AAH planning consultants

PHASE 1 CONTAMINATION STUDY

LAND SOUTH OF WHALEY BRIDGE

PROPOSED RESIDENTIAL DEVELOPMENT

JUNE 2016

JOB REFERENCE: 37095

Table of Contents

1.0 Introduction

1.1 AAH Planning have been commissioned to provide a Phase 1 Contamination Desk Study in support of a proposed residential development on Land to the south of Whaley Bridge, Derbyshire SK23 7EU.

1.2 The objective of the study is to research the likely geotechnical and chemical characteristics of the soil and ground water environment. During the study, information was sought from:

- Derbyshire County Council
- High Peak Borough Council
- Environmental Agency/British Geological Survey
- Landmark Envirocheck Report, May 2016
- Site Walkover 6th June 2016

2.0 Existing Site

2.1 The proposed housing development would be located at grid reference: X 401225, Y 380184 approximately 1.6 kilometres south of Whaley Bridge town centre, surrounded to the east, west and south by the Peak District National Park, the nearest part of it being 350m to the west. Further afield, Chapel en-le-Frith lies approximately 4km to the east and Stockport approximately 11km to the north-west. The site lies within the High Peak Borough Council administrative area.

2.2 As shown in Figure 1 the site is located on the southern edge of the settlement of Whaley Bridge which is surrounded by the Peak District National Park. Elnor Lane Farm which is associated with the application is situated approximately 740m to the south-east. The application site can be found in between residential built forms associated with Vaughan Road and Mevril Road to the west; as well as Randal Crescent and Elnor Avenue to the east. Agricultural land abuts the application site's northern and southern boundaries whilst a dismantled railway line (known locally as Shallcross Incline) is now a footpath surrounded by trees and runs along the site's eastern edge. The wider landscape is characterised by numerous blocks of woodland around the River Goyt, the nearest being Lodge Wood and Shallcross Wood to the west; as well as a number of plantations in and around the Randal Carr Brook to the east.

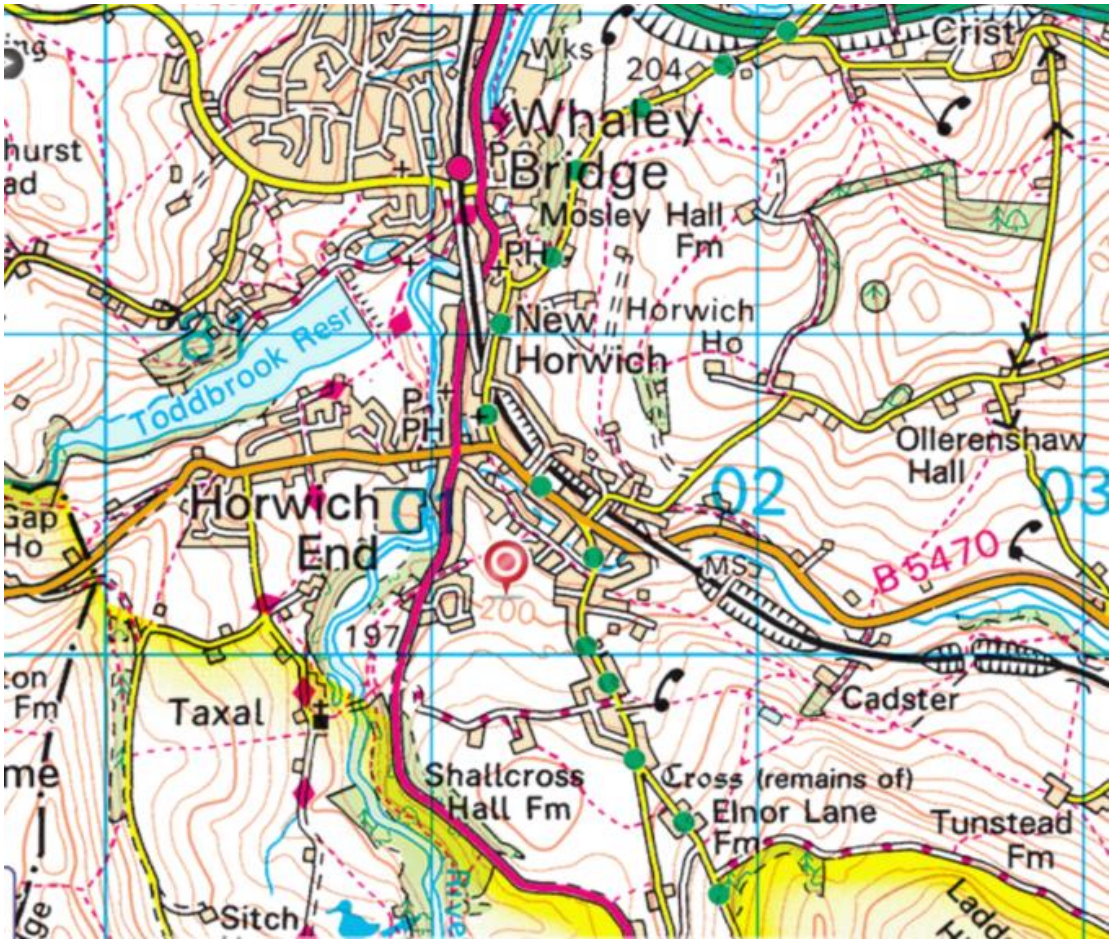

Figure 1 Site Location

2.3 No topographic survey was available at the time of writing, so the gradient of the site has been estimated from OS contours at 35m/300m, or 12%.

2.4 The existing site has open/agricultural use which is cited in Table 2 of the National Planning Policy Framework Technical Guidance (NPPFTG) as 'water compatible'. Water compatible in this instance means that there is no flood vulnerable infrastructure on the site.

3.0 Development Proposal

3.1 The proposal is to develop the 7.0 hectare site with 125 dwellings, an indicative density of 18 dwellings per hectare. This proposed density will allow for a more spacious arrangement with the necessary soft landscaping works to protect the visual amenity of the area. The proposal has a number of options for access. There is potential for the access being available from Mevril Road and Manor Road/Vaughan Road to the west. The other option is from Buxton Road and Carr Brook Close, Randal Crescent and Merv Springs Way having access to Shallcross Mill Road. All of the proposed residential dwellings would be designed so as to satisfy the council's standards for off street car parking and would satisfy National Government's Manual for Streets Design Guidance in creating streets and spaces for people rather than just for traffic. The proposed C3 class use would be 'more vulnerable' to flooding in accordance with Table 2 of the NPPFTG.

3.2 The proposed housing styles are not yet fixed, but an appraisal of surrounding housing types would suggest that a mixture of 2, 3, and 4 bedroom two storey dwellings in detached, semi-detached and terrace dwellings would form the basis of the development.

3.3 In addition to the built form of each dwelling house, there would be areas of private hardstanding utilised for driveways and pedestrian/patio hardstanding. It is probable that these areas could be constructed from pervious hardstanding materials. Highways within the development would be built to an adoptable standard and in all probability have a traditional construction, thus forming part of the site impermeable/drained catchment area. For the purposes of this assessment it is anticipated that the built development on the site would be approximately 43% of the 7.0 ha developed area which equates to 3.0 ha.

3.4 The proposed masterplan is shown in Appendix A.

4.0 Historical Site Uses

4.1 In appraising the site history, published Ordnance Survey maps have been reviewed dating from the end of the 19th Century up to the present day. A selection of large scale maps used in this report is contained in Appendix B.

4.2 Little has changed since the earliest maps available in 1882. The site itself has always been pasture land, with Buxton Road forming the west boundary, Shallcross Plane to the east and Shallcross Hall to the south. Air shafts to south and west indicate the presence of mines from at least 1899 onwards, in addition to quarries and a saw mill to the east.

4.3 By 1923 the Shallcross Hall colliery opened on the northwest corner of the site, where Mevril now sits, while to the northeast Mevril Springs Bleach Works was opened at more or less the same time. In 1937 Botaney Bleach Works was open to the northeast of the site, and housing appeared in the area now occupied by Vaughan Road and Manor Road. With the exception of these, the site remains agricultural, as it has always been. Apart from the gradual increase in size of Whaley Bridge, there is no evidence of any significant changes to the historic land uses in the vicinity of the site which could pose a contaminative risk to the proposed development.

5.0 Hydrology

Flood Risk

5.1 The site is shown by the Environment Agency's flood map for planning to be located within an area of Flood Zone 1 associated with a low probability of flooding, defined as less than 1 in 1000 (>0.1%) annual probability of river flooding in any given year. An excerpt from the Environment Agency Flood Zone Map is provided below.

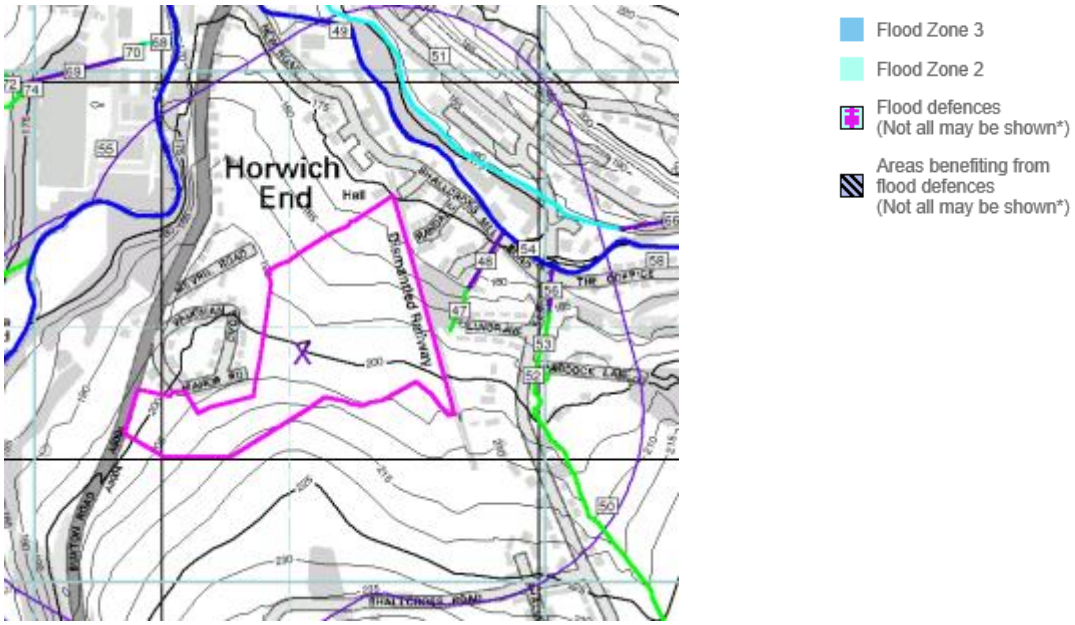

Figure 2 Environment Agency Flood Zone Map

5.2 The site is bound to the west by the River Goyt and to the east and north by the Randal Carr Brook. Ground levels fall to the north, and the site is protected to the south by Shallcross Road, so the site is not at risk from overland flow from any direction. Therefore the infiltration/attenuation system will be located in the northeast corner for discharge to groundwater or to the drain and culvert system to the west of the site. Provision should also be made for notional sewer exceedance overland flow routes, perhaps along internal roadways.

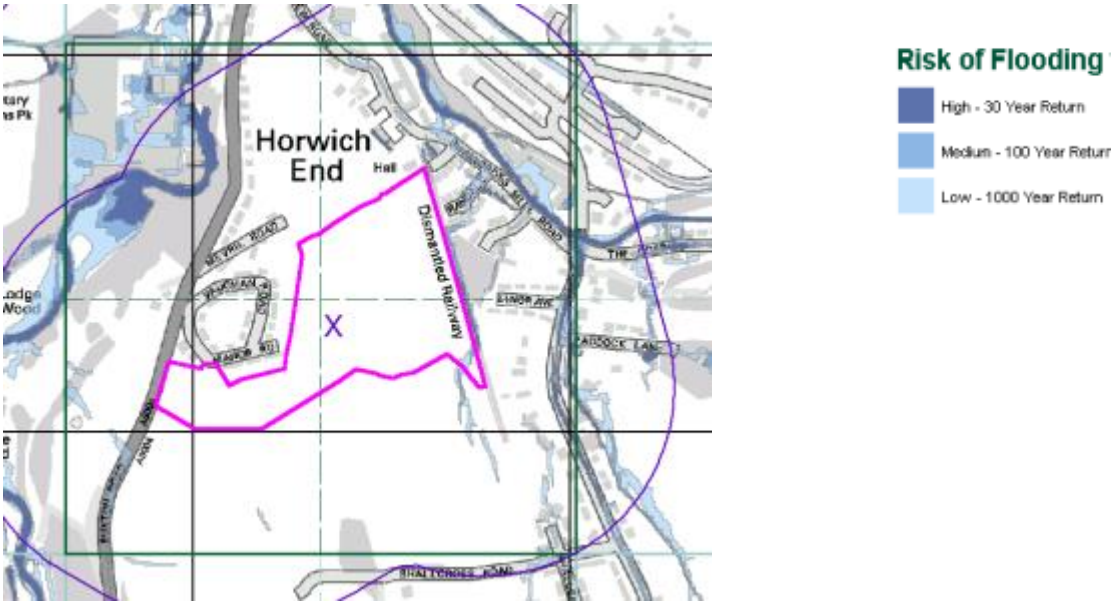

Figure 3 Environment Agency flood map for Surface Water

Discharge and Abstraction Consents

5.3 7 discharge consents have been identified between 250m and 500m from the site, and a further 5 between 500m and 1000m. 7 water abstraction licences have been identified within 1000m of the site, 1 less than 250m from the site. These are detailed in full in the appendices.

6.0 Geology

BGS Records

6.1 A desktop survey of mapped geological records has been undertaken as part of the Flood Risk Assessment process. Evaluation of the British Geological Survey (BGS) Geology of Britain Viewer shows the site has a Bedrock of Pennine Lower Coal Measures Formation - Mudstone, Siltstone and Sandstone, with superficial Devensian Till Deposits. No intrusive investigation has been undertaken for this study, but borehole records suggest (BGS ID: 193152) a 6m layer of brown fine and medium sand, slightly silty in parts with traces of fine and medium quartzite gravel. Beneath this there is soft grey brown sandy clay containing varying amounts of fine to coarse quartzite gravel.

6.2 Based on the published geology of the site it is likely that infiltration will be feasible. However, before the use of infiltration can be accepted, it will be necessary for onsite percolation testing to be undertaken to determine ground permeability. The commission of

percolation tests, to be undertaken in accordance with the BRE365 design methodology should be placed as a condition of consent on the planning decision notice.

Figure 4 Superficial Geology

6.3 BGS records include the following ground stability hazards within 250m of the Site:

- Collapsible ground stability: No Hazard – Very Low
- Compressible ground: No Hazard – Moderate
- Ground dissolution: No Hazard
- Landslide: Very Low – Moderate
- Running sand: No Hazard – Low
- Shrinking & Swelling: No Hazard – Very Low

6.4 BGS records indicate that part of the site is in an intermediate probability radon area, as between 3-5% of homes are above the action level. Therefore basic radon protective measures are necessary in the construction of new dwellings or extensions.

Coal Authority Records

6.5 A Coal Authority Mining Report has been obtained, and is reproduced in full in the appendices. In summary, the report indicates that the site is in a surface area that could be affected by underground mining in 2 seams of coal at shallow to 80m depth, and last worked

in 1925. Any ground movement from these coal workings should have stopped by now. The site is not within a surface area that could be affected by present underground mining.

6.6 The site is not in an area where the Coal Authority has plans to grant a licence to remove coal using underground methods, nor where a licence has been granted to remove or otherwise work coal using underground methods. The site is not in an area likely to be affected from any planned future underground coal mining. However, reserves of coal exist in the local area which could be worked at some time in the future. No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

6.7 There is one coal mine entry within 20 metres of the boundary of the site, and its approximate position is shown below. There is no record of what steps have been taken to treat the mine entry. However, there was no evidence of this during the site walkover and it is assumed to have been filled and capped. Other mines within the vicinity of the site (ID 126, 127, 128) were checked and not found.

Table 1 Recorded Coal Mines within the vicinity of the site boundary

ID	Site name	Commodity/Type	Distance (m)	Comment/Risk
126	Shallcross Hall Colliery	Deep Coal	25	Ceased 1925
127	Shallcross Hall Colliery	Deep Coal	46	Ceased 1925
128	Shallcross Hall Colliery	Deep Coal	56	Ceased 1925
129	Shallcross Hall Colliery	Deep Coal	73	Ceased 1925
130	Shallcross Hall Colliery	Deep Coal	133	Ceased 1925

6.8 The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining. The site is not within the boundary of an opencast site from which coal has been removed by opencast methods, and does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods. There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary, and the site is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

6.9 The Coal Authority has not received a damage notice or claim for the subject site, or any site within 50 metres, since 31st October 1994. There is no current Stop Notice delaying the start of remedial works or repairs to the site, the Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

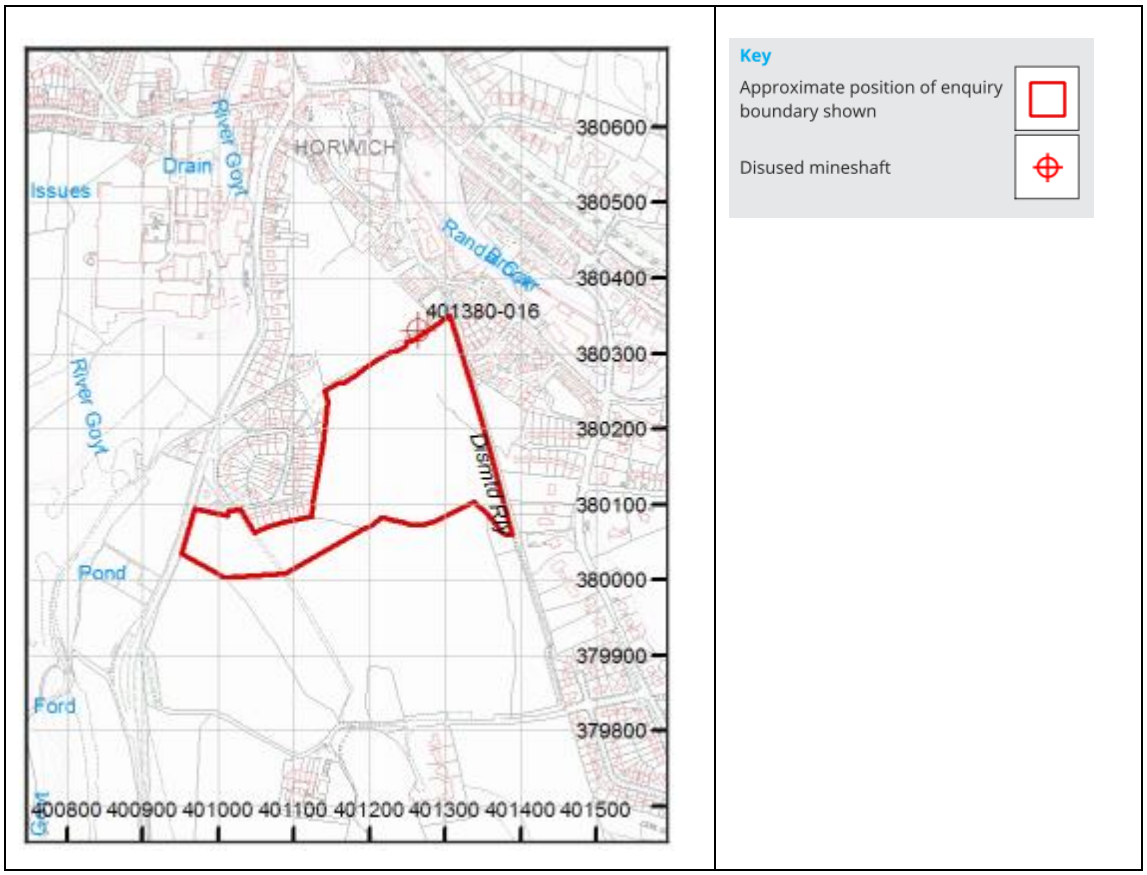

Figure 9 Approximate position of disused mine shaft

6.10 The Coal Authority has no record of a mine gas emission requiring action. The site has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

6.11 The site lies outside the Cheshire Brine Compensation District.

6.12 In view of the mining circumstances a prudent developer would seek appropriate technical advice relating to both the investigation of former coal mines and their treatment before beginning work on site. No development should be undertaken that disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and

adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

6.13 It should be noted that all collieries in the vicinity of the site had ceased to operate by 1925, and any ground movement from these coal workings should have stopped by now. There are no obvious signs of ground movement, nor of structural distress to buildings in the area.

7.0 Hydrogeology

7.1 The vulnerability of groundwater around the site is illustrated below. The site lies in an area defined as a Minor Aquifer of low permeability.

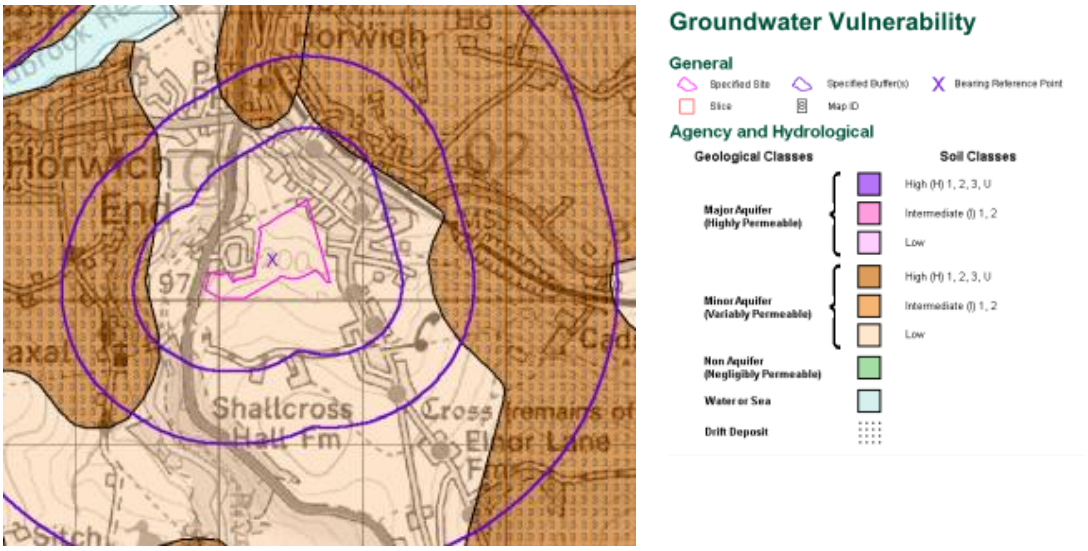

Figure 5 Groundwater Vulnerability

7.2 The bedrock is designated as Secondary A Aquifer, and the superficial aquifer as secondary undifferentiated.

7.3 No Source Protection Zones are indicated within 1km of the site. This is illustrated further in the Appendices.

Figure 6 Bedrock – Secondary B

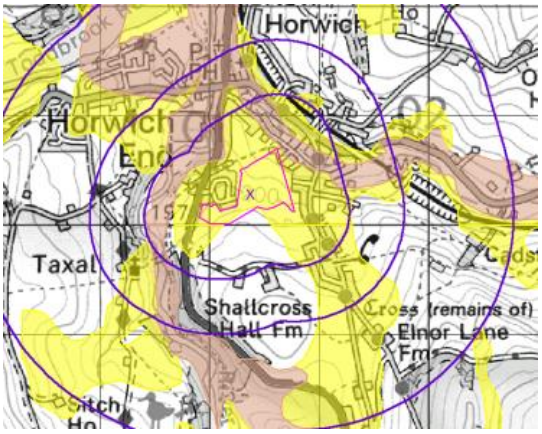

Figure 7 Superficial – Undifferentiated

7.4 The site does not lie within a Nitrate Vulnerable Zone (NVZ), indicated below. However, it is close to the South West Peak Environmentally Sensitive Area, to Shallcross and Park Ancient Woodland and to the Peak District National Park. Toddbrook Reservoir is also a Site of Special Scientific Interest. Also noted in the vicinity of the site are Whibbings Ancient Woodland, an area of Adopted Green Belt and Brookfield Pond Local Nature Reserve, both close to Toddbrook Reservoir.

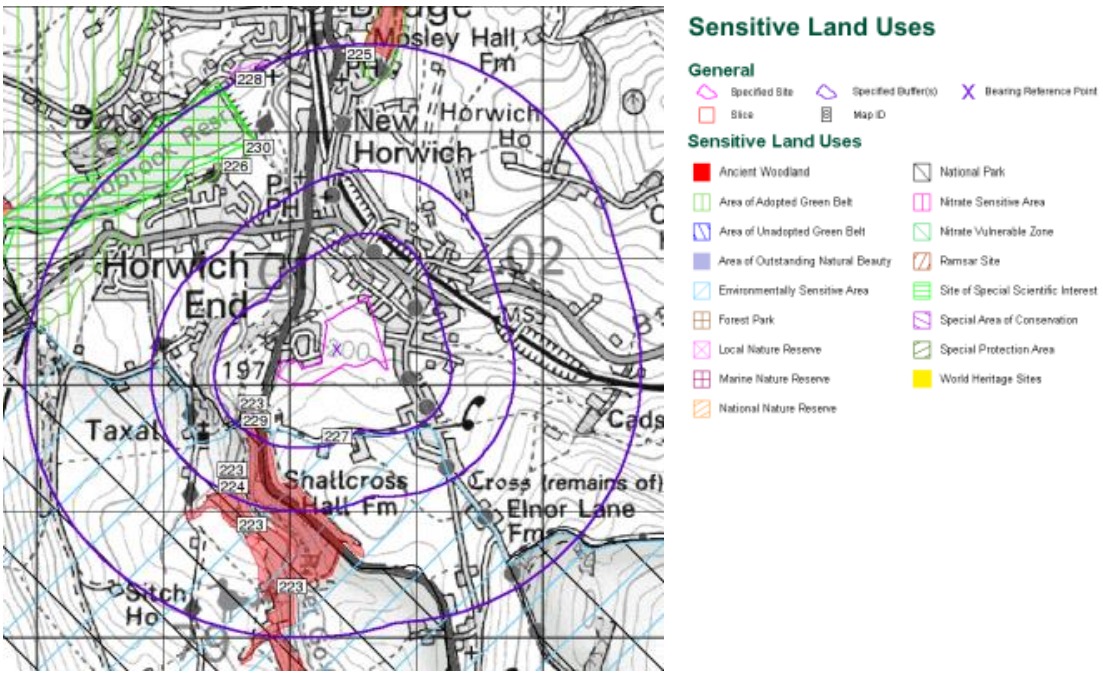

Figure 8 Sensitive Land Uses

8.0 Potential Contaminative Land Uses and Statutory Registers

Contamination

8.1 There are three Local Authority Pollution Prevention and Controls within 1km of the site, and thirty six Pollution incidents to Controlled Waters, four within 250m of the site. These are illustrated below and detailed in full in the Appendices.

8.2 The four closest pollution incidents to controlled waters are:

Table 2 Pollution Incidents to Controlled Waters

	Authority	Pollutant/cause	Cat/Severity	Distance (m)	Date
11	EA	Paraffin Oil Cause not known	3/Minor	106	31/8/1992
12	EA	Oil Accidental Spillage	3/Minor	150	4/6/1998
13	EA	Brown discoloration Cause not known	3/Minor	173	13/5/1994
14	EA	Paraffin Oil Cause not known	3/Minor	206	16/1/1996

8.3 There are 48 Contemporary Trade Directory Entries and 75 Points of Interest recorded within 1,000m of the Site boundary, details of which shown in the appendices. However, it is noted that all of these occur to the east west and north of the site, and they are therefore below the level of the site. Ground rises to the south, and there are no points of interest in this direction. The site is therefore considered to be safe from contaminative runoff from any direction. None of the following have been recorded:

- Contaminated Land Register Entries and Notices
- Prosecutions relating to controlled waters
- Enforcement and Prohibition Notices
- Integrated Pollution Controls
- Local Authority Integrated Pollution Prevention And Control
- Local Authority Pollution Prevention And Control Enforcements
- Prosecutions Relating to Authorised Processes
- Registered Radioactive Substances
- Substantiated Pollution Incident Register
- Water Industry Act Referrals

Landfill Waste

8.4 There is 1 Historic Landfill Site more than 800m from the site. 1 Licensed Waste Management Facility is over 969m from the site. 1 Local Authority Recorded Landfill Site is 858m from the site, and 2 Registered Waste Transfer Sites are identified between 250m and 1000m of the site. There are 29 Potentially Infilled Land sites (Non-water) and 13 (Water) and this is noted in Figure 9 below and in detail in the appendices. None of the following have been recorded within 1km of the site:

- BGS Recorded Landfill Sites
- Integrated Pollution Control Registered Waste Sites
- Registered Landfill Sites
- Registered Waste Treatment or Disposal Sites

Environmental Setting

8.5 None of the following are reported within 1000m of the site boundary:

- Areas of Unadopted Green Belt
- Areas of Outstanding Natural Beauty
- Forest Parks
- Marine Nature Reserves
- National Nature Reserves
- Nitrate Sensitive Areas
- Nitrate Vulnerable Zones
- Ramsar Sites
- Special Areas of Conservation
- Special Protection Areas
- World Heritage Sites

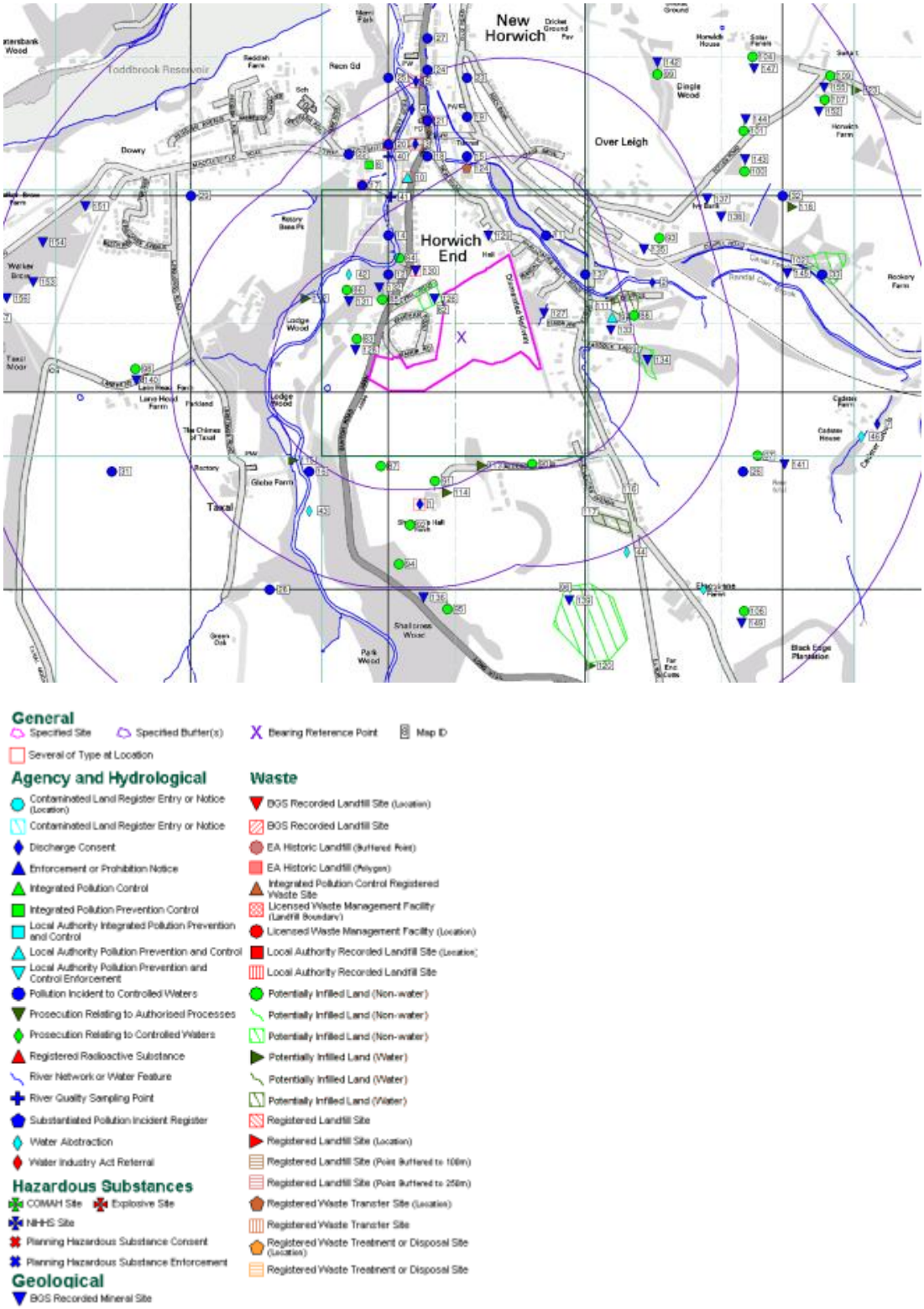

Figure 9 Site Sensitivity

Estimated Soil Chemistry

8.6 DEFRA/EA Soil Guideline Values (SGVs) are indicators of levels of contamination in the soil that may present unacceptable risks to human health (should there be any contact), as well as providing guidance to Local Authorities to determine contaminated land under Part 2A. However, these are merely indicative values in which exceedance may simply require further site-specific investigation as opposed to definitive remedial works. The estimated site soil chemistry is summarised below, along with the Contaminated Land Exposure Assessment (CLEA) Soil Guideline Values for residential land use:

Table 3 Estimated Soil Chemistry

Heavy Metal	Concentration (mg/kg)	CLEA SGV (mg/kg)	Year Published
Arsenic	< 15	32	2009
Cadmium	< 1.8	10	2009
Chromium	60 – 90	130	2002
Lead	< 100	450	2002
Nickel	15 – 30	130	2009

8.7 The estimated heavy metal concentrations on site are all shown to be below the published CLEA SGVs and may be confirmed should a soil assessment be required at the detailed design stage. The estimated Arsenic concentration in the soil within 1km of the site is < 15 mg/kg. Similarly, the estimated concentration of Cadmium is < 1.8 mg/kg, and that of Lead < 100 mg/kg. The concentration of Chromium is between 60-90 mg/kg and that of Nickel < 15 mg/kg.

9.0 Site Conceptual Model

9.1 Guidance has been published by DEFRA 'Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance' (April 2012).

9.2 Under Part 2A, for a relevant risk to exist there needs to be one or more contaminant-pathway-receptor linkage – "contaminant linkage" – by which a relevant receptor might be affected by the contaminants in question. In other words, for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or site; or significantly pollute controlled waters. For the purposes of this guidance:

- A “contaminant” is a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or to cause significant pollution of controlled waters.
- A “receptor” is something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, site, or controlled waters. The various types of receptors that are relevant under the Part 2A regime are explained in later sections.
- A “pathway” is a route by which a receptor is or might be affected by a contaminant.

9.3 The term “contaminant linkage” means the relationship between a contaminant, a pathway and a receptor. All three elements of a contaminant linkage must exist in relation to particular land before the land can be considered potentially to be contaminated land under Part2A, including evidence of the actual presence of contaminants. The term “significant contaminant linkage”, as used in this guidance, means a contaminant linkage which gives rise to a level of risk sufficient to justify a piece of land being determined as contaminated land. The term “significant contaminant” means the contaminant which forms part of a significant contaminant linkage.

9.4 This means that each of the following must be identified:

- Contaminant
- Pathway
- Receptor

and either:

- The Contaminant is causing Significant Harm to that Receptor, or
- There is a Significant Possibility of such harm being caused by the Contaminant to the Receptor.

9.5 Where any of the three elements of the SPR are not present, there is no risk and therefore land cannot be classified as statutory 'contaminated land'.

9.6 Section 78A (9) defines the pollution of controlled waters as: 'The entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter'. Land should not be designated as contaminated land where:

- A substance is already present in controlled waters;

- Entry into controlled waters of that substance from land has ceased; and
- It is not likely that further entry will take place.

9.7 Substances should be regarded as having entered controlled waters where:

- They are dissolved or suspended in those waters; or
- If they are immiscible with water they have direct contact with those waters on or beneath the surface of the water.

9.8 In 2004 the Environment Agency published the 'Model Procedures for the Management of Land Contamination', CLR11, which provides the technical framework for applying a risk management process, based on the 'suitable for use' approach, when dealing with land affected by contamination.

9.9 In 2008, to enable the practical application of good practice of the EA's Model Procedures CLR11, R&D Publication 66 'Guidance for the Safe Development of Housing on Land Affected by Contamination' was published by the National House Builders Council (NHBC), the EA and the Chartered Institute of Environmental Health. Whilst written to be relevant to housing development it is also applicable to other forms of development where sites are land affected by contamination. The guidance describes in detail the process and activities involved for the identification and assessment of hazards for a Phase 1 assessment.

9.10 At Phase 1 stage, it is necessary to develop an initial conceptual site model to understand the possible relationships between contaminants, pathways and receptors. If a hazardous source, via an exposure pathway to a potential receptor can be established then there is a 'pollutant linkage', which is assessed using parameters summarised below. At this stage, the conceptual model is prepared without site specific soils, groundwater or gas testing and as such, the findings should be treated only as first and general indications of possible SPR linkages.

9.11 The potential sources of contamination to the site are limited to its current use. The primary potential source of contamination to the site is therefore:

Agricultural Use	Soil and Water Contamination
Coal Extraction	Soil and Water Contamination

9.12 The potential receptors and pathways at the site are:

Table 4 Potential Receptors and Pathways

Potential receptors:

- End users / site occupiers
- Adjacent users / occupiers
- Controlled waters
- Flora and fauna
- Buildings & construction materials

Potential pathways:

- Direct ingestion of soil / water / fruit or vegetable
- Inhalation of dust / vapours
- Direct skin contact with the ground / water
- Regression of plant growth due to phytotoxic contamination
- Vertical and lateral migration of contamination

Table 5 Conceptual Site Model

Source	Pathway	Receptor	Comment	Risk and Mitigation
Contaminated Soils **On-site:** Agricultural **Off-site:** Agricultural Coal mining	Direct Ingestion & skin contact	Site workers & occupiers	Undeveloped site. Agricultural use may have included the use of pesticides and fertilizers which pose a minor potential contamination threat.	**Medium Risk** Appropriate PPE such as gloves & a targeted remedial strategy treating any soil contaminants if found.
	Inhalation of dust		Undeveloped site. On and off site land uses do not suggest a significant potential for dust inhalation.	**Low Risk** None Necessary
	Vertical & lateral migration		Undeveloped site situated on a Secondary A Aquifer with soils of unknown leaching potential.	**Medium Risk** Appropriate PPE such as gloves & a targeted remedial strategy treating any soil contaminants if found.
	Direct fertilizer uptake	Flora	Undeveloped site. On-site use encourages plant growth.	**Low Risk** None Necessary
	Direct contact	Building materials	Undeveloped site. Agricultural land uses are not considered to have a detrimental impact on building materials.	**Low Risk** None Necessary
Contaminated Groundwater **On-site:** Agricultural **Off-site:** Agricultural Coal Extraction	Direct ingestion and skin contact	Site workers & occupiers	Site is situated on high ground above a Secondary A Aquifer. Groundwater flow into site is possible, and the site is not in a Groundwater Protection Zone	**Low Risk** None Necessary
	Vertical & lateral migration	Controlled Waters	Groundwater flow into site is a low possibility (small catchment) however none of the sources have the potential to detrimentally impact on the proposed site, nearby mines closed c.100 years ago. Controlled fertilizer application (NVZ).	
	Direct uptake	Flora		
	Direct contact	Building Materials		

	Lateral migration	Adjacent occupiers	Site is situated on high ground above a Secondary A Aquifer. Groundwater flow from site is possible, but no development upstream.	

10.0 Conclusion

10.1 The development would see an increase in the flood risk vulnerability of the site from 'water compatible' to 'more vulnerable' to flooding.

10.2 A review of readily available site environmental data, including historical mapping and statutory registers has identified agriculture as a potentially contaminative land use in the vicinity of the site. Agriculture carries risks of typical contaminants such as nitrogen, potassium and phosphorous contained within fertilisers, chemicals from pesticides and herbicides, coliform and non-coliform bacteria from livestock waste and manure application and hydrocarbons (oil and fuel leakages from machinery). No evidence of this has been found. It should be noted that the site lies within a nitrate vulnerable zone, where there are restrictions on the application of fertilizers and pesticides.

10.3 The Coal Authority Mining Report indicates that the site is in a surface area that could be affected by underground mining in 2 seams of coal at shallow to 80m depth, and last worked in 1925. Any ground movement from these coal workings should have stopped by now. The Coal Report indicates that there is no known risk from present or future underground coal mining, or from past, present or future opencast coal mining. There is one mine entry within 20m of the site, and no known damage due to geological faults affected by coal mining.

10.4 It should be noted that all collieries in the vicinity of the site had ceased to operate by 1925, and any ground movement from these coal workings should have stopped by now. There are no obvious signs of ground movement, nor of structural distress to buildings in the area. It is assumed that any subsurface gas emissions likely to affect the site have already occurred.

10.5 The study has identified little evidence of any soil contamination in or adjacent to the site. The estimated heavy metal concentrations on site are all shown to be below the published CLEA SGVs and may be confirmed should a soil assessment be required at the detailed design stage. The estimated Arsenic concentration in the soil within 1km of the site is < 15 mg/kg. Similarly, the estimated concentration of Cadmium is < 1.8 mg/kg, and that of Lead <

100 mg/kg. The concentration of Chromium is between 60-90 mg/kg and that of Nickel < 15 mg/kg.

10.6 Although there are 48 Contemporary Trade Directory Entries and 75 Points of Interest recorded within 1,000m of the site boundary, all of these occur to the east, west and north, and are therefore below the level of the site. There is the possibility of contaminative runoff from the south, but no sources of contamination in this direction. The site is therefore considered to be safe from contaminative runoff from any direction.

10.7 The overall contaminative risk at the site is therefore considered to be low, and we are satisfied that following the proposed development the site will be suitable for use, safe and not determinable as contaminated land under Part 2A of the Environmental Protection Act.

APPENDIX A:

PROPOSED LAYOUT