinking water standard	SPH	Separate-phase hydrocarbon
EA	Environment Agency	SPT	Standard penetration test
EQS	Environmental quality standard	SVOC	Semi-volatile organic compound
FFL	Finished floor level	TPH	Total and speciated petroleum hydrocarbon
GAC	General assessment criteria	TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group)
GL	Ground level	UKWIR	United Kingdom Water Infrastructure Risk
GSV	Gas screening value	UST	Underground storage tank
HCV	Health criteria value	VCC	Vibro-concrete column
ICSM	Initial conceptual site model	VOC	Volatile organic compound
LEL	Lower explosive limit	VRSC	Vibro-replacement stone columns
LMRL	Lower method reporting limit	VSC	Vibro-stone columns
LNAPL	Light non-aqueous phase liquid (petrol, diesel, kerosene)	WHO	World Health Organisation
MCV	Moisture condition value	WRAP	Waste and Resources Action Programme
MIBK	Methyl isobutyl ketone	WTE	Water table elevation



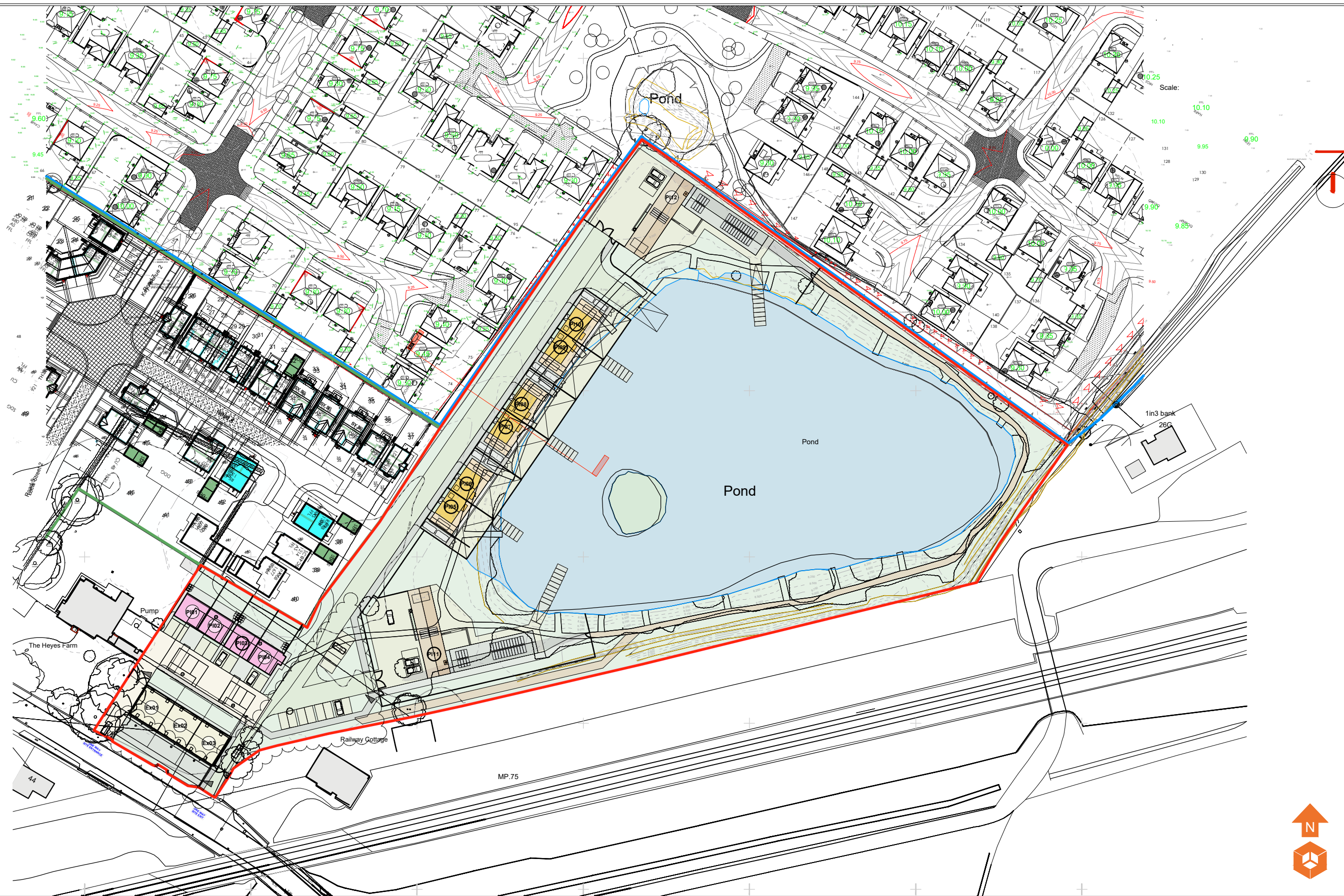


m	Metres	ppm	Parts per million
km	Kilometres	mg/m³	Milligram per metre cubed
% v/v	Percent volume in air	m bgl	Metres below ground level
mb	Millibars (atmospheric pressure)	m bcl	Metre below cover level
l/hr	Litres per hour	mAOD	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts per billion)	kN/m²	Kilonewtons per metre squared
ppb	Parts per billion	µm	Micrometre
mg/kg	Milligrams per kilogram (parts per million)		



APPENDIX III

DRAWINGS



Notes:

Client:
Mac Roofing

Job No:
18-365

Date:
06.02.2026



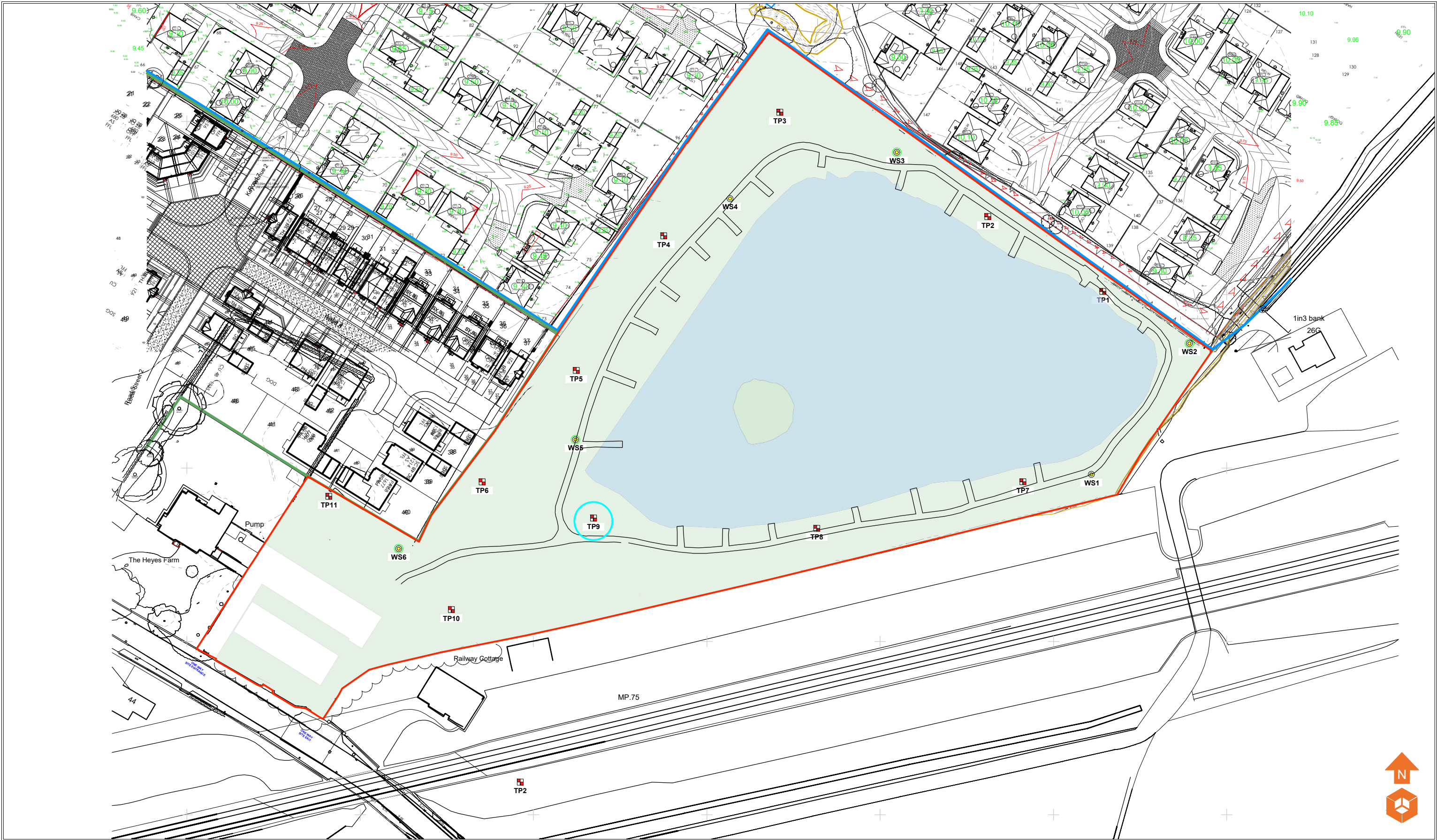
Environmental Engineering
Partnership Ltd
Taylor Road, Trafford Park
Urmston, Manchester, M41 7JQ
Tel: 0161 707 9612
E-mail: info@e3p.co.uk
Website: www.e3p.co.uk

P1	REVA	06.02.2026	TG	HM	HM
Phase	Issue	Date	Drawn	Checked	PM

Job Title:
**The Barns,
Halewood**

Drawing Title:
**Proposed Development
Plan**

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- Location Symbols
- Approximate Window Sample Probehole Location (BEK Location 2023)
 - Approximate Window Sample Probehole Location (Gas / Groundwater Probe) (BEK Location 2023)
 - Approximate Trial Pit Location (BEK Location 2023)

Contamination Exceedances - Asbestos

- Amosite + Chrysotile Fibres <0.001%, Board 0.079%

Notes:					
P1	REVA	06.02.2026	TG	HM	HM
Phase	Issue	Date	Drawn	Checked	PM

Client:	Mac Roofing
Job Title:	The Barns, Halewood

Job No:	18-365
Drawing No:	014
Date:	06.02.2026
Scale:	NTS

Environmental Engineering Partnership Ltd
Taylor Road, Trafford Park
Urmston, Manchester, M41 7JQ
Tel: 0161 707 9612
E-mail: info@e3p.co.uk
Website: www.e3p.co.uk

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APPENDIX IV

JIWG WORKING GROUP

ASSESSMENT

Decision Support Tool for Receptor Risk Ranking

Stage 1		Score
Hazard Identification		
Select ACM type (run model for each type to generate 'Worst Case' output)	Free dispersed fibres/fibre bundles	2
Extent of degradation of ACMs	Disaggregated (dominated by loose fibrous material; extreme degradation in ACM and/or free asbestos fibres/fibre bundles)	4
Friability and degree of bonding by matrix (ACM matrix, not ground materials)	Friable ACM or ACM with fibres not linked in any matrix (free dispersed fibres/fibre bundles)	4
Distribution of Visible Asbestos Across Affected Area	Occasional/random occurrences of visible contamination by ACMs	1
Asbestos fibre type	Mainly chrysotile and trace amphibole (no crocidolite)	1
Sub-total		12
Hazard ranking		Medium

No warranty, expressed or implied, or reliance, is provided in relation to the use of this tool.

It is contingent on users to satisfy themselves that the output from the tool is relevant and appropriate to the assessment being made.



Stage 2		Score	
Emission Factors			
Amount of asbestos fibre in selected ACM/fibre type as % of host material	Very Low quantities - 0.001 to 0.01 %wt/wt	1	
Respirable fibre index for ACM - RIVM report 711701034 (2003)	Very low	1	
Activity type and effect on deterioration of ACMs	High disturbance, significant deterioration expected	4	
Best description of primary host material matrix	Made Ground - Recycled Aggregate, Track Ballast	4	
Sub-total		10	
Exposure ranking			Medium

Stage 3		Score	
Pathway and Receptor Sensitivity			
Receptor category	Residential	No score required	
Age of Receptor	Infant (under 5)	4	
Duration of exposure/site occupancy	>> 10 hours per day (e.g. 24 hour residential exposure)	4	
Receptor ranking		8	High
Combined hazard, exposure and receptor ranking			Medium
Pathway: Distance of Receptor from Source	>10m of edge of area of disturbance	3	
Pathway: Depth to impacted material	surface	E	
Pathway ranking		3E	Medium
Overall ranking			Medium



Joint Industry **Working Group**

Asbestos in Soil and Construction & Demolition Materials

Project Reference	18-365
Site Name	The Barns, Halewood
Client	Mac Roofing & Contracting Ltd
Run by	E3P
Date	06.02.2026
Reviewed by	
Characterisation of scenario being evaluated	Fibres within Made Ground
Interpretation of scenario ranking by DST	

Decision Support Tool for Receptor Risk Ranking

Stage 1		Score
Hazard Identification		
Select ACM type (run model for each type to generate 'Worst Case' output)	Free dispersed fibres/fibre bundles	2
Extent of degradation of ACMs	Disaggregated (dominated by loose fibrous material; extreme degradation in ACM and/or free asbestos fibres/fibre bundles)	4
Friability and degree of bonding by matrix (ACM matrix, not ground materials)	Friable ACM or ACM with fibres not linked in any matrix (free dispersed fibres/fibre bundles)	4
Distribution of Visible Asbestos Across Affected Area	Occasional/random occurrences of visible contamination by ACMs	1
Asbestos fibre type	Mainly chrysotile and trace amphibole (no crocidolite)	1
Sub-total		12
Hazard ranking		Medium

No warranty, expressed or implied, or reliance, is provided in relation to the use of this tool.

It is contingent on users to satisfy themselves that the output from the tool is relevant and appropriate to the assessment being made.



Stage 2		Score
Emission Factors		
Amount of asbestos fibre in selected ACM/fibre type as % of host material	Very Low quantities - 0.001 to 0.01 %wt/wt	1
Respirable fibre index for ACM - RIVM report 711701034 (2003)	Very low	1
Activity type and effect on deterioration of ACMs	High disturbance, significant deterioration expected	4
Best description of primary host material matrix	Made Ground - Recycled Aggregate, Track Ballast	4
Sub-total		10
Exposure ranking		Medium

Stage 3		Score	
Pathway and Receptor Sensitivity			
Receptor category	Construction	No score required	
Age of Receptor	Adult (>24 and <60)	1	
Duration of exposure/site occupancy	> 1hr <10 hr daily exposure (e.g. part-time to full time occupational exposure or extended daily recreational exposure)	3	
Receptor ranking		4	Low
Combined hazard, exposure and receptor ranking			Medium
Pathway: Distance of Receptor from Source	In or within 10m of area of disturbance	4	
Pathway: Depth to impacted material	surface	E	
Pathway ranking		4E	High
Overall ranking			High



Joint Industry **Working Group**

Asbestos in Soil and Construction & Demolition Materials

Project Reference	18-365
Site Name	The Barns, Halewood
Client	Mac Roofing & Contracting Ltd
Run by	E3P
Date	06.02.2026
Reviewed by	
Characterisation of scenario being evaluated	Fibres within Made Ground
Interpretation of scenario ranking by DST	



Joint Industry Working Group

Asbestos in Soil and Construction & Demolition Materials

Project Reference	18-365
Site Name	The Barns, Halewood
Client	Mac Roofing & Contracting Ltd
Run by	E3P
Date	06.02.2026
Scenario details	ACM within Trial Pits

Decision Support Tool for CAR2012 Work Categories

Stage 1

Hazard Factors

Score

Select ACM type (run model for each type to generate 'Worst Case' output)
Extent of degradation of ACMs at outset of work
Friability and degree of bonding by matrix (ACM matrix, not ground materials)
Distribution of Visible Asbestos Across Affected Area
Amount of asbestos fibre in selected ACM/fibre type as % of host material

Free dispersed fibres/fibre bundles	2
Disaggregated (dominated by loose fibrous material; extreme degradation in ACM and/or free asbestos fibres/fibre bundles)	4
Friable ACM or ACM with fibres not linked in any matrix (free dispersed fibres/fibre bundles)	4
Occasional/random occurrences of visible contamination by ACMs	1
Moderate quantities - >0.05 to <0.1 %wt/wt	3

Sub-total

14

Note: the asbestos licensing regime is unaffected by the type of asbestos fibre present in ACMs

Hazard ranking

Medium

No warranty, expressed or implied, or reliance, is provided in relation to the use of this tool.

It is contingent on users to satisfy themselves that the output from the tool is relevant and appropriate to the assessment being made.

Stage 2

Exposure Factors

Score

Anticipated airborne fibre concentration - Control Limit or SALI?

<0.001 fibres/ml

0

Anticipated duration of exposure to asbestos

> 2 hours in a 7 day period and Up to 10 hours in a day (e.g. full time occupational exposure)

4

Activity type and effect on deterioration of ACMs during work

Not low intensity, significant deterioration expected

4

Best description of primary host material matrix (soil/made ground)

Made Ground - Recycled Aggregate, Track Ballast

4

Respirable fibre index for ACM - RIVM report 711701034 (2003)

Very low

1

Sub-total

13

Exposure ranking

Medium

Combined hazard and exposure ranking

27

Medium

Stage 3

Risk Assessment Outputs

Probable Licensing Status	Notifiable Non-Licensed Work
RPE*	EN140 with P3 filter half mask
Dust Suppression**	Localised mechanical dust suppression
Hygiene/Decontamination***	Localised and enhanced personal decontamination facilities

*Where RPE has to be worn continuously for long periods (e.g. more than 1-hour), then powered RPE may be necessary.

**Reduction in control measures possible if natural mitigation factors are present (e.g. raining, wet ground)

***Guide only; suitability of selected personal hygiene measures may be reviewed on a site/contamination-specific basis

Project Reference 18-365
 Site Name The Barns, Halewood
 Client Mac Roofing & Contracting
 Run by E3P
 Date 06.02.2026
 Scenario details Visible ACM in trial pits

Decision Support Tool for CAR2012 Work Categories

Stage 1

Hazard Factors

Select ACM type (run model for each type to generate 'Worst Case' output)
 Extent of degradation of ACMs at outset of work
 Friability and degree of bonding by matrix (ACM matrix, not ground materials)
 Distribution of Visible Asbestos Across Affected Area
 Amount of asbestos fibre in selected ACM/fibre type as % of host material

Unspecified fibrous board	2
Weathered (Slight degradation in ACM; material still retains its basic integrity)	2
Non-friable ACM or ACM with fibres firmly linked in a matrix	0
Occasional/random occurrences of visible contamination by ACMs	1
Moderate quantities - >0.05 to <0.1 %wt/wt	3

Sub-total

8

Note: the asbestos licensing regime is unaffected by the type of asbestos fibre present in ACMs

Hazard ranking

Low

No warranty, expressed or implied, or reliance, is provided in relation to the use of this tool.

It is contingent on users to satisfy themselves that the output from the tool is relevant and appropriate to the assessment being made.

Stage 2

Exposure Factors

Score

Anticipated airborne fibre concentration - Control Limit or SALI?

<0.001 fibres/ml

0

Anticipated duration of exposure to asbestos

> 2 hours in a 7 day period and Up to 10 hours in a day (e.g. full time occupational exposure)

4

Activity type and effect on deterioration of ACMs during work

Not low intensity, significant deterioration expected

4

Best description of primary host material matrix (soil/made ground)

Made Ground - Recycled Aggregate, Track Ballast

4

Respirable fibre index for ACM - RIVM report 711701034 (2003)

Very low

#N/A

Sub-total

#N/A

Exposure ranking

#N/A

Combined hazard and exposure ranking

#N/A

#N/A

Stage 3

Risk Assessment Outputs

Probable Licensing Status	#N/A
RPE*	#N/A
Dust Suppression**	#N/A
Hygiene/Decontamination***	#N/A

*Where RPE has to be worn continuously for long periods (e.g. more than 1-hour), then powered RPE may be necessary.

**Reduction in control measures possible if natural mitigation factors are present (e.g. raining, wet ground)

***Guide only; suitability of selected personal hygiene measures may be reviewed on a site/contamination-specific basis

