



Remediation Strategy Report

Site: Pearson Way, Neath

Prepared For: Wellspring Property and Investments Ltd

Issue Date: October 2022

Job No: 16819/RS

REPORT TITLE : **Remediation Strategy Report: Pearson Way, Neath**

JOB NUMBER : **16819/RS**

DATE : **October 2022**

REPORT REFERENCE : **211022-16819/RS**

Document Revision Record

Issue Number	Date	Revision Details
1	19th October 2022	Draft
2	21 st October 2022	Final

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SECTION 1 Introduction and Proposed Development

1.1 Introduction

Wellspring Property and Investments Limited (the Client), is proposing the construction of residential properties at Pearson Way, Neath.

TFW Group Limited have been commissioned by Wellspring Property and Investments Limited, to prepare a Remediation Strategy Report for the site.

Previous investigations and assessments have identified that remedial measures are required for the development. This report presents a Remediation Strategy for the site based on these previous investigations and assessments.

1.2 Objectives

The objective of the Remediation Strategy is to detail the remedial steps that are required to render the site fit for its intended use.

In summary, the following remediation requirements have been identified and are covered in this report.

1. Design of Gas Protective Measures required for the site (GCS 2);
2. Chemical Analysis of any material imported for use in Landscaped Areas;
3. Potable Water Supply Pipe Material Assessment;
4. Soils, if disposed to landfill, should be classified in accordance with Environment Agency Guidance WM3 to derive a European Waste Code, and disposed in accordance with this code.
5. Any soil import or export should be performed under an appropriate permit, exemption, or Material Management Plan.

1.3 Previous Investigations and Assessments

The Remediation Strategy is based on the findings of previous investigations and assessments. This report shall be read in conjunction with the following documents.

- TFW Group Limited Geotechnical and Geoenvironmental Report, Report Ref: 16819 (April 2022)

1.4 Limitations and Exceptions of Investigation

This report has been prepared for the sole internal reliance of the Client and the project design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of TFW Group Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill. The report represents the findings and opinions of experienced geoenvironmental and geotechnical consultants. TFW Group Limited does not provide legal advice and the advice of lawyers may be required.

It is not within the scope of TFW Group Limited to:

- Provide Method Statements and Risk Assessments for the site remediation, preparation and development.
- Design, assess or install utility service trench fill and pipes for potable water supply beneath the site.
- Provide specific design for Gas Protection barriers. A specialist approved installer should be engaged for this aspect of the works.

1.5 Quality Assurance

The quality and environmental aspects of the assessment and investigation comply with UKAS Accredited ISO 9001:2015 and ISO 14001:2015 standards.

The following subsection information has been summarised from previous investigations and assessments listed in **Section 1.3**.

The development site is rectangular in shape and locates at Pearson Way, Neath, SA11 2EJ. The site centres on an approximate National Grid Reference of 274640 195700, occupying a plan area of approximately 0.25 Hectares.

The site elevation is approximately 55 to 45m AOD steeply sloping down to the west. A steep drop off is situated in the northwest of the site.

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2.2 Site History Summary

A historical map review revealed that the site has remained undeveloped although it has been reprofiled historically and residential development has occurred around the site in recent times.

It was concluded that the overall risk to the surface stability of the site from possible unrecorded workings is considered low.

No historical landfills are recorded within 250m of the site.

2.3 Geology and Ground Conditions

The site is underlain by the Hughes Member of the Carboniferous South Wales Coal Measures. Superficial deposits were not recorded on the Geology Map and Made Ground is known to be present from reprofiling of the site.

The shallow ground conditions encountered during the recent TFW site investigation can in general be summarised as shown in **Table 2.1**.

Table 2.1 Summary of Typical Ground Conditions

Depth (m)			Thickness (m)	Stratum
0.00	-	0.1-0.8	0.1-0.8	Grass over soft brown very sandy locally gravelly, CLAY with fine rootlets.
0.1-0.8	-	1.7-2.2	1.1-1.4	Stiff to Very stiff occasionally firm brown, orange and blue mottled very Gravelly CLAY to medium dense clayey GRAVEL . (Made Ground Fill)
1.7-2.0	-	3.7-4.0	2.0-2.2	(Boreholes Only) Firm locally stiff brown very gravelly CLAY or Medium Dense very Clayey sandy GRAVEL . Very wet in places. (Made Ground) (Suspected Fill)
3.7	-	4.0	NA	(BH03 and TP02 and TP03 Only). Stiff to very stiff brown gravelly CLAY .
Gravels comprised typically angular sandstone with some weak angular mudstone.				

2.4 Groundwater

Groundwater was encountered as follows;

WS02 2.0 – 2.3 Wet Strata

WS02 3.8 – 4.0 Wet Strata

WS03 1.7 – 3.7 Wet Strata

TP03 2.0 Minor Water Ingress

2.5 Radon

The Envirocheck Report details that **NO** radon protective measures are required for new developments on the investigation site.

2.6 Hydrogeology and Hydrology

The bedrock deposits beneath the site have an aquifer designation of secondary aquifer – A. The site does not locate within a groundwater source protection zone.

2.7 Identified Contamination

2.7.1 Soil Contamination

Soil Chemical Testing did not detect any determinants in excess of the Generic Assessment Criteria (GAC) for a Residential Setting with Plant Uptake.

2.7.2 Ground Gas

Gas Monitoring placed the site within Gas Characteristic Situation 2 (GCS 2).

SECTION 3 Sources of Contamination Requiring Remediation

The summary of the refined conceptual site model is presented in **Table 3.1.** and based on findings of previous investigations and assessments, detail significant pollutant linkages requiring remediation or mitigation.

Table 3.1 Refined Conceptual Site Model

Source	Pathway	Receptor
S3 – Soil Gas	P7 – Horizontal and vertical migration and inhalation of ground gas	R2 – Future site users (residents)
S1 – Made Ground	P9 – Absorption of contaminants into potable water pipes	R2 – Future site users (residents)

SECTION 4 Proposed Remedial and Mitigating Measures

4.1 General

Based on the finding of previous investigations and assessments and the identified pollutant linkages the following remedial measures have been devised for the site.

Specific validation requirements for the proposed remedial measures are discussed in the following section.

4.1.1 Protection of Construction & Maintenance Workers and Passers-by or Neighbouring Site Users

Whilst no specific contamination in excess of GACs were detected, dust can be managed by good site management.

As good practice, construction workers should adhere to good site management, COSHH, good standards of hygiene and appropriate health & safety on site, with personal protection equipment (PPE) and dust suppression where appropriate.

If, during earthworks, ground conditions are encountered that are markedly different to those found during the investigation, the ground should be subject to additional sampling and testing and any necessary remedial measures designed and implemented before continuing with the works.

These measures should be detailed in the contractor's Risk Assessment and Method Statements as well as the contractor's Construction Management Plan.

4.1.2 Protection of Future Site Users (Residents and Visits)

Soils

Any soils imported for use in landscaped areas or for construction fill should be subject to chemical analysis prior to import and should, as a minimum, achieve the Generic Assessment Criteria (GAC) for a Residential Setting with Plant Uptake.

In accordance with EC Regulation 1272/2008 and Environment Agency Guidance WM3 soils destined for off-site disposal should be classified on the basis of their hazard properties prior to disposal. Soils are classified as a mirror entry waste and should be classified on the basis of their specific chemical properties.

Soil Imports and Exports should be performed under an appropriate Permit, Exemption or Material Management Plan.

Clean material should also be placed along service runs.

Gas Protection

To mitigate against the risk to future site users from ground gas full protection measures will be required in all structures. Reference should be made to guidance publication BR 211:2015 for further details on required protection elements. Verification of the installed protection measures is highly recommended. Terra Firma Group Ltd. offer a comprehensive ground gas protection system verification service.

To protect the future site users from identified ground gas, proposed structures will need to incorporate within its construction a suitable ground gas protection system. The ground gas protection system should be designed, verified, installed and validated in accordance with the British Standard 8485:2015+A1:2019 and CIRIA guidance C735:2014. In addition, NHBC

guidance may also need to be adopted depending on the requirements of the proposed development guarantor.

It is recommended that a specialist consultant is retained to prepare a risk assessed ground gas protection system Verification Plan for the proposed development. The Verification Plan will detail the required protection measures based on the perceived risk associated with the complexity of design, experience of the installer, size of the site and gas characteristic situation. The Verification Plan also details the step-by-step process and requirements to allow for the completion of a Validation Report. Terra Firma Group Ltd offer Verification and Validation services.

Potable Water Supply

For proposed new supply water pipes, the UK Water Industry Research publication 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (Report 10/WM/03/21)' should be consulted. Evidence of this assessment, and the pipe material used, should be retained for inclusion in the Verification Report.

SECTION 5 Validation of Remedial and Mitigating Measures

The following remedial measure will require validation and inclusion within a Validation Report:

- Validation of Imported Soils
- Records of Off-Site Disposal (transfer/Consignment Notes)
- Design, Installation and Verification of Gas Barrier
- Potable water supply pipe (assessment and installation)

5.1.1 Imported Soil Validation

All imported soils, aggregate or stone that are not virgin quarry stone should be validated as suitable for use. Imported materials exempt from validation testing should be accompanied by a delivery/transfer note. Notes should be retained and submitted for inclusion within the Validation Report upon completion of the works.

The provider should supply a laboratory analysis report to confirm that the soil/aggregate/stone is suitable for use. Depending on the source and available test data, it may be prudent to independently sample and analyse the materials prior to being brought to site.

Sampling and analysis of the soil/aggregate/stone once imported will be required in addition to any taken at source.

All samples should, as a minimum, be analysed for the determinants listed in **Table 5.1**.

Table 5.1 Validation Criteria

Determinant	Units	Guideline Value (Residential)	Source
Inorganic			
Arsenic	mg/kg	37	1
Boron	mg/kg	290	1
Cadmium	mg/kg	11	1
Chromium III	mg/kg	910	1
Chromium VI	mg/kg	6	1
Copper	mg/kg	2400	1
Lead	mg/kg	200	2
Mercury	mg/kg	40	1
Nickel	mg/kg	130	1
Selenium	mg/kg	250	1
Zinc	mg/kg	3700	1
Cyanide	mg/kg	8	3
Asbestos	%	Non Detected	-
Organics – Phenol & PAH			
Phenol	mg/kg	120	1
Naphthalene	mg/kg	2.3	4
Acenaphthylene	mg/kg	170	4
Acenaphthene	mg/kg	210	4
Flourene	mg/kg	170	4
Phenanthrene	mg/kg	95	4
Anthracene	mg/kg	2400	4
Fluoranthene	mg/kg	280	4
Pyrene	mg/kg	620	4
Benzo(a)anthracene	mg/kg	7.2	4
Chrysene	mg/kg	15	4
Benzo(b)fluoranthene	mg/kg	2.6	4
Benzo(k)fluoranthene	mg/kg	77	4
Benzo(a)pyrene	mg/kg	2.2	4
Indeno(123cd)pyrene	mg/kg	27	4
Dibenzo(ah)anthracene	mg/kg	0.24	4
Benzo(ghi)perylene	mg/kg	320	4
Organics – TPH			
PH C5 – C6 Aliphatic	mg/kg	42	4
PH C6 – C8 Aliphatic	mg/kg	100	4
PH C8 – C10 Aliphatic	mg/kg	27	4
PH C10 – C12 Aliphatic	mg/kg	130	4
PH C12 – C16 Aliphatic	mg/kg	1100	4
PH C16 – C21 Aliphatic	mg/kg	65000	4
PH C21 – C35 Aliphatic	mg/kg	65000	4
PH C5 – C7 Aromatic	mg/kg	70	4
PH C7 – C8 Aromatic	mg/kg	130	4
PH C8 – C10 Aromatic	mg/kg	34	4
PH C10 – C12 Aromatic	mg/kg	74	4
PH C12 – C16 Aromatic	mg/kg	140	4
PH C16 – C21 Aromatic	mg/kg	260	4
PH C21 – C35 Aromatic	mg/kg	1100	4
1 - LQM/CIEH Suitable For Use Level (S4UL) 2015			
2 - Defra Category 4 Screening Level (Provisional value)			
3 - Environment Agency CLEA v1.06 Derived Value (Now withdrawn)			
4 - S4UL threshold based on 1% soil organic matter			

5.2 Off-Site Disposal

Soils should be classified in accordance with WM3 and disposed to an appropriate facility based on their classification. Paperwork pertaining to the haulage and disposal of soils and demolition rubble should be retained for inclusion in the Validation Report.

A surface tank locates in the east of the site, marked as 'WASTE INK'. The content of the tank should be assessed and disposed on the basis of its chemistry.

5.3 Gas Protection

Validation of installed ground gas protection systems by an independent third party will be required upon completion of the development. Validation may only be achieved if processes prescribed in the Verification Plan are undertaken.

5.4 Potable Water Supply Pipes

A copy of the potable water supply pipe assessment, along with evidence of the water supply pipe installation, should be retained for inclusion in the Validation Report.

Photographic evidence of the installation shall be provided by the **groundworker** for inclusion in the Validation Report.

5.5 Validation Report

Following completion of the works a verification report should be compiled demonstrating the completion and effectiveness of the works set out in the Remediation Strategy.

The Verification Report should include, but not limited to, the following:

1. A record of any areas where made ground is removed (service runs, under roads etc).
2. For soils disposed of off-site, a record of the volume removed, from which areas and details of the receiving landfill. Transfer tickets should be retained.
3. A record of the number of imported soil sources and their respective volumes
4. Details of the source and supplier of all imported soils and appropriate permits, exemptions of MMPs for the imports
5. Chemical test certificates for imported soils where available from the provider
6. Chemical test data for all imported soils as sampled at source (if possible) and on site
7. Details of the source and volume of any imported stone/aggregate

It is beyond the responsibilities of Terra Firma to source these documents and they should be provided by the appropriate person as and when they become available.

SECTION 6 Working Practices

6.1 Protection of Construction Workers

In order that construction workers are protected during site works across the site the following should be adhered to:

1. Compliance with health and safety regulations
2. Provision of Method Statements and Risk Assessments
3. Compliance with Control of Substances Hazardous to Health (COSHH) Assessment
4. Good level of Personal Protection Equipment (PPE)
5. Specific advice from Asbestos Consultant
6. Good level of hygiene by site workers
7. Dust suppression measures
8. Emergency contingencies should be defined prior to commencement of site works

6.2 Protection of the Environment

During the remediation and construction periods, there is a risk to the environment and adjacent sites from de-watering, excavations, moving contaminated soil, drainage misconnections, discharges of perched groundwater to local surface waters or the ground, runoff from construction materials and/or exposed ground, wheel washing and oil or chemical spills.

A drainage plan should be devised, identifying manholes to prevent pollutants accidentally reaching surface water sewers. Temporary drainage measures may need to be put in place.

The contractor(s) must also strictly adhere to the Pollution Prevention Guidelines for Working at Construction and Demolition Sites (PPG6). This publication gives both advice and guidelines which should be followed with regards to the planning and preparation of site works, site drainage, delivery and storage of construction materials, the management of waste, good housekeeping in particular to prevent runoff of silt and other fines into nearby water courses, refuelling, concrete and what to do in the event of an emergency.

Within the documentation prepared by the contractor(s), the following information should be provided, but not limited to:

- Project Description
- Key participants/contractor(s)
- Technical procedures
- Phasing of works and approximate timescales
- Site plans to scale
- Details of consents or license needed
- Health and Safety, COSHH Assessment, Method Statements and Risk Assessments
- Emergency contingencies

In addition, the following precautions should also be taken.

- All potential chemicals and associated risks and emergency procedures for spills/leaks should be considered in the site risk assessment and the details provided to all site employees.
- Any potential pollutant materials or chemicals/detergents used on site should be adequately stored in suitable containers, with clear labelling.
- Any oil or hazardous substance containers and associated pipe works should be enclosed within a bund.
- Care taken during delivery of materials, with correct supervision and labelling detailing the substance and its quantities.

- All delivery drivers should be informed of procedures and restrictions.
- Any materials on delivery should be covered to ensure there is no spillage.
- Any detergents, paints, chemicals etc should not be allowed to be discharged into surface drains or water courses.
- Washing out and cleaning of concrete/cement plant should be carried out in a contained area with adequate measures to collect all run-off water.
- Security and prevention of vandalism, especially of oil drums/containers.

6.3 Material Management & Disposal of Soils

Any imports or exports of soil should be performed under an appropriate Permit/Exemption or Material Management Plan. Paperwork should be in place prior to the proposed movement.

Excavated made ground may be disposed of at landfill. Prior to disposal classification of the material will need to be completed in accordance with Environment Agency protocol detailed in 'Technical Guidance WM3 – Waste Classification - Guidance on the Classification and Assessment of Waste'.

Waste transfer and disposal must be undertaken by an authorised person. A waste transfer notes/consignment notes must accompany each load and records should be maintained for inspection if required



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