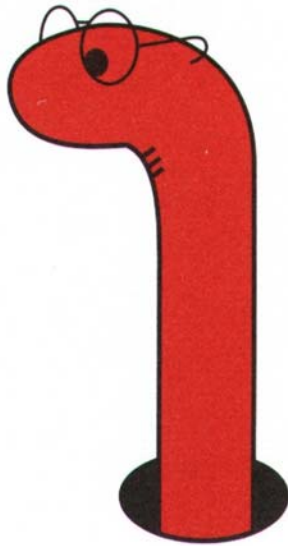


Electronic Report



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Our Ref: Todmorden Road / OL15 9EG / 2023
Date: 4 October 2023

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RIVERSIDE BUSINESS PARK, TODMORDEN ROAD, LITTLEBOROUGH, OL15 9EG
PROPOSED INVESTIGATION

INTRODUCTION

A commercial development is proposed. Following a PRA (4/10/23) the objective is to design a suitable investigation to consider contamination, landfill gas and geotechnical issues.

SITE DESCRIPTION

Riverside Business Park to the southeast of Todmorden Road in Littleborough and at OS Grid Reference 394110, 416790, comprises a block of five commercial units (1-5) at the centre. The proposed development, referred to as 'The Site', is an 'L' shaped plot, about 60 x 70m, along the southwest and southeast. There is a caravan compound (hardcore surface) at the south corner, with portacabin office at its northeast. At the north/centre is a dilapidated portal frame building with a concrete slab, and concrete block building (unit 3) at its south corner. Along the southwest boundary is a hand car wash and portacabin. The floor is a mix of tarmac, hardcore and unsurfaced areas.

Town House Brook (flowing southeast) forms the southwest boundary and the River Roch (flowing southwest) forms the southeast boundary in river valleys. To the northeast is a small block of industrial units and to the northwest are houses. The area slopes down to the southeast.

PROPOSED DEVELOPMENT

It is proposed to demolish unit 3 and build a new industrial unit over a larger footprint as an extension to the south of unit 2 and east of unit 5. A block of two new units will be built on the southwest boundary, a smaller unit at the northwest and larger unit at the southeast. There will be a new yard and car parking at the southeast.

INDUSTRY PROFILE

The site was formerly a petrol station and vehicle repair workshop, now split into small industrial units. Made ground is also expected.

Industry	Possible Contaminants
Garage Workshop	Metals: lead, chromium, copper Volatile organic compounds/solvents (VOC) Fuel: petrol, diesel, MTBE (TPHs) Polycyclic aromatic hydrocarbons (PAH) Asbestos
Petrol Station	Metals: copper, zinc, chromium, nickel, lead, cadmium, arsenic, Mineral oils, fuel oils (TPHs) BTEX Compounds General hydrocarbons (PAHs)
General Contaminants in Made Ground/ Garage colony	Metals: arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc Inorganic compounds: cyanide, sulphates Asbestos Polycyclic aromatic hydrocarbons (PAH) TPHs

CONCEPTUAL MODEL

A conceptual model based on the source-pathway-receptor concept is included.

Source	Receptors	Pathway	Potential/Likely Pollutant Linkage
Asbestos	End-users	No pathway	No
	Off-site	Migration off-site	Possible
Inorganic contaminants	End-users	No pathway	No
	Groundwater	Leaching towards	Unlikely
	River/stream	Leaching towards/migrating towards	Yes
Sulphate	Building fabric	Concrete directly in contact with soil	Yes
Hydrocarbons	End-users	No pathway	No
	Service pipes	Seeping into drinking water pipes	Yes
	Groundwater	Leaching towards	Unlikely
	River/stream	Leaching towards/migrating towards	Yes
Hydrocarbon vapours	End-users	Inhalation of vapours indoors and outdoors	Yes
Landfill gas	End-users (inside)	Seeping into buildings, explosion, asphyxiation	Yes
Radon	End-users (inside)	Seeping into buildings	No

PROPOSED INVESTIGATION

Contamination

Taking into account the site history it is likely that contamination will be present, possibly at high levels, and an intrusive investigation is required. The first stage is to contact the petroleum licensing officer to see if they hold details on former tanks, then a properly targeted investigation can be designed.

The second stage will consist of boreholes and tests to confirm the presence/absence and extent of contamination on the site. Tests will be required at both shallow depth and deeper below the site.

Proposed Action

- Drill 5 boreholes to about 6 metres deep.
- Excavate 3 trial holes up to 0.6 - 1.0m deep.
- Test 7 shallow samples (about 0.25m deep) for :heavy metals, cyanide, sulphate, PAHs, TPHs, phenols and asbestos.
- Test 4 samples from about 1.5-2.0m for PAHs and TPHs
- Test 2 deeper samples for a suite of contaminants suitable for selecting water pipes.
- Screen the boreholes for VOC using hand-held PID monitor.
- Test the 3 worst case samples from the PID screen, >5ppm, for a more detailed analysis. Maximum 1 per BH.

Controlled Waters

A low risk to ground water and high risk to surface water is possible. Following soil tests it is expected that leachate tests, tests on perched water, and tests on the adjacent water course will be required.

Proposed Action

- Allow for carrying out leachate tests on the 3 worst case soil samples for contaminants of concern.
- If perched water is present, test 3 samples for :heavy metals, cyanide, sulphate, PAHs, TPHs, phenols.
- Test 2 samples from the River Roch and 2 from Town House Brook for heavy metals, cyanide, sulphate, PAHs, TPHs, phenols.

Landfill Gas/Ground Gas/Vapours

There are potential nearby ground gas sources and a low gas risk is anticipated. A gas testing programme is required. The ground investigation should also allow for testing samples for volatile hydrocarbons.

Proposed Action

- Install 4 gas monitoring wells.
- Test for methane, carbon dioxide and gas outflow on 4 occasions over 1 month.

Radon

Radon protection measures are not required.

Foundations

A series of boreholes are required in the area of the proposed building to allow the most suitable foundations to be designed.

Proposed Action

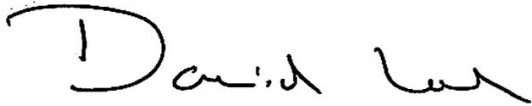
- *Supplement boreholes with 1 dynamic probe.*

General

The PRA, and these proposals, should be issued to the Local Authority for their comments before proceeding with the investigation.

Yours faithfully

on behalf of Worms Eye Ltd

A handwritten signature in black ink, appearing to read 'David Lord', with a stylized, cursive script.

David Lord

BSc (Hons)

FGS, MEnvSc, AIEMA