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REMEDIATION STRATEGY FOR PROPOSED RESIDENTIAL DEVELOPMENT MG GARAGE, WREXHAM ROAD, RHOSTYLLEN, WREXHAM

PREPARED FOR

SG ESTATES LTD

OCTOBER 2025

REMEDIATION STRATEGY 23156/REM/04

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SSIP SAFETY SCHEMES IN PROCUREMENT

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REMEDIATION STRATEGY

PROPOSED RESIDENTIAL DEVELOPMENT

MG GARAGE, WREXHAM ROAD, RHOSTYLLEN, WREXHAM

1.0 INTRODUCTION

1.1 R.E. Fry & Associates (REFA) have been commissioned by SG Estate Ltd, Unit 1, Rhosddu Industrial Estate, Old Rhosrobin, Rhosrobin, Wrexham LL11 4YL to prepare a remediation strategy scheme for the required site development works at the proposed residential development located at former MG Garage site, Wrexham Road, Wrexham.

1.2 The site has previously been the subject of a previous Phase II Site Investigation by Solmek Limited, report ref. S200831/SI. The report identified Made Ground to a depth of 1.10m below ground level with firm to stiff clay and loose to medium dense sand gravel deposits encountered underlying the Made Ground. The report and subsequent chemical analysis were initially assessed for commercial land use and initially did not identify any elevations of the contaminants tested. The analysis has subsequently been reassessed by REFA Consulting against residential with private plant uptake which identified elevated PAH factions within a number of positions.

1.3 Following the initial first investigation a Phase I and Phase II Geoenvironmental report was carried out by REFA Consulting Engineers (report reference: 23156/GEIR/02, dated May 2024).The REFA investigations identified the requirement for a full remediation strategy for the site and therefore, this remediation strategy has been developed in order to allow for the site's safe development. The previous investigation reports should be considered when reviewing this report.

1.4 Careful appraisal of the historical maps show that the site has remained a parcel of farmland until around 1958 with the construction of a garage towards the west of the site and remained in a similar configuration until the late 1970's with expansion of the garage and construction of several outbuildings. Aerial imagery from the early 2000's noted the presence of what appeared to be abundant disused cars or scrap pieces both centrally and to the south of the site.

1.5 At the time of both investigations, underlying fuel tanks associated with the petrol station/ garage were still in the ground. It is indicated that Tanks 1 and 2 were infilled using liquidised sand and Tank 3 was rendered free of petroleum products. The works on the tanks was undertaken in 1996. Additionally, an interceptor tank is also present within the site. The locations of these features is appended on 23156/05, Approximate Tank Location Plan. As part of the remediation of the site, these tanks along with associated infrastructure will need to be carefully removed as part of the remediation process of the site.

1.6 This remediation strategy is intended to detail the minimum works which should be carried out within the development process to ensure that the ground conditions within the site do not represent a hazard to site operatives, residential end users or members of the general public.

2.0 SITE CONDITIONS

2.1 The site has been subject to a programme of ground investigation works undertaken by Solmek and REFA which have identified Made Ground to a maximum depth of 1.60m bgl. within position WS09. Made Ground was typically granular in nature and comprised of a dark grey gravelly sand or sandy gravel. Localised hydrocarbon odours were identified within WS03 and WS05 within the REFA investigation and BH4 & TP1 within the Solmek Investigation. Following chemical analysis within these positions, however, WS05 (REFA) and TP1 (Solmek) did not identify any contamination within these positions.

2.2 The investigation works identified bands of firm to stiff or stiff cohesive deposits with varying gravel, sand and silt content. The deeper cohesive units were recorded within the north western portion of the site and proven to a maximum depth of 3.90m bgl. Granular medium dense silty fine to medium sand deposits have been recorded to a maximum depth of 5.45m and trended to increase in depth towards the south eastern boundary with very dense gravelly sand, sandy gravel deposits underlying the medium dense granular deposits.

3.0 CHEMICAL ANALYSIS

3.1 The Solmek and REFA investigations have identified elevated concentrations of various PAH and TPH compounds within the Made Ground material within WS03. WS10, BH1, BH2 and BH4. Table 1 details further the exceedances recorded during the programme of chemical testing and the locations of the exceedances are shown on.23156/03, Chemical Exceedances Location Plan, appended.

Table 1: Chemical Exceedances

	Assessment Criteria (mg/kg)	WS03 at 0.15m (REFA)	WS03 at 0.50m (REFA)	WS10 at 0.30m (REFA)	BH1 at 0.30m Solmek	BH2 at 0.50m Solmek	BH4 at 0.30m Solmek
Lead	200	56	-	28	110	210	45
Benzo(a)anthracene	7.2	28.49	-	4.66	10	<0.1	45
Benzo(a)pyrene	2.2	57.06	-	5.91	19	<0.1	42
Benzo(b)fluoranthene	2.6	5.81	-	6.5	27	<0.1	52
Dibenz(ah)anthracene	0.24	0.62	-	0.84	6.1	<0.1	7.5
Chrysene	3.3	6.72	-	4.9	10	<0.1	47
Indeno(123-cd)pyrene	27	41.53	-	4.29	18	<0.1	25
Napathalene	2.3	13.59	-	0.17	<0.1	<0.1	11
Benzene	0.087	-	0.139	-	-	-	0.0024
Aromatic EC>16-21	260	758	<7	-	-	-	34
Aromatic EC>21-35	1100	3346	26	-	-	-	780

[1] LQM & CIEH S4UL's for human health risk assessment (Registration No. S4UL 3265) – Residential with home grown produce (1% SOM) 2015
[2] DEFRA : SP1010 : Category 4 Screening Levels
Criteria values based upon LQM & CIEH S4UL's for human health risk assessment (Registration No. S4UL 3265) – Residential with home grown produce (1% SOM) 2015

3.2 The presence of elevated concentrations of various PAH and TPH compounds represent a long-term hazard to the residential end user of the site and a programme of remediation is required.

3.3 The desk study and ground investigation have not identified specific controlled waters receptors beyond the presence of a secondary A aquifer, and therefore the risk to controlled waters receptors is considered to low. A semi-quantitative controlled waters risk assessment will be conducted based on the verification results with consideration given to aqueous solubility and/or mobility of hydrocarbon compounds in groundwater to assess potential risks".

4.0 PROPOSED REMEDIATION MEASURES

4.1 As part of the remediation of the site, the three (3 No.) fuel tanks and associated fuel pipe lines and interceptor tanks will need to be removed by a specialist contractor. The contractor will maintain an accurate record of the locations of the removed services and tanks. Following the initial removal, the following steps will be required to address any residual contamination within the strata surrounding the tanks and pipelines;

- Photoionisation Device to be used on the side walls and base of excavation of the tanks and pipelines, should the device pick readings indicating Volatile Organic Compounds (VOC) are present, then the excavation may require widening to remove the impacted soil;
- Additional chemical sampling at the sides and base of the removed infrastructure will then be required in order to validate their removal and confirm no TPH compounds are present;
- Excavations can then be infilled using 'clean' site won/ imported fill material to the required level for construction.

4.2 During the development of the site the contractor will maintain an accurate record of the materials excavated and removed from the site as part of any site preparation works including details of where the materials are disposed of e.g. waste transfer notes. This information will be supplied to the engineer and will form part of the validation report.

4.3 The previous ground investigation has identified exceedances of the assessment criteria in relation to Lead, Naphthalene, benzo(a)anthracene, chrysene, benzo(a)pyrene, dibenz(ah)anthracene, benzo(b)fluoranthene, Indeno(123-cd)pyrene, Aromatic EC>16-21,Aromatic EC>21-35 and Benzene. These exceedances are attributed to the Made Ground material within the site and potential tank 2/ 3 with regards to the TPH exceedances recorded within WS03. Therefore, where garden levels are to be reduced, Made Ground material should be removed to allow for the provision of either 600mm clean or within areas of shallower Made Ground deposits, removed entirely to expose the natural brown silty sand deposits assuming the natural soils show no evidence of impact from the above Made Ground. It is recommended that sampling of the underlying natural strata should be carried out as part of the validation of the soft landscaping areas where less than 600mm Made Ground was removed. A clean inert capping should then be installed in all front and rear garden areas.

4.4 From a review of the proposed planning layout, a chemical assessment of the site won Made Ground which is to be retained beneath the structures and areas of hardstanding should be made prior to its placement. This is to ensure there is no vapour risk associated with the site won Made Ground Material. With regards to other contaminants within the fill, it is considered that the Made Ground material will be sufficiently capped, thus breaking the pathway for human consumption. It is acknowledged that the Made Ground may vary in thickness, depth and extent which is subject to on-site assessment during the remediation process.

4.5 Along the north western boundary, an area proposed public space is present, again within this area, a clean capping system should be adopted comprising of a minimum clean, 'inert' 150mm topsoil material and 300mm subsoil material.

4.6 The works are to be monitored by an independent engineer who will ensure that the following verification procedures are adopted:-

- Liaison with the appointed groundwork contractor, inspection and general monitoring of the works;

- The investigations have identified elevated concentrations of numerous lead, PAH and TPH compounds within the Made Ground material inside the site and therefore, it is considered unsuitable for retention within the sensitive garden and landscaped areas. Notwithstanding the presence of contaminative materials, the presence of physical hazards such as glass and metal etc will also need to be removed.

- The ground investigation works has not identified topsoil deposits within this investigation. As such, there will be a requirement for the importation of further topsoil, and consequently a programme of chemical testing is required to determine the suitability of this material for use within a residential development with plant uptake. Should material be used from SG Estates wider site, this material should be transferred using an appropriate waste transfer permit, such as a Materials Management Plan or U1 Exemption.

- Excavation of the Made Ground material should be undertaken to allow a minimum capping layer at a depth of at least 600mm or removed entirely to expose the natural brown silty sand deposits assuming the natural soils show no evidence of impact from the above Made Ground on the ground investigation data, Made Ground was recorded at 0.30m to 0.45m bgl within the centre of the site. The capping system should then be installed within both the rear and front garden areas as per REFA's Remediation Plan, drawing number 23156/04B.

- Any imported topsoil or subsoil, or material brought on under an appropriate permit, to the site will require a programme of chemical testing to determine the suitability of this material for use within a residential environment to ensure that it satisfies the requirements of this land use as described in tables 2 and 3 below;

- It is the contractor's responsibility to assess any materials proposed for importation to the site and ensure that they meet the criteria set out later in this document. This may include laboratory testing, or the review of investigation data and laboratory testing carried out by others. Any laboratory testing shall clearly demonstrate that the soils tested are uncontaminated and suitable for use in residential garden areas as prescribed in tables 2 and 3 below;

- This data will be supplemented by field and laboratory testing undertaken by the engineer during the remediation works. All test data obtained will be collated by the engineer for inclusion in the validation report;

- Where the site works identify any suspicious or unusual ground conditions these must be reported to the engineer for further inspection, sampling and assessment to determine their suitability for retention within the site area. Where unusual or suspicious ground conditions are encountered these will be referenced within the final validation report.

4.7 Where garden levels are to be raised, clean inert material may be imported to the site from a certified source. Where any materials are imported, it will be necessary for these materials to be sampled and tested in accordance with the procedures detailed below to confirm their suitability for use within a residential environment.

4.8 A watching brief should be maintained throughout all groundworks and should be conducted by the client and groundworker on site. If any unsuspected ground or contamination is identified, then the consulting engineer and the appropriate regulatory authorities should be notified so appropriate remediation measures can be in place if required. Written confirmation will be required from the client and groundworker that no unforeseen contaminations has been identified during the groundworks.

4.9 Details of the remediation measures are shown upon appended Drawing number 23156/04C for reference.

5.0 VERIFICATION

5.1 The engineer will liaise with the appointed ground works contractor and inspect the site during the works and upon completion.

5.2 Topsoil, where required, will be placed at a minimum thickness of 150mm and subsoil will be placed at a minimum thickness of 450mm. Please note, within the stripped areas of Made Ground, that the existing silty sand material, will form part of the capping thickness. Validation of the surface capping will be undertaken by trial hole excavation. Trial holes will be required to ensure that suitable thickness of a clean capping layer has been provided to a depth of at least 600mm for the front and rear gardens.

5.3 Representative samples of the materials generated or imported to the site will be subject to sampling frequencies and chemical analyses summarised within tables 2 – 3. Sampling frequencies for imported material have been made in accordance with WGLA CLILC guidance 'requirements for the Chemical Testing of Imported Materials for Various End Uses and Validation of Cover Systems'.

5.4 Recycled aggregate (6F2) refers to the demolition of the existing buildings on site. Prior to demolition an asbestos survey should be carried out and an asbestos containing materials identified removed by an appropriate licensed asbestos removal company. Once demolished the material should be tested in accordance with the sampling strategy outlined within Table 2 below. It is intended that the crushed material is to be reused to infill the removed tank areas.

Table 2: Site Generated Material Sampling Frequency and Analysis

Material	Sampling Frequency	Analysis Suite
Recycled Aggregate (6F2)	1 sample per 1000m^3	*A – B – C - D*
Sub-soil (capping material- site won superficial sand or clay deposits)	1 sample per 250m^3	*A – B – C- D*

A – Heavy Metals and inorganics Suite
B – Speciated PAH
C – Asbestos Screen (quantification required if fibres are present)
D – TPH (CWG) C5 – C44 bandings inc BTEX MTBE

Table 3: Imported Material Sampling Frequency and Analysis		
Material	**Sampling Frequency**	**Analysis Suite**
Recycled Aggregate General Fill (6F2)	1 sample per 1000m^3	*A – B – C - D*
Brownfield General Fill Material	1 sample per 500m^3	*A – B – C - D*
Greenfield General Fill Material	1 sample per 1000m^3	*A – B – C*
Topsoil (Garden Soils)- Between 20m^3 and 250m^3	4 samples required	*A – B – C - D*
Sub-soil (Garden Soils) Between 20m^3 and 250m^3	4 samples required	*A – B – C - D*
Topsoil (Garden Soils)- More than 250m^3 but less than 1000m^3	4 sample per 250m^3 (minimum of 4)	*A – B – C - D*
Sub-soil (Garden Soils) More than 250m^3 but less than 1000m^3	4 sample per 250m^3 (minimum of 4)	*A – B – C - D*
Virgin Quarried Material (Stone Only)	1 sample per 2000m^3	*A*
A – Heavy Metals and inorganics Suite *B – Speciated PAH* *C – Asbestos Screen (quantification required if fibres are present)* *D – TPH (CWG) C5 – C44 bandings inc BTEX MTBE*		

5.4 Samples recovered from the remediation works will be analysed by an appropriately certified laboratory using UKAS and MCERTS accredited testing procedures for selected chemical determinands based upon public guidance and the results of the ground investigation works. The range of determinands to be assessed and their assessment criteria are shown in table 4 overleaf.

Table 4: Assessment Criteria Screening Values site generated and imported soils			
Determinand	**Assessment Criteria for capping soils in gardens (mg/kg)**	**Assessment Criteria for capping soils utilised in landscaped areas (mg/kg)**	**Assessment Criteria for capping soils utilised in POS (mg/kg)**
Suite A			
Arsenic	37[3]	40[3]	79[3]
Cadmium	11.0[3]	85.0[3]	120[3]
Chromium (total)	910[3]	910[3]	1500[3]
Copper	2400[3]	7100[3]	12000[3]
Lead	200[1]	310[1]	630[1]
Mercury	40[3]	56[3]	120[3]
Nickel	130[3]	180[3]	230[3]
Selenium	250[3]	430[3]	1100[4]
Zinc	3700[3]	40000[3]	81,000[3]
Total Cyanide	34.2	34.2	34.2
Phenol	280[3]	440[3]	440[3]
Suite B			
Acenaphthene	210[3]	3000[3]	15000[3]
Acenaphthylene	170[3]	2900[3]	15000[3]
Anthracene	2400[3]	31000[3]	74000[3]
Benzo{a}anthracene	7.2	11.0[3]	29.0[3]
Benzo{a}pyrene	2.2[2]	3.2[1]	5.7[2]
Benzo{b}fluoranthene	2.6	4.0[3]	7.2[3]
Benzo{ghi}perylene	320[3]	360[3]	640[3]
Benzo{k}fluoranthene	77.0	110[3]	190[3]
Chrysene	15.0	30.0[3]	57.0[3]
Dibenz{ah}anthracene	0.24	0.31	0.57
Fluoranthene	280	1500[3]	3100
Fluorene	170	2800[3]	9900[3]
Indeno{123-cd} pyrene	27.0	45.0[3]	82.0[3]
Naphthalene	2.3	2.3[3]	4900[3]
Phenanthrene	95.0	1300[3]	1300[3]
Pyrene	620	3700[3]	7400[3]
Suite C			
Asbestos Screen	ND	ND	ND
Suite D			
Aliphatic EC 5-6	42.0	42.0	57000[3]
Aliphatic EC >6-8	100	100	60000[3]
Aliphatic EC >8-10	27.0[3]	27.0	13000[3]
Aliphatic EC >10-12	130[3]	130	13000[3]
Aliphatic EC >12-16	1100[3]	1100	13000[3]
Aliphatic EC >16-35	65000[3]	65000	250000[3]
Aliphatic EC >35-44	65000[3]	65000	250000[3]
Aromatic EC 5-7	70.0[3]	370	56000[3]
Aliphatic EC >7-8	130[3]	860	56000[3]
Aromatic EC >8-10	34[3]	47	5000[3]
Aromatic EC >10-12	74[3]	250	5000[3]
Aromatic EC >12-16	140	1800	5000[3]
Aromatic EC >16-21	260[3]	1900	3800[3]
Aromatic EC >21-35	1100[3]	1900	3800[3]
Aromatic EC >35-44	1100[3]	1900	3800[3]
Benzene	0.087[3]	0.38	72.0
Toluene	130[3]	880	56000
EthylBenzene	47.0[3]	83.0	24000
M/P Xylenes	59.0[3]	82.0	41000[3]
O Xylene	60.0[3]	88.0	41000[3]
Methyl tert-Butyl Ether	20[2]	20.0	85500[1]

[1] DEFRA : SP1010 : Category 4 Screening Levels
[2] Atkins Atrisk SSV values
[3] LQM and CIEH S4UL's for Human Health Risk Assessment (Registration No. S4UL 3265)
ND – None Detected

6.0 TIMESCALE

6.1 The implementation of the Remediation Strategy is subject to approval of the Local Authority and the implementation will be undertaken in accordance with the contractor's progress and for the development as soon as feasibly possible.

7.0 REPORTING

7.1 Upon completion of the works a full and final validation report will be prepared and submitted to the local authority and other regulatory authorities in order to satisfy them that the works have been completed successfully and to allow for any appropriate planning conditions to be discharged.

7.2 The validation report will also be submitted to the NHBC for approval in accordance with NHBC Handbook Chapter 4.1

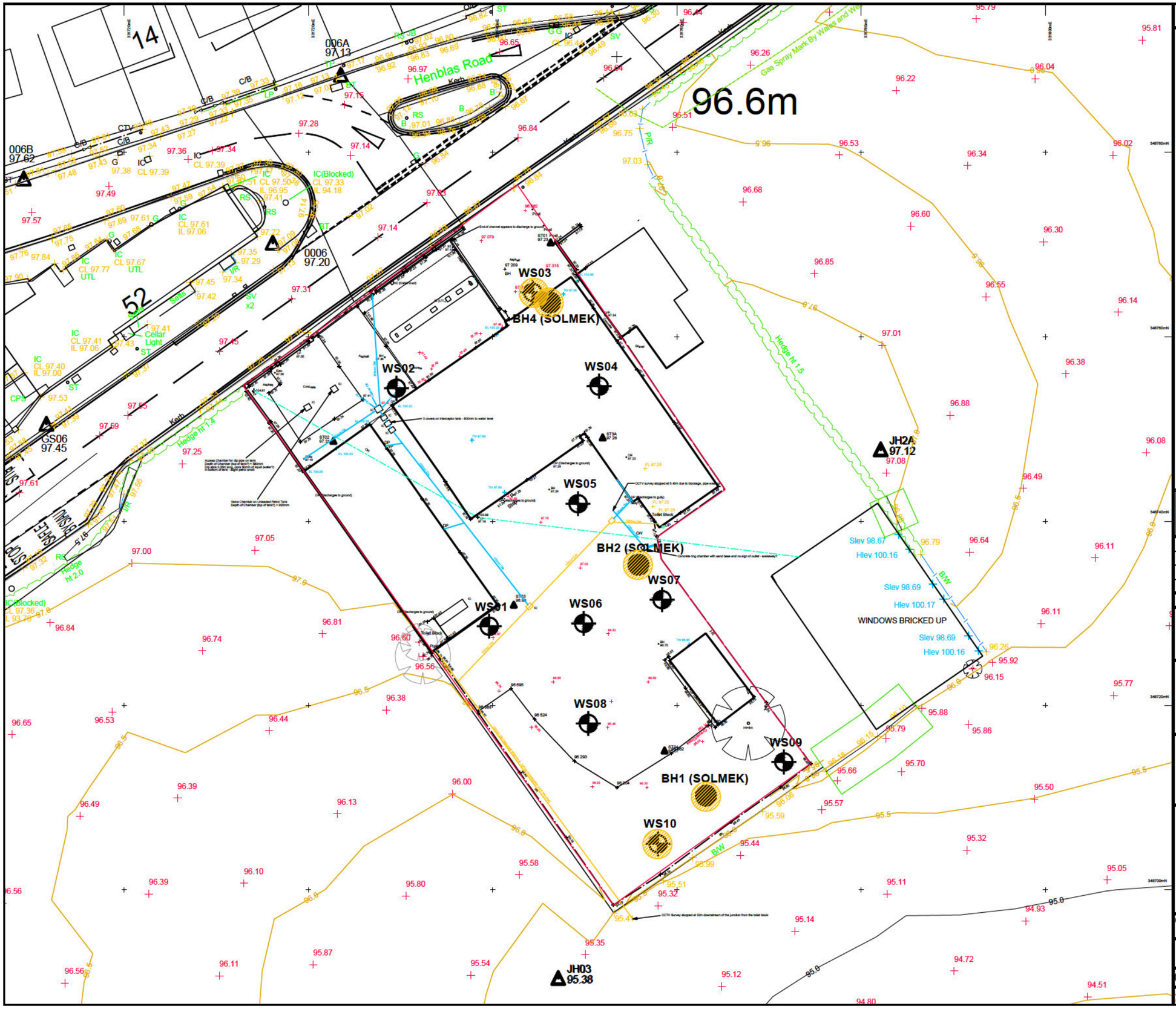
7.3 This report will include the following:-

- A description of all works undertaken;
- An accurate record of excavations and ground movements, including a record of the area removed following the tanks and infrastructure removal. Records including but not limited to, certificates, photographs, test results and disposal records should be maintained,
- Details of the disposal of any arisings from the site;
- The results of all chemical testing and contamination assessments;
- A photographic recorded of the removal of the tanks, interceptor tanks and associated infrastructure should be provided as part of the validation process
- A photographic record confirming the removal of unsuitable Made Ground material and the introduction of a minimum 150mm topsoil layer and minimum 450mm subsoil layer to gardens or 150mm topsoil layer and 300mm subsoil layer within the public open space area subject to depth of the natural ground, as indicated upon the appended remediation plan;
- Confirmation that the works have been completed in accordance with this remediation strategy.

Signed for and on behalf of
R E FRY & ASSOCIATES LIMITED

[redacted]

Stephen Boot BSc (Hons), FGS
Senior Geo-Environmental Engineer



NOTES

WS10 Approximate Window Sampler Locations

Approximate SOLMEK Borehole Locations

Chemical Exceedence Locations

Site Boundary

smas worksafe designer www.smasltd.com as recognised by SSIP SAFETY SCHEMES IN PROCUREMENT

Drawing Stage		Drawing Status			
●	Draft	●	Comments		Tender
	Issued		Information		Construction
	Preliminary		Approval		As Built

This drawing is not authorised unless signed as checked & approved

Client
SG Estates Ltd

Job title
MG Grages, Wrexham Road, Wrexham

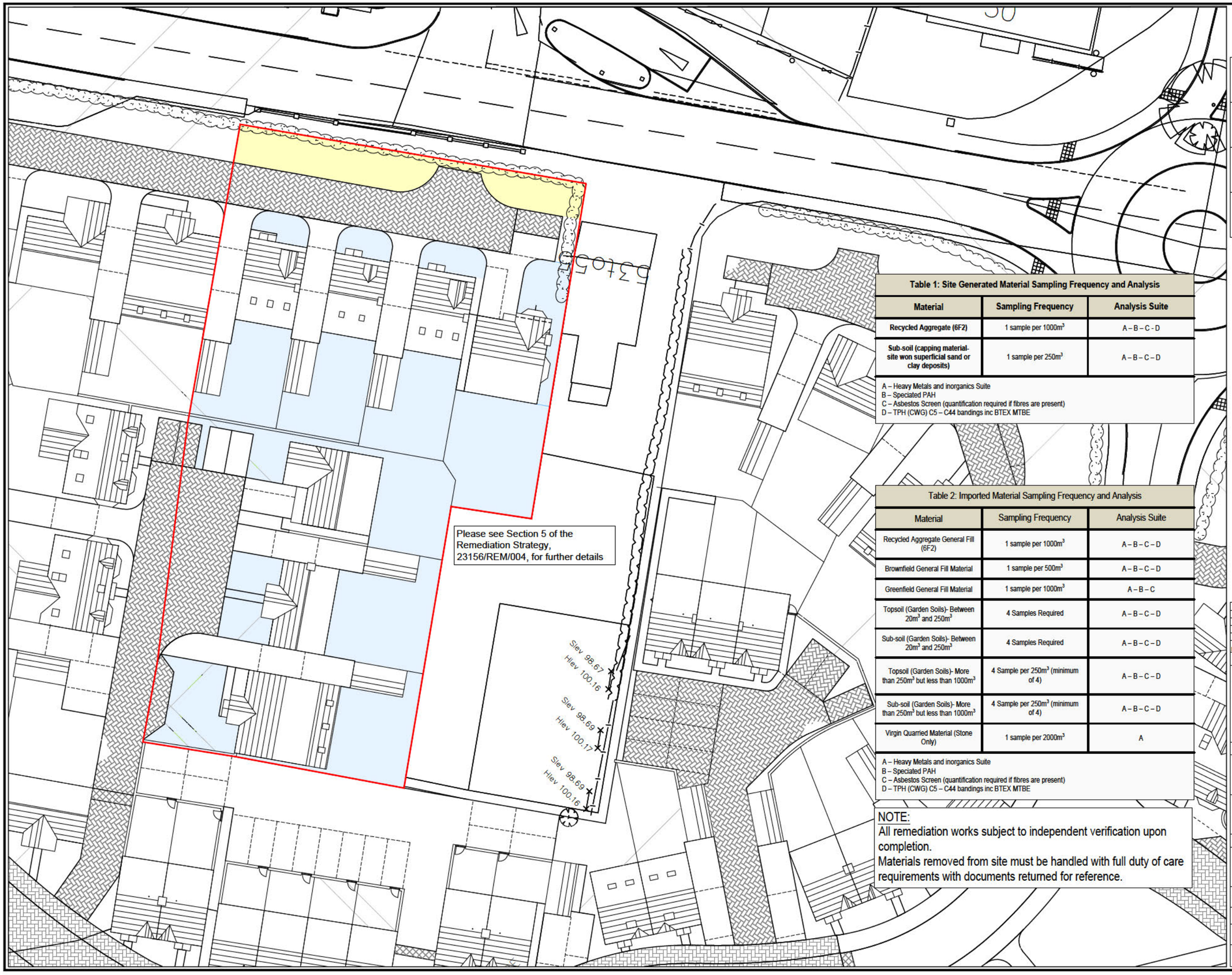
Drawing title
Chemical Exceedances Location Plan

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Chkd	Appvd	date	scale	drawn
SB	HM	04.03.24	1:500	EB

DRAWING No **23156/03** rev

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KEY

	Site Boundary
	Areas Requiring a 600mm layer of clean capping material, comprising of minimum 150mm of topsoil and 450mm of subsoil
	Public Open Space - 450mm clean capping system comprising of minimum 150mm topsoil and 300mm subsoil

Please see Section 5 of the Remediation Strategy, 23156/REM/004, for further details

Table 1: Site Generated Material Sampling Frequency and Analysis

Material	Sampling Frequency	Analysis Suite
Recycled Aggregate (6F2)	1 sample per 1000m^3	A – B – C - D
Sub-soil (capping material- site won superficial sand or clay deposits)	1 sample per 250m^3	A – B – C – D

A – Heavy Metals and inorganics Suite
B – Speciated PAH
C – Asbestos Screen (quantification required if fibres are present)
D – TPH (CWG) C5 – C44 bandings inc BTEX MTBE

Table 2: Imported Material Sampling Frequency and Analysis

Material	Sampling Frequency	Analysis Suite
Recycled Aggregate General Fill (6F2)	1 sample per 1000m^3	A – B – C – D
Brownfield General Fill Material	1 sample per 500m^3	A – B – C – D
Greenfield General Fill Material	1 sample per 1000m^3	A – B – C
Topsoil (Garden Soils)- Between 20m^3 and 250m^3	4 Samples Required	A – B – C – D
Sub-soil (Garden Soils)- Between 20m^3 and 250m^3	4 Samples Required	A – B – C – D
Topsoil (Garden Soils)- More than 250m^3 but less than 1000m^3	4 Sample per 250m^3 (minimum of 4)	A – B – C – D
Sub-soil (Garden Soils)- More than 250m^3 but less than 1000m^3	4 Sample per 250m^3 (minimum of 4)	A – B – C – D
Virgin Quarried Material (Stone Only)	1 sample per 2000m^3	A

A – Heavy Metals and inorganics Suite
B – Speciated PAH
C – Asbestos Screen (quantification required if fibres are present)
D – TPH (CWG) C5 – C44 bandings inc BTEX MTBE

NOTE:
All remediation works subject to independent verification upon completion.
Materials removed from site must be handled with full duty of care requirements with documents returned for reference.

INFO

Rev.	Description	By	Date
C	Updated as per CLO comments.	AB	24.10.25
B	Added note	AW	07.08.25
A	Added public open space spec. to key	AW	20.06.25

Revision History

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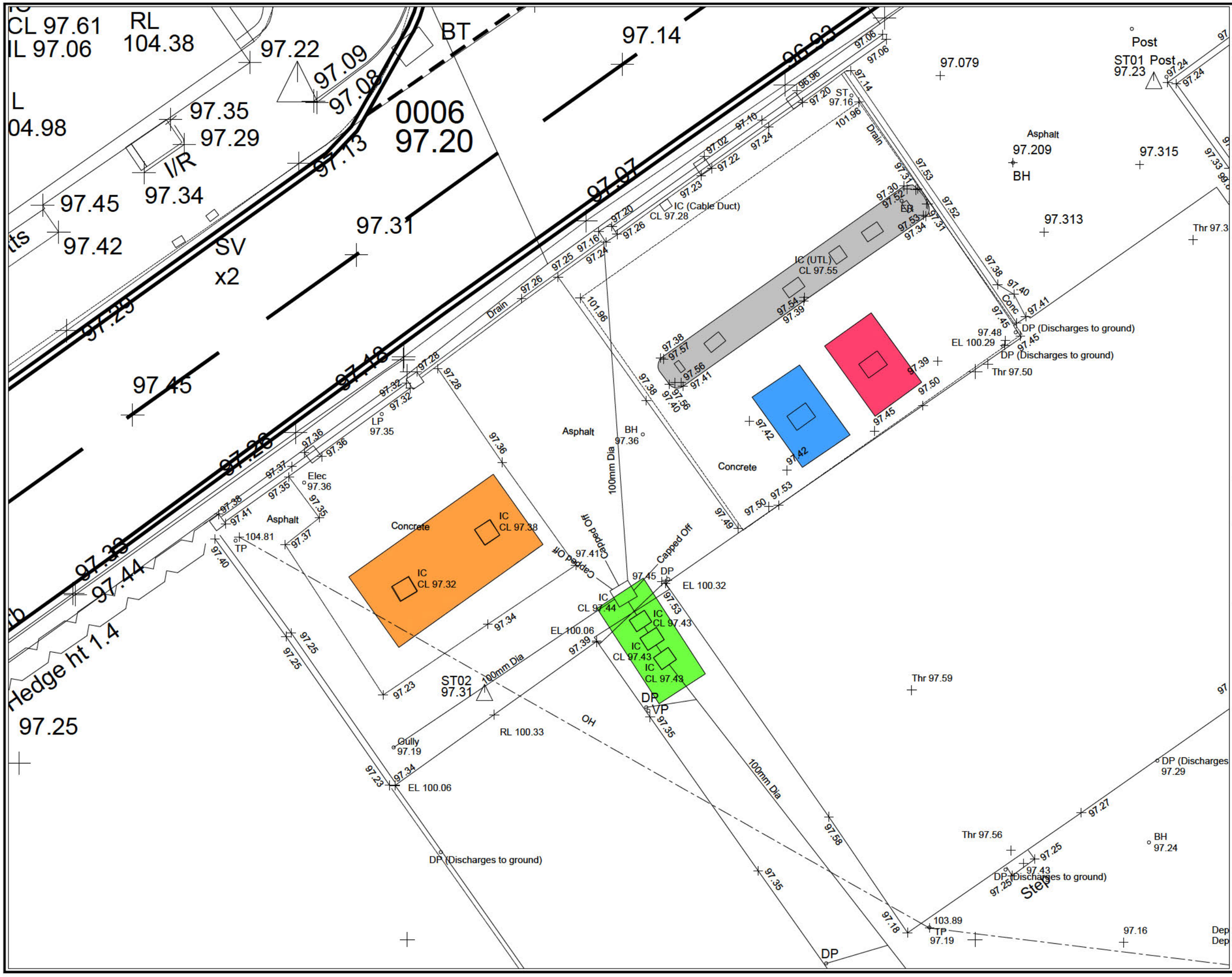
SG Estates Ltd

MG Garages, Wrexham Road, Wrexham

Drawing

Remediation Strategy Plan

Sheet Size	Scale at Sheet Size	Date	Drawn By	Checked By
A3	nts	31.03.2025	AB	
Project Number		Drawing Number		Current Revision
23156		23156/04		C



KEY

	Tank 1 3000 Gallon - Made safe 20/02/96
	Tank 2 3000 Gallon - Made safe 20/02/96
	Tank 3 Rendered free from petroleum products 26/02/96
	Interceptor Tank 800mm to water level

NOTES

Drawing used -

63045MCLS-01 - with drainage investigation AD 19.12.23

INFO

Rev.	Description	By	Date

Revision History

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Client

SG Estates Ltd

MG Garages, Wrexham Road, Wrexham

Drawing

Approximate Tank Location Plan

Sheet Size	Scale at Sheet Size	Date	Drawn By	Checked By
A3	125:1	16.05.25	AW	
Project Number		Drawing Number		Current Revision
23156		23156/05		*

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wrexham
COUNTY BOROUGH COUNCIL
CYNGOR BWRDEISTREF SIROL
wrecsam

Andy Davies
SG Estates

BY EMAIL ONLY

Eich Cyf/Your Ref	
Ein Cyf/Our ref	MG Garage
Dyddiad/Date	20 October 2025
Gofynner am/Ask for	Angela Roberts
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E-bost/E-mail	contaminatedland@wrexham.gov.uk

Dear Andy

PROPOSED RE-DEVELOPMENT OF THE MG GARAGE, WREXHAM ROAD, RHOSTYLLEN - REMEDIATION STRATEGY

Thank you for sending the following reports for me to review.

i. Solmek, Phase 1: Desk Study, Rhostyllen, Wrexham, Thistlewood Properties, S200831, September 2020
ii. Solmek, Phase 2: Site Investigation, Rhostyllen, Wrexham, Thistlewood Properties, S200831/SI, September 2020
iii. REFA, Proposed Residential Development, MG Garage, Wrexham Road, Rhostyllen, Wrexham for SG Estates Ltd, May 2024, Final Report, Geo-Environmental Investigation Report, 23156/GEIR/02
iv. REFA, Remediation Strategy for Proposed Residential Development, MG Garage, Wrexham Road, Rhostyllen, Wrexham for SG Estates Ltd, August 2025, Remediation Strategy, 23156/REM/03

I have reviewed all the reports but note that both of the Solmek reports were prepared based on a commercial development proposal for the site. Therefore I have taken account of the factual information contained within those reports, but not the interpretation and findings of the investigation as that is no longer applicable and has been superseded by the REFA investigation and remediation strategy.

I can provide the following comments, some of which will require further work and/or a response on.

1. I agree in principle with the Remediation Strategy and note that it is intended to detail the minimum amount of work which will be required for the proposed development (paragraph 1.6).

Rydym yn croesawu gohebiaeth yn Gymraeg. Byddwn yn ymateb i unrhyw ohebiaeth yn Gymraeg ac ni fydd hyn yn arwain at unrhyw oedi.
We welcome correspondence in Welsh. We will respond to any correspondence in Welsh and this will not lead to any delay.

2. I agree that the three (3 No.) fuel tanks and associated fuel pipelines and interceptor tanks will need to be removed by a specialist contractor (paragraph 4.1 of the Remediation Strategy). Elsewhere it has also been stated that there are 2 underground fuel tanks, not 3. Noting these discrepancies, all remediation works will need to allow for unforeseen infrastructure and contamination being uncovered. It is also stated that they have been infilled with liquidised sand, but that only one of the tanks was reportedly drained, consequently it appears possible the other two may still contain fuel. With these works reportedly taking place in 1996 records may be limited, therefore the methodology for removal needs to account for fuel still being present and mitigation measures put in place to remove/reduce any risk of leaks or spills taking place during their removal. The same care would also apply to the removal of the interceptor tank and any associated infrastructure such as pipework. An appropriately qualified, specialist contractor would be experienced in tackling this type of situation. Relevant guidance should be considered, such as the:
   - Welsh Government '*Groundwater protection codes for Wales – Underground storage tanks*', February 2017; and
   - EPIC '*Before you dig: What's beneath your feet? Garages and Filling Stations – A guide for developers*' Version 2.0, October 2023.

3. In addition to the comments in 2. above regarding the tank decommissioning works, all works should be documented and include an accurate record of the locations of the removed services and tanks. This, along with other information (including certificates, photographs, test results and disposal records), should be compiled into a Validation Report.

4. Following the tank removal it is detailed in paragraph 4.1 of the Remediation Strategy that further assessment of the side walls and base of the excavation of the tanks and pipeline areas will be tested for VOCs using a PID, in addition further chemical sampling will also take place to confirm whether any residual contamination is present. I can confirm I agree with this, although the amount of testing hasn't been specified, you should ensure it is sufficient to demonstrate there is no residual contamination. You may wish to provide details on this work to the Contaminated Land Team prior to backfilling the excavations to ensure we are satisfied, informal correspondence via email to include photographs for instance would suffice and if an Officer is available we can visit the site too. Please note that if areas of suspected leaks are identified then further, more detailed investigation, will be required.

5. The Geo-Environmental Investigation Report identifies several elevated contaminants which are noted as being in various localities across the site and that due to the quantity and widespread contamination across the whole site area remediation is required. I agree with this, but it should be recognised that there is a risk that more significant, as yet unidentified, contamination could be present at the site, specifically the petrol filling station forecourt where no investigation has taken place (the closest investigation position is WS03 and significant contamination was identified there). Paragraph 9.2.2 states "… *WS03 in close proximity to the historical fuel tanks 1 and 2. These elevated hydrocarbon levels could potentially show a historical underground leak has occurred. It would be prudent to undertake further investigation and sampling*

in this area to positively confirm if a leak has occurred and if so, to what extent". The contamination may also be as a result of incidents on the forecourt too. It is accepted that access was limited at the time of the investigation (paragraph 4.2.2). The proposed site layout (as detailed on Drawing No: WR2-SAL-A1-ZZ-DR-A-0607 Revision P10, Proposed Site Layout Phases 2B-4) indicates that area will comprise a shared private drive to some of the new houses, even though the development of this area may comprise hardstanding it still requires thorough assessment. Underground storage tanks 1 and 2 are in that area and will be removed as part of the remediation works, but it is possible contamination from fuel line leaks, forecourt spillages, or tanker filling point spillages may be present in and around the area of the pumps. Furthermore, a channel is stated as appearing to discharge to ground on the REFA Drawing No: 23156/03 dated 04.03.24 'Chemical Exceedances Location Plan' in the Geo-Environmental Investigation Report. The site drainage is not discussed in detail, although reference to the interceptor tank is made and it is shown on the plan too. Further assessment of the potential for ground contamination because of any contaminants in the channel should also be undertaken.

6. In addition to 5. above, there is the possibility of other areas of contamination at the site which have not been covered in much detail e.g. the general maintenance and repair of cars will mean the garage workshop and yard area will have had numerous other bulk fluids such as oils, antifreeze, brake fluids, solvents and degreasers, paints, thinners, lead acid batteries. Also the garage specialised in classic cars so asbestos lined brake pads may have been handled and stored there. In addition to spills and leaks associated with this work, there would also be waste arisings too, and a dedicated waste storage area may have been used. The REFA Geo-Environmental Investigation Report does state "*Two single storey buildings are present towards the north, extending southwards onto a possible former storage area. This area towards the south contains worn macadam surfaces with evidence of stripped cars and parts. The surfacing across the site comprises of both macadam and concrete hardstanding*." It is recommended that close attention is given to the ground conditions when the hardstanding in this area of the site is removed and details of this provided in the Validation Report to support any conclusions drawn. Should any ground be uncovered which requires further investigation then this should undertaken and reported to the Contaminated Land Team for consideration.

7. Whilst both site investigation reports assessed asbestos risks and none were found, in conjunction with the site being surfaced with tarmac and concrete, it is likely the potential for asbestos to be present is low, however this should not be entirely ruled out and any further assessment of the site which is now required should still include for asbestos sampling.

8. Paragraph 4.3 of the Remediation Strategy details the requirement for removal of 600mm of made ground to enable the placement of clean cover for front and rear gardens (or less if made ground is shallower, provided the natural soils haven't been impacted by the made ground). It is not clear what method of assessment will be used to evaluate whether any unacceptable contamination

of the natural ground has occurred, it will need to involve testing and not just be based on visual or olfactory senses.

9. The Remediation Strategy states that in areas where hardstanding and structures will be present then the made ground in those areas can remain in situ, this may be appropriate however it will depend on the contamination status of the made ground that is yet to be assessed, as unacceptable impacts may still occur such as: impacts on service lines/water supply pipes that may run through such an area, the potential for vapour impacts or the risk that the contamination may migrate and impact surrounding soils.

10. The 450mm of clean cover proposed for the public open space area on the north western boundary (referred to in paragraph 4.4 of the Remediation Strategy) is considered sufficient.

11. An accurate record of the materials excavated and removed including details of where the materials are disposed should be kept i.e. waste transfer notes and included within the Validation Report.

12. As stated in paragraph 4.5 (bullet points 3, 5 and 6) and 4.6 of the Remediation Strategy, the importation of any soil that is to form the clean cover system will require testing to demonstrate it is suitable. Details of its origin will also be required. The testing regime of the clean cover materials will be no less strict than that outlined in the WLGA/CLILC '*Requirements for the Chemical Testing of Imported Materials for Various End Uses and Validation of Cover Systems*' guidance, copy provided.

13. The final bullet point of paragraph 4.5 and paragraph 4.7 of the Remediation Strategy refers to the identification of any suspicious or unusual ground conditions. Also paragraph 10.2.2 states "*If any unusual or suspicious strata or ground conditions are encountered during the subsequent site stripping preparation work, it will be necessary for these areas to be bought to the attention of the appropriate authorities so that all necessary inspection, sampling and testing may be undertaken to determine whether these materials present a hazard to human health.*" I agree that discussion will be required with the Contaminated Land Team so agreement on any remedial measures required can be reached.

14. In addition to 13. above, the further assessment of the petrol filling station forecourt area or any contamination identified during the removal of the tanks and interceptor (and any other infrastructure) needs to be discussed with the Contaminated Land Team so any further assessment or remediation in those areas can be agreed prior to the construction of the properties or roads commencing.

15. It is not clear what the: Recycled Aggregate (6F2), Made Ground Fill Material, or Natural General Fill Material detailed in Table 2 in paragraph 5.3 will be used for. Depending on what the purpose of it will be will depend on whether the sampling frequency is sufficient. In addition, any site generated topsoil (although it is stated no top soil is present on the site) or subsoil should also be

subject to TPH analysis. The testing regime of the clean cover materials will be no less strict than that outlined in the WLGA/CLILC '*Requirements for the Chemical Testing of Imported Materials for Various End Uses and Validation of Cover Systems*' guidance, copy provided.

16. New water supply pipes for the properties are likely to require protection in case of any residual hydrocarbon contamination from previously unidentified isolated pockets of ground. This should be considered further and advice sought from the water supplier if needed. If specialist pipes are not to be used in the proposed development then details of the assessment which came to that conclusion should be provided to the Contaminated Land Team for review and approval. Otherwise if specialist pipes are used then the installation of those should be detailed in the Validation Report.

17. The gas risk assessment has indicated the site and proposed development would be classified as Characteristic Situation 1, I can confirm that I have no concerns with this. Olfactory evidence, PID readings and some VOC & sVOC results indicate there is hydrocarbon vapour contamination but the site investigation concludes there is no human health risk. At this time until further assessment of the filling station forecourt has been completed, I consider that the vapour risks have not been fully characterised.

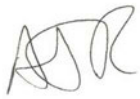
18. Until the further assessment works have been completed it is not possible to confirm at this stage that there are no concerns in relation to controlled waters (please see Note 20 below).

19. In relation to the contents of the Validation Report (paragraph 7.3 of the Remediation Strategy), a photographic record of the removal of the tanks and interceptor (and any other infrastructure) should also be provided.

20. Although it is noted that the nearest hydrological feature (the Glanyrafon Brook) is 295m away and the drift and solid geology are not Principal aquifers, they are both Secondary A aquifers. Geological mapping held by the Council indicates there is a significant depth of superficial deposits which comprise till (albeit with sand, silt and gravel too). Despite this it is possible Natural Resources Wales (NRW) may have comments regarding risks to controlled waters and you may wish to consult with them, alternatively I understand they will be consulted routinely as part of the planning application process. It is stated in paragraph 3.3 of the Remediation Strategy 'A semi-quantitative controlled waters risk assessment will be conducted based on the verification results with consideration given to aqueous solubility and/or mobility of hydrocarbon compounds in groundwater to assess potential risks." As remediation works are required then it is considered further assessment of controlled waters impacts is appropriate on completion of those works. You may wish to submit the assessment prior to submitting a Validation Report because if the findings of that assessment indicate further works are required then those works would be best undertaken first. The Council (and/or NRW) will not be able to conclude the Validation Report is sufficient if there are outstanding concerns.

Please do not hesitate to contact me should you have any queries about this letter.

Yours sincerely



Mrs Angela Roberts
Contaminated Land Officer