PEAK ENVIRONMENTAL SOLUTIONS

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PHASE 1 SITE INVESTIGATION

LAND AT 152A ALBION ROAD
NEWTOWN, NEW MILLS
DERBYSHIRE
SK22 3JP

REPORT PREPARED FOR

Treville Properties Limited
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Derbyshire
SK23 7EP

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Issue	**Issue Date**	**Prepared**	**Checked**	**Approved**
Rev A	July 2014	Clare Dainton Consultant	Christopher Dainton Technical Director	Clare Dainton Consultant
		Notes: First Issue		
Rev B	December 2015	Christopher Dainton Technical Director	Clare Dainton Consultant	Christopher Dainton Technical Director
		Notes: Issue for revised development layout		

1.0 INTRODUCTION

Peak Environmental Solutions Limited (PESL) has been commissioned by Treville Properties Limited to provide a Phase 1 site investigation for 0.2 hectares of Land at 152A Albion Road (the 'site'), Newtown, New Mills, Derbyshire, SK22 3JP (Grid Ref: 399570, 384830). The site location is shown in Figure 1, with the current site layout shown in Figure 2 and a client supplied topographical survey in the Figures section (Drawing Ref: 411175/01/P1).

The Phase 1 site investigation has been prepared to support a planning application to High Peak Borough Council (HPBC) for residential redevelopment of the site. The current proposed layout is shown in a client supplied plan in the Figures section (Drawing Ref: 411175/02/P1) and comprises ten dwellings (2 & 3 bedroom) in three terrace blocks with private gardens and a central access roadway down off Albion Street.

The site was granted outline planning permission by HPBC in February 2013 for the construction of four terraced houses and four apartments (application reference HPK/2012/0692) and the new application is being submitted to support the new proposed layout. The existing outline planning permission includes a phased Condition 14 relating to land contamination and it is assumed that a similar condition would be attached to a permission if the new application is successful.

This report has been produced for submission to HPBC to provide an initial assessment of the potential for ground contamination at the site and make recommendations for any further work necessary to meet the requirements of a land contamination condition that is likely to be in line with Condition 14 associated with HPK/2012/0692. The report collates relevant historical and environmental information/data about the site and includes a site conceptual model, a preliminary risk assessment, risk evaluation and conclusions and recommendations to assist with decision making.

The report has been produced in accordance with the umbrella framework laid out in DEFRA/EA CLR-11 '*Model Procedures for the Management of Land Contamination',* BSI 10175 *'Investigation of Potentially Contaminated Sites'* Code of Practice and NHBC/EA Publication R&D66 (*'Guidance for the Safe Development of Housing on Land Affected by Contamination'*), as well as in general accordance with the National Planning Policy Framework 2012.

The report was finalised in December 2015 and should be read in the light of any subsequent changes in legislation, statutory requirements, statutory and non-statutory guidance, relevant research and industry practices, and should be read in conjunction with the references are provided in Section 6.0. Information provided to or obtained by Peak Environmental Solutions has been relied upon in good faith. This report is subject to the standard terms and conditions of Peak Environmental Solutions and the limitations and exceptions detailed in Appendix A.

2.0 SCOPE OF WORK

2.1 Desk Study and Site Walkover

The information considered as part of the Phase 1 site investigation (desk study) includes historical Ordnance Survey mapping data, geological data/maps (including data from The Coal Authority) and site data held by the Environment Agency. Where appropriate, third party information has been referenced in the report or reproduced in the Appendices, with additional references listed in Section 6.0.

A site walkover was undertaken by Peak Environmental Solutions on the 26th June 2014 to assess the environmental site setting and check for visual evidence of on-site contamination. Photographs taken during the site walkover are presented in Appendix B. The walkover survey did not include an assessment of asbestos containing materials (ACM) in the buildings or invasive weeds such as Japanese knotweed, Himalayan balsam or Giant hogweed. These aspects fall outside the investigation scope of works.

2.2 Preliminary Risk Assessment

The qualitative preliminary risk assessment (PRA) considers the redeveloped land use and includes development of a land contamination conceptual site model (CSM) to assess the significance of risks associated with relevant pollutant linkages (RPLs) identified by a source-pathway-receptor analysis. The assessment of risk is based on a consideration of the following:

- The probability of an event occurring, taking into account both the presence of the hazard and receptor and the plausibility of the pathway (where probability is defined as the chance of a particular event occurring in a given period of time); and
- The severity of the potential consequence, taking into account both the potential severity of the hazard (specific to the site) and the sensitivity of the receptor (where severity or consequence can be defined as the adverse effects (or harm) arising from a defined hazard, which impairs the quality of human health or the environment in the short or longer term).

The PRA uses the risk matrix, consequence, likelihood and risk classification scheme (Very Low to Very High) detailed in Appendix E. For the purposes of the qualitative assessment, identified Very Low to Low risks will be considered acceptable for the redeveloped use.

2.3 Conclusions and Recommendations

The conclusions and recommendations provide details of the actions that need to be taken to ensure that the site is safe for the redeveloped use and any additional information that is likely to be required by HPBC following the granting of planning permission.

3.0 PHASE 1 SITE INVESTIGATION RESULTS

The findings of the Phase 1 site investigation or desk study are presented in tabular form as outlined in Table 1.

Table 1: Report Overview

Table Title	Aspect covered
Table 2: Site Description & Environmental Setting	Site Location & Description Contemporary Site Activities Contemporary Neighbouring Landuse Geology Geological Hazards Hydrogeology Hydrology Environmentally Sensitive Areas Conservation Designations
Table 3: Potentially Contaminative Landuse	Historical On-Site Landuse Historical Off-Site Landuse Contemporary On-Site Landuse Contemporary Off-Site Landuse Pollution Incidents Landfill Sites
Table 4: Substances of Concern	Likely contaminants based upon history of site and neighbouring land
Table 5: Conceptual Model & Preliminary Risk Assessment	Relevant Pollutant Linkage Assessment Preliminary Risk Assessment (PRA)

Table 2: Site Description & Environmental Setting

Aspect	Comments	Sensitivity (Low, Moderate, High)
Site Location & Description	- The land at 152A Albion Road (the site) occupies an area of ~0.2 hectare and is located in Newtown on the south-west side of New Mills, Derbyshire, SK22 3JP. The site is located in an area of mixed land use consisting of industrial developments, residential houses and a canal. Municipal buildings and a railway station are also in close proximity. The site is centred on NGR 399570, 384830 as is shown in Figure 1. - The site is an irregular rectangle sandwiched between Albion Road (the A6015) to the south/southeast and the Peak Forest Canal to the north/northwest. Ground levels drop steeply (by ~8 to 10m) between Albion Road and the canal. The current site layout is shown in Figure 2 and in a topographical survey in the Figures section. Photographs from the site walkover are included in Appendix B. - A downward sloping driveway off Albion Road in the eastern corner of the site provides access to a relatively level platform in the central and western parts of the site. This platform is represents the 'slab level' of former mill buildings that were demolished in the mid 1960s (with infilled basement levels below, see historical section); the platform is present at the top of a large retaining wall (this retaining wall is the remaining part of the mill building side elevation) close to the canal in the north of the site. Later commercial structures (see historical section) were then placed on this level and then subsequently demolished in 2013. - To the south of the platform, a further series of smaller retaining walls and a sloping area of tree covered ground return the site up to the level of the adjacent Albion Road pavement. A narrow, irregularly shaped area of sloping, tree covered, ground is present at the base of the retaining wall adjacent to the canal in the north of the site. - The southern part of the site (with the exception of the access driveway) is located between adjacent residential houses and is steeply sloping and heavily vegetated being largely covered by semi mature trees. Further mature trees are present on the small strip of land at the base of the retaining wall in the north of the site. - Some demolition works were undertaken in 2013 (no significant quantities of demolition materials present) and structures were limited to a covered parking area currently used for junk storage adjacent to 142 Albion Road and a small open sided storage shed immediately south of the overgrown area in the north of the site. A concrete slab loading dock was also present immediately to the north of 142 Albion Road. Some remnant brick and concrete walls have also been left in place at the top of some of the retaining walls in the north of the site and between the site and adjacent land to the east and west. Other drops are protected by wooden fencing. - Mixed surfacing is present across the site. The former mill building area and west of the site are largely concrete, typically broken/damaged to varying degrees. Remnants of former walls and other building features are also present. Asphalt and cobble surfaced areas are located to the east of the former building, reflecting the use for parking/access. - Various evidence for underground services was noted during the site walkover. A possible below ground tank (possibly in a former cellar) and discharge point were also identified near to one of the former building walls.	Not applicable

Aspect	Comments	Sensitivity (Low, Moderate, High)
Visual Evidence for Contamination	- No visual evidence for contamination was identified during the site walkover. The following were identified: • The possible below ground tank described above. • Limited quantities of various demolition and other materials across the site.	Not applicable
Contemporary Site Activities	- The site is currently disused. Contamination as a result of contemporary activities is considered unlikely.	Not applicable
Contemporary Neighbouring Landuse	- The following land uses immediately surround the site: • North/northwest: The Peak Forest Canal bounds the site to the north and beyond is a large confectionary factory (Swizzles Matlow Limited). Beyond the factory is an area of woodland and railway lines, with more woodland and further industrial premises beyond. • East/northeast: A yard/car parking area for the adjacent property is located immediately beyond the boundary. • South/south east: Two semi-detached residential houses (142 and 144 Albion Road) front onto Albion Road immediately on the eastern boundary. Albion Road and further residential properties are located beyond. • West/south west: Residential properties fronting onto Albion Road are present immediately to the south west. To the south, beyond Albion Road, is the station car park for New Mills railway station.	**High** - Adjacent residential properties - Adjacent watercourse (canal)
Proposed Site Use	- The current proposed layout is shown in a client supplied plan in the Figures section and comprises ten dwellings (2 & 3 bedroom) in three terrace blocks with private gardens and a central access roadway down off Albion Street. - The proposed development will require levels on the lower part of the site to be reduced significantly, including removing the currently below grade remnants of the former mill buildings; this will restore the site profile to levels more consistent with land to the east, west and north. Surplus materials generated by reducing site levels would be removed from site.	**High** - The proposed residential property represents a High sensitivity receptor to any on-site contaminant sources.

Aspect	Comments	Sensitivity (Low, Moderate, High)
Geology	- Ground levels in the central and northern parts of the site are elevated compared with adjacent land with retaining walls present in the north of the site. Fill associated with the demolition of the mill and infilling of its basement level are expected behind the retaining walls in these areas, probably thinning northwards. - Superficial Geology: The 1:50,000 scale British Geological Survey (BGS) geology map does not record the presence of superficial deposits beneath the site. Quaternary Glacial Till deposits area however present in the immediate vicinity (to the east in particular) and may extend beneath the site. - Solid (bedrock) Geology: The geological map indicates that solid geology beneath the site consists of Carboniferous sandstones of the Millstone Grit Group. Rough Rock is likely to be present immediately beneath the site and this consists of a coarse grained, cross bedded sandstone. - The BGS also hold borehole log records that can provide additional ground condition information. The nearest record is located on the canal towpath to the north of the site. This indicates the presence of 3.4m of made ground over 1.2m of mudstone/sandstone over grey moderately weathered iron stained very silty mudstone/weak fine grained sandstone extending to the full drilling depth of 15m below ground level (mbgl). The borehole log is reproduced in Appendix D. - The site is located within Coal Authority Coal Mining Reporting Area (Low Risk Development Area, DLRA) associated with the underlying Carboniferous Strata. A Coal Authority report was obtained for the site in June 2014 and is provided in Appendix D. The Coal Authority report identifies an expected absence of coal mining and coal mining gas hazards. The report also states that there are no known mine entries within 20m of the site and that no future workings are proposed at present. As the site is within a Coal Authority DLRA, no planning consultation should be required with the Coal Authority and the local authority would be expected to attach Coal Authority 'Standing Advice' to a planning permission. - The site is not located in an area that is affected by radon. The estimated probability of the property being above the Action Level for radon is 0 to 1%. At this level, no specific radon protection measures would be expected to be required by building control. A radon report provided by Public Health England is included in Appendix D.	**Low - Moderate** - The bedrock geology does not represent an important geological resource. - The site is in an area that is affected by coal mining or radon hazards.

Aspect	Comments	Sensitivity (Low, Moderate, High)
Hydrogeology	- Environment Agency (EA) defined groundwater vulnerability data does not record an aquifer status for superficial deposits in the area. The Bedrock deposits are classified as a Secondary A aquifer*: permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.* - The EA groundwater vulnerability map records the site as being over a minor aquifer with a high vulnerability to surface pollution. - The site is not within an EA defined Source Protection Zone (SPZ) for the protection of important groundwater resources within the area. The nearest SPZ is located ~8 km to the east of the site. - The EA licence several abstractions from groundwater within the vicinity. The nearest abstraction is carried out by Swizzles Matlow to the north of the site. They abstract up to 845.6 cubic metres of groundwater per day for general cooling purposes. - The EA do not record the site as being within a Nitrate Vulnerable Zone (NVZ) for groundwater.	**Moderate** - Groundwater from the underlying Secondary A aquifer is abstracted for use in the vicinity of the site.
Hydrology	- No on-site surface water features were identified during the site walkover. The nearest surface water feature is the Peak Forest Canal immediately to the north of the site along the entire length of the northern boundary. The site is also within the catchment of the River Goyt located ~280m north of the site at the base of a steep sided river valley. - The EA website does not include current or historic river quality data for either the Peak Forest Canal or the River Goyt in the vicinity of the site. - The site is not recorded by the EA as being within an area that is at risk of flooding. - Several abstractions from surface water are licensed by the Environment Agency in the site vicinity. The nearest is licensed to Swizzles Matlow for use in general cooling.	**High** - Surface water is present on site or in very close proximity and represents a sensitive receptor for any on-site contamination.
Environmentally Sensitive Areas/ Conservation Designations	- The Government Information website www.magic.gov.uk lists conservation designations for the area. The site is not located within an environmentally sensitive area. There are no other designated areas or sites within 250m of the site including Area of Outstanding Natural Beauty (AONB), Environmentally Sensitive Areas (ESA), Local Nature Reserves (LNR), National Nature Reserves (NNR), Sites of Special Scientific Interest (SSSI) or Specially Protected Areas (SPA). No Scheduled Ancient Monuments are located near the site.	**Low**

Table 3: Potentially Contaminative Landuse

Aspect	Comments	Sensitivity (Low, Moderate, High)
Historical On-Site Landuse	- Historic Ordnance Survey Maps for the site are presented in Appendix C. - 1875 - 1892: An embankment is shown in the southern part of the site adjacent to Albion Road. Several tracks are shown crossing the site possibly providing access to the adjacent Albion Mill. - 1897 - 1899: The central and western parts of the site have been developed with several joined structures, possibly houses. - 1912: No significant change. - 1922 - 1924: The buildings on the site have expanded slightly with some small structures shown. The entrance driveway is shown in its current position. The purpose of the on-site buildings is still unclear. - 1938: No significant change. - 1948: No significant change. - 1954 - 1955: No significant change. - 1968: The site appears to be now occupied by two buildings and the site entrance driveway. Buildings in the north of the site have been removed. - 1970 - 1977: The building layout has been altered with the central part of the site now occupied by a long narrow structure. The uses is not recorded. - 1984: The shape of the on-site buildings has altered again with the layout similar to that currently observable in the foundations structures on site. No use for the buildings is recorded. - 1992: No significant change. - 2006: No significant change.	**Moderate - High** - Based on the Ordnance Survey maps, the site has been developed since approximately 1897. The exact use of the site is not fully understood. - The site is in an area of mixed developments and is likely that the buildings on site have been used for industrial purposes.

Aspect	Comments	Sensitivity (Low, Moderate, High)
Other On-Site Historical Information	- Internet research suggests that the mill buildings in the centre of the site were known as the Newtown Mill and operated from the late part of the 19th century. A map showing the site and the surrounding area dated 1899 is shown at: http://www.pittdixon.go-plus.net/upfc-warksmoor-wharf/upfc-warksmoor-wharf.htmin (viewed 7th July 2014). - An internet article published by the New Mills Historical Society also suggests that the mill was a corn mill (http://www.newmillshistory.org.uk/pdf/nl02, viewed on the 7th July 2014). - Mr G Cullen of Treville Properties has also provided additional information about the site and this is included below. - The 'Old Corn Mill' was occupied and owned by Clifford Ashworth from the early 1950's and included adjoining 'Workshops'. Clifford Ashworth is understood to have operated as Lyme Marquetry Interior Decoration and traded in rare woods. - The mill burnt down in 1966 and the adjacent workshops were also damaged. - GA Clapham and Son Limited (a local building company) are understood to have purchased the site after the fire and then demolished the mill and used the demolitions materials to infill the basement levels. It is understood that the fire-damaged workshop was refurbished as a "joiners workshop" and that a 'garage block' was constructed in the east of the site in the late 1960s, possibly along with some additional retaining walls . The site is then understood to have been used by Claphams as builders yard. The historical maps indicate further buildings were added/altered in the 1970s & 1980s - The northern part of the site, prior to demolition during 2013, was most recently used by ABC Kitchens (a local kitchen supply and fabrication business) for a period of 5 to 6 years. - The southern part of the site adjacent to Albion Road does not appear to have any permanent building cover during the last 20 to 30 years.	**Moderate** - Other historical information indicates that the site was developed as a mill of some sort (possibly a corn mill) and was used as such for some period. In recent years, the site has been used as a builders yard and as a workshop for a local kitchen supply company. - Ground contamination from these uses is considered possible.

Aspect	Comments	Sensitivity (Low, Moderate, High)
Historical Off-Site Landuse	- 1875 to 1892: The canal is already in place immediately to the north of the site. To the northeast, the Albion Mill (Cotton) is present within ~200m, with the Brunswick Mill beyond (also cotton). New Mills station is also in place to the south of the site and several other mills are present to the north east within Newtown. - 1897 to 1899: The two houses immediately to the south of the site that front onto Albion Road have been developed. The Albion Mill (assumed to relate to properties to the north east, not those on site) is now shown as an emery mill rather than a cotton mill. The Warkmoor Cotton Mill is located ~100m to the east and a Rope Walk is shown also starting ~100m east. - 1912: No significant change. - 1922 - 1924: New railway lines have been constructed ~90m to the north of the site. - 1938: No significant change. - 1948: No significant change. - 1954 - 1955: No significant change. - 1970 - 1977: No significant change. - 1984: The Brunswick mill to the north of the site has been considerable expanded to occupy its current footprint. - 2006: No significant change.	**Moderate** - The site is located in an area that has been industrially developed for a very long period. - Most of the surrounding industry is however hydraulically down gradient of the site and as a result, associated impacts on the site may be limited.
Contemporary On-Site Landuse	- No known site current activities are subject to any current or historic environmental permit or licence. - No visual or olfactory evidence of contamination was noted during the site walkover.	**Low**
Contemporary Off-Site Landuse	- The nearest activity licensed by the EA is located >500m from the site.	**Low**
Pollution Incidents	- A significant water pollution incident is recorded on the EA website as occurring in close proximity to the site in 2008. Significant impact to water associated with sewage materials was recorded. No impact to land was identified. - No other pollution incidents are recorded within 500m of the site.	**Low** - The one recorded incident is unlikely to affect the site.
Landfill Sites	- According to the EA website, there are no historic or current landfills within 250m of the site. The Mousley Bottom historic landfill is located ~400m northeast of the site is the Stones Mill Dam landfill ~200m to the west. This landfill last received waste in 1986 and is not considered likely to affect the site.	**Low** - One historic landfill site has been identified but is unlikely to affect the site.

Table 4: Substances of Concern

Group	Substances	Comments
The potential site contaminants listed below are considered possible based on a long history of industrial development at the site. If additional historical information became available, the list of potential contaminants could be altered to reflect the new findings.		
Inorganic Substances	- Metals including arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc - Asbestos containing materials (ACMs)	- Anthropogenic metals associated with a long history of urban/industrial land use may be present. - Naturally occurring metals may be present in site soils. - ACMs may have been present in site buildings and may remain at the site.
Organic Substances	- Total petroleum hydrocarbons (TPH): aliphatic & aromatic fractions C5-C44 - BTEX (benzene, toluene, ethylbenzene, xylene) - Priority 16 polyaromatic hydrocarbons (PAHs): naphthalene, acenaphthene, acenaphthylene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo-a-anthracene, chrysene, benzo-b-fluoranthene, benzo-k-fluoranthene, benzo-a-pyrene (BaP), dibenzo-a,h-anthracene, benzo-g,h,i-perylene, indeno-1,2,3-c,d-pyrene	- Lubricants and fuels may have been at the site for various purposes. - Anthropogenic TPH/PAH & organic compounds associated with a long history of urban/industrial land use may be present.
Ground Gases	- Methane - Carbon dioxide - Organic vapours	- Methane and carbon dioxide may be associated with biodegradable fill materials.
The substances listed in Table 4 are those that may be present in the ground at the site based on the evidence presented in Tables 1 to 3. The selection of the potential specific substances and hazards of concern has been guided by our experience of brownfield sites, the primary sources present and information/guidance provided in published DOE industry profiles, CLR-8 (officially withdrawn, but still a valuable resource), EA publication R&D66:2008 and other relevant references. These documents have been used as an additional screening tool to help assess the significance of contaminants and contaminant/hazard groupings and help decide which contaminants/hazards warrant consideration by the ESA as potential substances and hazards of concern.		

Table 5: Conceptual Model & Preliminary Risk Assessment for Redeveloped Land Use

Source	Sensitive Receptor	Pathway	Consequence	Likelihood	Risk Classification	Comments
Inorganic & organic substances in site soils	**Human Health (On site)** Future site occupants/residents	Direct contact via Ingestion & dermal pathways	Medium	Likely	Moderate risk	The development will incorporate garden areas where residents may be exposed to contaminants in site soils.
		Inhalation of dusts	Medium	Likely	Moderate risk	
		Inhalation of vapours	Medium	Likely	Moderate risk	
		Ingestion of site grown vegetables	Medium	Likely	Moderate risk	
	Human Health (Off site) Neighbouring properties	Inhalation of dust Inhalation of vapours	Medium	Low	Moderate/Low risk	A small number of residential properties are present, two in particular are in very close proximity.
	Controlled Waters Groundwater Off-site surface waters	Soils leaching to groundwater Lateral groundwater flow Discharge to surface waters	Medium	Likely	Moderate risk	Site underlain by Secondary A aquifer. Surface water in particular is in close proximity to the site.
	BBM&S Buildings, Building Materials and Services	Contact with soils and pore water	Medium	Likely	Moderate risk	Presence of contaminants that may affect performance of buildings/service materials are possible.
	BBM&S Structures & Services	Vapour entry in structures and services	Medium	Likely	Moderate risk	-
	BBM&S Potable water pipes	Contact with soils and pore water	Medium	Likely	Moderate risk	Any hydrocarbon contaminants may affect performance of pipes or enter water supply via pipes.
Ground gases & vapours	**Human Health (On site)** Future site occupants/residents	Gas/vapour accumulation in buildings and services	Medium	Likely	Moderate risk	Organic vapours and ground gases may be present in site soils.
	Human Health (Off site) Neighbouring properties		Medium	Likely	Moderate risk	-
	BBM&S	Entry in structures and services	Medium	Low	Moderate/Low risk	-

Note: Identified Very Low and Low risks are considered acceptable for the redeveloped use.

4.0 CONCLUSIONS

4.1 Overview

The Phase 1 site investigation has identified the following key details about the site:

Sources of contamination

- The central and northern parts of the site have been developed for a long period since at least 1897. Fill materials and made ground from this period of activity may be affected by contamination.
- The exact use of the buildings over time is not known, but the best available historical information obtained to date suggests that the site may have been operated as a corn mill until the more recent past when it was converted for use as a builders yard and a kitchen fabricators workshop.
- The level platform in the central part of the site appears to have originally been formed by the demolition of the mill and infilling basements behind a retaining wall; the retaining wall actually appears to comprise the remnant of the mill building elevation down to the canal. The fill materials used in infill the basement are believed to be from the demolition of the main mill building.
- At least one possible below tank (probably in an infilled cellar) was identified during the site walkover.
- Some ground contamination as a result of these uses is considered possible.

Pathways and receptors

- The principal receptor for contaminants at the site following redevelopment will be the residents of the proposed properties, with exposure pathways including direct contact, inhalation of dusts and inhalation of vapours. Ingestion of site grown vegetables has been considered as a pathway at this stage.
- Residents in the properties immediately adjacent to the site could also theoretically be at risk. Exposure pathways are currently likely to be limited however.
- The Peak Forest Canal is in very close proximity to the site and represents a sensitive receptor for any contamination present at the site.
- Groundwater beneath the site could also be affected by contamination.

4.2 Preliminary Risk Assessment

Based upon the findings of the Phase I desk study, the PRA indicates there is:

- *Moderate risk* to future site users from potential site contamination
- *Moderate to low risk* to off-site users/occupiers from potential site contamination
- *Moderate risk* to surface waters and groundwater (controlled waters) from potential site contamination
- *Moderate risk* to BBM&S from direct contact with potential site contamination
- *Moderate to low risk* to BBM&S from ground gas and soil vapours

Identified Very Low and Low risks are considered acceptable for the redeveloped use

5.0 RECOMMENDATIONS

Based on the findings of the Phase I site investigation and PRA, Peak Environmental Solutions recommend that the following actions be considered to manage the identified potential land contamination risks:

- Completion of a targeted Phase 2 site investigation and generic quantitative/qualitative human health and controlled waters risk assessments to identify the presence, character, extent and significance of any soil contamination sources identified. The Phase 2 investigation would be expected to be conditioned by the local authority as part of the planning permission.

  The Phase 2 investigation should be undertaken following the proposed reduction in site levels and removal of surplus materials. The investigation should then focus on areas of potential contamination based on the results of this investigation and on areas where residential gardens and building footprints are proposed.

  The Phase 1 CSM and risk evaluation should be refined and the Phase 2 report should include conclusions and recommendations for any further investigation or risk assessment work.
- Production of a remediation/protection strategy to ensure that new buildings and site soils (including imported soils/sub-soil) do not represent a risk to the future site occupants following redevelopment. Imported materials and re-use of site-won soils should be managed and verified in an appropriately controlled and documented manner agreed with HPBC. This will normally be conditioned by the local authority as part of the planning permission.
- The remediation/protection strategy should include a Discovery Strategy for use during the redevelopment should unexpected impacted made ground deposits and/or natural soils and waste deposits be encountered. The strategy should include a protocol for characterising and dealing with any encountered contamination, including liaison with HPBC.
- Any Phase 2 investigation should include laboratory inspection/analysis of recovered soil samples for ACMs. Additional guidance on managing ACMs in site soils during site development is provided by the HSE and CIRIA C773, *'Asbestos and Soil in made ground: a guide to understanding and managing risk*'.
- Liaison with Building Control to determine the requirements for ground gas, radon and/or soil vapour protection measures for the development.
- New site services should be laid in appropriate service corridors.
- Below ground water supply services should comply with industry best practice for site development.
- Production of a final verification report to document the successful implementation of the remediation/protection strategy and other engineering measures.

It is assumed that these works, where deemed necessary by HPBC, would not be required to support a planning application for redevelopment and would be conditioned as part of a granted planning permission.

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