

Preliminary contaminated land assessment: Nant Parc, Johnstown, Wrexham

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Prepared for

Wrexham County Borough Council
Housing, Public Protection and Environment Department
Ruthin Road
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REPORT SUMMARY

LAND QUALITY RISK ASSESSMENT

The purpose of this report is to provide clear and pragmatic advice regarding the nature and potential significance of land quality hazards which may be present at the study site.

As such, potential land quality risks have been assessed by considering three key items:

1. The likelihood that **sources of contamination** are present within the sub surface materials at the site.
2. The presence and nature of **potential receptors** *(i.e., something that could be adversely affected by a contaminant, such as people, an ecological system, property or a water body).*
3. The **pathway** by which a receptor can be exposed to or affected by a contaminant, relating to the site and surrounding area.

The **level of risk** is based on a consideration of both the **probability** (likelihood) of contamination occurring and the potential **severity** (consequence) of the associated hazard. These factors can be used to produce an overall **risk category**, which describes the level or risk posed by the study site.

The assessment findings for the study area are summarised as follows:

1. Probability/likelihood of contamination being present	High likelihood	
	Likely	
	Low likelihood	
	Unlikely	
2. Potential severity/consequence of any impacts	Severe	
	Medium	
	Mild	
	Minor	
3. Overall risk posed by the site	Very High	
	High	
	Moderate	
	Moderate/low	
	Low	
	Very low	

It is acknowledged that the risk assessment findings are based on documentary sources of information and site walkover observations alone.

RECOMMENDATIONS (FOR NEXT STEPS)

New pavilion – the principal risk that has been identified associated with the proposed construction of the new pavilion that warrants further consideration is associated with the possible migration and accumulation of bulk gases/radon within built structures. Further investigation and assessment could be undertaken to clarify any risks. However, given the associated costs of investigation and the likelihood of residual uncertainties following any investigation, it may be prudent to adopt a precautionary approach and include gas protection measures within the structure of the new pavilion.

Nevertheless, a watching brief is also recommended during the proposed redevelopment activities and associated ground works (which would include a thorough inspection of any exposed sub surface soils/Made Ground by a suitable qualified contaminated land practitioner) to confirm the nature and gas generation potential of these materials.

It is noted that any potentially significant risks to construction workers will likely be mitigated through the use of appropriate working methods, personal protection equipment and good hygiene practices.

On-going use of the wider Nant Parc site - there is only limited evidence to suggest that there are any significant risks from any contamination associated with the on-going use of the wider Nant Parc site. If there was future redevelopment or a change of use was planned then intrusive site investigations to assess the composition and extent of any residual contamination may be required. Otherwise the Site should be kept under review in the light of any new information and in accordance with the Council's Contaminated Land inspection strategy as part of their duties under Part IIA of the Environmental Protection Act 1990.

1 INTRODUCTION

1.1 Background

Wrexham County Borough Council (the Council) has requested that a preliminary risk assessment is undertaken associated with the proposed erection of a new bowling pavilion at Nant Parc, Johnstown, near Wrexham. Nant Parc was formerly occupied by a sewage works and has since been developed as a bowling green and public open space (including a playing field and children's playground).

Planning permission (P/2014/0958) has been granted for the construction of the new pavilion. However, owing to the former potentially contaminative land use (sewage works), planning conditions (No 4 and 5) require that a contamination risk assessment and associated remediation (if necessary) is undertaken. Preparation of the preliminary risk assessment presented in this report is an initial step required to satisfy these conditions. Further to this, the Council has requested that the preliminary risk assessment considers the wider Nant Parc area in addition to the footprint of the proposed pavilion. These areas are collectively referred to in this report as 'the Site'.

The preliminary risk assessment has been undertaken by firstly compiling information concerning the Site and the surrounding area, including current and historical land uses, geological records and registered pollution incidents. The collated information is then used to construct a 'conceptual site model', including an understanding of likely contaminant sources, pathways and receptors. Finally, a preliminary assessment of risks posed to identified receptors (i.e., people, buildings or the natural environment) from the anticipated land quality at the Site is performed. The risk assessment methodology is consistent with CIRIA C552 (2001); see Appendix D for details.

1.2 Objectives

The project objective is to undertake a preliminary risk assessment of the Site in accordance with current best practice and relevant national guidance (Environment Agency, 2004; 2010; BSI, 2011). The purpose of this report is to provide clear and pragmatic advice regarding the nature and potential significance of contamination hazards which may be present at the Site and to establish whether any further phases of assessment (e.g. an intrusive investigation) are required at the Site in relation to either the proposed pavilion replacement or for the on-going use of the wider area of Nant Parc.

1.3 Report limitations

It is noted that the findings presented in this report are largely based on information supplied by third parties. Whilst we assume that all information is representative of past and present conditions we can offer no guarantee as to its validity.

This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

2 SITE SETTING AND HISTORY

2.1 Site location

Information relating to the site location is summarised in Table 2.1.

Table 2.1 Site details

Site address	Nant Parc, Johnstown, Wrexham (nearest postcode LL14 2TB).
Area	1.14 ha
Site location	The Site is located towards the eastern edge of the settlement of Johnstown approximately 5 km to the south-west of Wrexham.
Current site use	The western extent of the Site is currently occupied by a bowling green with temporary clubhouse and associated car parking. The remainder of the Site comprises public open space including a grassed playing field and children's playground.
Current surrounding land use	The Site is positioned within a predominately residential area. The Site is primarily bounded by residential properties; however Johnstown Infant School is located directly north of the bowling green.

2.2 Environmental setting summary

Information relating to the environmental site setting is summarised in Table 2.2. Additional information is contained in the environmental data report presented in Appendix A.

Table 2.2 Environmental setting data

Topic	Description	Assessment
Geology	The Site is underlain by superficial deposits almost entirely comprising Glacial Till. Glaciofluvial sand and gravel deposits are present only on the very farthest south-western extent of the Site beyond the footprint of the clubhouse. These superficial deposits are underlain by the Etruria Formation which is predominately comprised of mudstone. There are no available BGS borehole logs within 100 m of the Site.	Given the nature of the local geology and hydrogeology, the sensitivity of local groundwater is judged to be medium.
Hydrogeology	The Glacial Till deposits are classified as Unproductive Strata and typically have low permeability and offer negligible water supply or river base flow potential. The Glaciofluvial deposits and Etruria Formation are classified as Secondary (A) Aquifers. As such, permeable layers within these deposits are capable of supporting water supply at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. Council records identify one groundwater abstraction licence within 2 km of the Site: Located c.880m to the south west (NGR: 329841, 345515) Address: Garden Hall Farm, Brandy, Ruabon Type: Groundwater borehole	

Topic	Description	Assessment
	Use: Commercial (dairy) There are no groundwater Source Protection Zones (SPZ) located within 500 m of the Site. The Site lies within a "potential for groundwater flooding to occur at surface" groundwater flood risk susceptibility area based on the underlying geological conditions. The British Geological Survey confidence rating for this susceptibility classification is "moderate".	
Hydrology	The nearest surface water course is Aberderfyn Brook, a tertiary river located c. 175 m north-east of the Site. The Site does not lie within an area designated by the Environment Agency as being at risk from surface water flooding. There are no surface water abstraction licences located within 2 km of the Site.	Given the distance from the Site and the nature of the local geology, the sensitivity of local surface waters is judged to be low.
Landfill	There are one or more Environment Agency listed historical landfills located within 500 m of the Site. These include: - Hafod Quarry Landfill located c.220 m south of the Site; the waste types received comprised household, commercial & industrial waste. The operational dates are unknown although the waste licence was surrendered in 2005. - Stryt Las Landfill is located c.470 m west of the Site; the landfill received inert waste between 1993 and 1995. The waste licence was surrendered in 2005. There are one or more Environment Agency listed operational landfills located within 500 m of the Site. These include: - Hafod Quarry Landfill is located c.220 m south of the Site (see above). There are no Local Authority listed historical landfills located within 500 m of the Site. There are no other waste sites located within 500 m of the Site.	Despite the presence of these potential contaminative land uses/activities in the area surrounding the Site, since none of these occur within close proximity (i.e., within a 200 m radius of the Site) they are unlikely to pose a significant contamination hazard in relation to the Site.
Ecology and wildlife	The following environmentally sensitive areas are present within 500 m of the Site: - Stryt Las a'r Hafod Site of Special Scientific Interest (SSSI) is c.85 m to the east and c.470 m west. - Johnstown Newt Sites Special Areas of Conservation (SAC) are c.85 m east and c.470 m west.	The relatively close proximity of the identified environmental designations suggests that a potential linkage could occur if any contamination were present on Site.

Topic	Description	Assessment
Environmental Permits, Incidents and Registers	There is one recorded historical discharge consent within 250 m of the Site; - Discharge to Aberderfyn Brook at Johnstown Tan-y-clawdd Nant Park Estate. The consent was revoked in 1992.	Despite the presence of this potential contaminative activity since it does not occur within close proximity (i.e., within a 50 m radius of the Site) it is unlikely to pose a significant contamination hazard in relation to the Site itself.
Radon	According to current UK radon mapping (Public Health England, 2015) the Site lies in an area where 3 to 5 % of homes are at or above the UK radon action level (200 Bq/m^3).	Radon mitigation measures may be necessary for any built structure should a pathway exist.

2.3 Site history

The Site land use history, based on a review of historical land use mapping (available in Appendix B), is summarised in Table 2.3.

Table 2.3 Site history

Date	Description
1873-1875	The Site is undeveloped at this time and comprises open fields where the assumed use is agricultural. A rail line is located c.70 m east of the Site running north-south. A road running east-west is located c.120 m south of the Site. A well is located c.250 m north-west of the Site. Hafod-y-bwch Colliery is located c.600 m northeast.
1898-1900	The western extent of the Site has been developed by this time and is labelled as “Sewage Works – Wrexham R.D. Council”. The sewage works includes two rectangular structures in the north-western corner of the Site and a long narrow rectangular structure in the southern western corner of the Site. There has been minimal development in the area immediately surrounding the Site; Johnstown and Hafod Rail Station has been developed c.150 m southeast of the Site. A small sandpit is mapped c. 200 m south of the Site. Hafod Red Brickworks has been developed c. 500 m east. Hafod-y-bwlch Colliery has expanded to within 400 m of the Site The well previous identified c. 250 m to the north-west of the Site is no longer mapped.
1909	The sewage works has been extended to cover the majority of the Site area. The structure present along the southern boundary of the Site has been removed and one of the two structures present in the north-western corner of the Site has also been removed. A large number of additional features have been developed across the Site, including; - Two / three sludge tanks located in the north-western corner of the Site; - Seven sludge tanks located toward the north-eastern corner of the Site. - Four identical square structures located in the area of the current bowling green. - Infrastructure connecting the various areas of the sewage works. There has been some residential development c.120 m south of the Site.
1912	No change on-Site.

Date	Description
1938	No change on-Site.
1949	No change on-Site.
1960-1964	The sewage works are no longer mapped. The Site appears predominately undeveloped (vacant open land) other that a single narrow rectangular structure present in the north-west corner of the Site.
1967	No change on-Site. The land directly south and west of the Site has been developed to residential. An electricity sub-station is marked c.60 m south of the Site
1974-1977	The structure in the north-eastern corner of the Site is no longer mapped. A school is mapped north of the Site adjacent to the north-western corner of the Site.
1981	The Site is now marked as a playing field with a path running south-west to north-east across the Site towards a “play area” located in the north-eastern corner of the Site. The land directly north and east of the Site has been developed to residential by this time. Johnstown Infant School has been developed directly north of the current bowling green facility. An electricity sub-station is marked c.110 m north of the Site.
1986	No change on-Site.
1989-1992	No change on-Site.
1992-1994	No change on-Site.
2006	Aerial imagery shows the western extent of the Site had been developed by this time to comprise a bowling green with associated parking area and the temporary pavilion structure. A small basketball plinth has been installed in the centre of the Site.
2013	Aerial imagery shows no change on-Site.

3 CONSULTATIONS

3.1 Wrexham County Borough Council

The Council was contacted regarding the proposed development.

Mrs Angela Guy of the Housing, Public Protection and Environment Department confirmed that the Council were aware of the former use of the Site as a sewage works. Anecdotal evidence suggests that the sewage works had been closed by the time Welsh Water took over the Council's other sewage plants in c. 1974.

Mr David Sharp, Principal Building Control Surveyor, advised that he was not aware of any significant issues with regard to building control in the local area.

The Development Control Department provided details of planning permissions associated with the Site. These are summarised in Table 2.4.

Table 2.1 Planning history

Reference	Date	Description	Comments
RHO 0361	1974	Proposal for use of the former sewage works for recreational purposes including the siting of play equipment on land.	Documentation refers to requirements for: - filling and levelling of the site with operations undertaken to the satisfaction of the Council. - stability investigation of the entire site prior to the proposed use. No further details of the operations / investigations undertaken have been provided.
RHO 19292	1991	Proposal for construction of the bowling green.	Plans for the development are very similar to the current day layout including a car park area at the western entrance, pavilion and the playing green.

4 SITE INSPECTION

A site inspection and walkover was undertaken on 31st March 2015 (photographs of the Site are presented in Appendix C). The following salient observations were made:

- The current land uses immediately surrounding the Site are consistent with contemporary mapping (i.e. primarily residential with an infant school immediately to the north of the bowling green).
- The general slope across the Site is from the north-west to the south-east.
- The western part of the Site, as occupied by the bowling green, is flat; this appears to have been formed by cutting into the previously higher ground in the west and filling / raising the area to the east. This has resulted in the ground surface to the west (off-Site) being c. 1 m above the Site elevation and the eastern end of the bowling green area being c. 1 m above the adjacent playing field level.
- Evidence of Made Ground (i.e. fragments of brick / concrete) was noted in flower beds around the edge of the bowling green. It is assumed that this material is associated with the development and decommissioning of the sewage works.
- No other visual or olfactory signs of contamination were identified.
- No signs of vegetation stress were noted.
- No direct evidence of any invasive species was identified.
- The playing field area slopes gradually to the east with no significant undulations or signs of differential settlement.
- The car park and general areas of hard-standing around the bowling green / existing pavilion are covered predominately in tarmac with some areas of concrete and paving slabs.
- The playing field is largely grass covered; the basketball plinth is covered in tarmac, and the children's play area is covered with combination of hardstanding and grass.
- The existing bowling green pavilion (which is a porta cabin style structure) does not appear to have any significant foundations which penetrate the sub-surface; as such the structure is positioned on short stilts which offers passive ventilation beneath the structure.

5 CONCEPTUAL SITE MODEL

5.1 Conceptual ground model

Based on the available documentary and site walkover information the key features of the physical ground model are as follows:

- Given that the Site was historically developed as a sewage works (between at least the 1890's and the 1960's) Made Ground is anticipated beneath the entire Site (as appears to be noted within the flower beds adjacent to the bowling green). Given the absence of any data regarding the decommissioning of the sewage works, it is unclear as to what extent the sub-surface sewage works foundations and infrastructure was removed or whether they fully or partially remain on-Site.
- Glacial Till and Glaciofluvial superficial deposits underlie / are present adjacent to the Site; the Etruria Formation underlies these deposits.
- Shallow groundwater may be present within the Glaciofluvial deposits and Etruria Formation which are both classified as a Secondary (A) Aquifer. The likely presence of low permeability deposits (associated with the Glacial Till) close to the ground surface may offer protection to the underlying/adjacent aquifers from any near surface contamination. The thickness / precise extent of these deposits is however unknown.
- The closest surface water feature is the Aberderfyn located c.175 m north-east of the Site.

5.2 Conceptual exposure model

A preliminary conceptual exposure model has been developed for the Site which describes the likely contaminant sources present across the Site, potential receptors and the possible pathways linking sources and receptors. In order for harm or pollution to be caused to identified receptors there must be three essential elements present:

A contaminant: a substance that is in, on, or under the land and has the potential to cause harm or to cause pollution of controlled waters;

A receptor: in general terms, something that could be adversely affected by a contaminant, such as people, an ecological system, property or a water body;

A pathway: a route or means by which a receptor can be exposed to or affected by a contaminant.

An environmental hazard is identified where all three of these elements are present (i.e., there is a 'contaminant linkage'), and there is consequently the potential for a contaminant to affect a particular receptor through a particular pathway.

The information collated by ESI has been used to characterise likely contaminant sources, pathways and receptors relating to the Site, as outlined below

i) Sources

- Potential sources of land contamination (principally associated with the former sewage works (DoE, 1994)) include assorted contaminants associated with the historical treatment of sewage / sludge on-Site such as metals and various inorganic / organic compounds. These contaminants may have entered the subsurface through leaking tanks, drums or pipework used to transport sludge.
- Contaminants associated with fuels used in pumps, heating systems, plant or vehicles stored on-Site when it was established as sewage works.
- Asbestos that may have formerly been contained within pipework and building materials on-Site; the disturbance of any such materials during decommissioning and

demolition of plant and buildings may have resulted in asbestos containing materials (ACM) being present within the sub surface.

- Electrical transformers previously present on Site associated with the sewage works may have contained polychlorinated biphenyls (PCBs) as dielectric fluid (typically used from 1940's onwards). Contamination of soils on-Site may have occurred during spills, retro-filling or break-up of plant containing PCBs.
- Made Ground or fill materials associated with the initial development and then decommissioning of the sewage works may contain a variety of inorganic and organic contaminants and could also give rise to the generation of bulk gases and leachate.
- Miscellaneous spills of small quantities of engine oil, fuel, antifreeze, etc. associated with the parking of vehicles on-Site or small scale use of pesticides, herbicides etc.
- Naturally occurring radon gas.

ii) Pathways

Potential contaminant pathways include *(in the context of the proposed development of the new bowling pavilion):*

- Dermal contact; soil and soil dust ingestion; inhalation of soil dust (construction workers).
- Volatilisation of any residual organic contaminants to indoor building spaces and subsequent inhalation by users.
- Lateral / vertical migration and accumulation of any bulk gases / radon into the new bowling pavilion and associated sub-surface structures.
- Ingress of any dissolved phase contaminants into water supply pipework and subsequent ingestion by users.
- Dissolution of any near surface contamination and transport through the unsaturated zone to shallow groundwater.

Potential contaminant pathways include *(in the context of the on-going use of the remainder of the Site):*

- Dermal contact; soil and soil dust ingestion; inhalation of soil dust.
- Volatilisation of any residual organic contaminants and subsequent inhalation outdoors.
- Lateral / vertical migration and accumulation of any bulk gases into neighbouring buildings and sub-surface structures.
- Dissolution of any near surface contamination and transport through the unsaturated zone to shallow groundwater.

iii) Receptors

Potential contamination receptors *(in the context of the proposed development)* include:

- The new bowling pavilion structure.
- Construction workers during the development.
- End users of the bowling pavilion.

Potential contamination receptors *(in the context of the remainder of the Site)* include:

- Users / maintenance workers at the Site (including the wider bowling club area, playing field and children's play area).
- Glaciofluvial deposits (Secondary (A) Aquifer) immediately adjacent to the Site.

- The Etruria Formation (Secondary (A) Aquifer) underlying the Site.
- Aberderfyn brook.
- Stryt Las a'r Hafod SSSI and Johnstown Newt Sites SAC.
- Neighbouring buildings and occupants.

Further consideration of the likely significance of relevant source-pathway-receptor linkages is presented in Section 6.

6 PRELIMINARY RISK ASSESSMENT

A preliminary assessment of land quality risks has been conducted using the methodology outlined in CIRIA C552 (2001). As such, risk is considered to be a function of both the probability (likelihood) of contamination occurring at the study site and also the potential severity (consequence) of the environmental impacts associated with any such contamination.

The classification system used to define contaminant probability, consequence and risk is described in Appendix D.

The risk assessment relating to the area of the pavilion redevelopment is described in Table 6.1. The risk assessment relating to the wider Nant Parc area is described in Table 6.2.

Table 6.1 Preliminary Risk Assessment: Pavilion Development Area

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
1	Potential for **inorganic** and low volatility organic contaminants to be present within the sub-surface **soils**	Dermal contact, soil and soil dust ingestion, inhalation of soil dust	HH	Future Site users (of the bowling green pavilion)	**Mild**	**Unlikely**	**Very low risk**	The presence of the redeveloped pavilion structure will likely constrain any direct exposure to any Made Ground/contamination present in the locality.
2		Dermal contact, soil and soil dust ingestion, inhalation of soil dust	HH	Construction workers	**Minor**	**Likely**	**Low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the potential to impact on workers (i.e., during ground works for construction). However, it is likely that potential risks can be mitigated through the use of appropriate personal protection equipment and good hygiene practices.
3		Ingress into water supply pipework and subsequent water ingestion	HH	Future Site users (of the bowling green pavilion)	**Mild**	**Low Likelihood**	**Low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the potential to impact on water supply pipework. However, given the nature of the pavilion the frequency of potential exposure is likely to be low.
4		Building materials in direct contact with aggressive ground	PROP	New bowling pavilion	**Medium**	**Low Likelihood**	**Moderate / low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the potential to impact on building materials associated with the new pavilion.

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
5	Potential for **inorganic** and low volatility organic contaminants to be present within the sub-surface **soils**	Dissolution into pore water/shallow groundwater and subsequent migration	CW	Glacial Till (Unproductive Strata)	**Minor**	**Likely**	**Low risk**	The risk classification reflects the local groundwater sensitivity (low resource value) and the uncertainty over the nature of any residual contamination associated with Made Ground present at the Site.
6		Dissolution into pore water/shallow groundwater and subsequent migration	CW	Glaciofluvial deposits (a Secondary (A) Aquifer)	**Mild**	**Low Likelihood**	**Low risk**	The risk classification reflects the local groundwater sensitivity (moderate resource value), the modest source area/volume, the uncertainty over any residual contamination associated with any Made Ground, and the uncertainty over whether the Glaciofluvial deposits are present on the Site or whether a pathway to them may exist.
7		Dissolution into pore water/shallow groundwater and subsequent migration	CW	Etruria Formation (a Secondary (A) Aquifer)	**Mild**	**Low Likelihood**	**Low risk**	The risk classification reflects the local groundwater sensitivity (moderate resource value), the modest source area/volume, the uncertainty over any residual contamination associated with any Made Ground, and the likely protection offered by the Glacial Till to the underlying groundwater.
8		Dissolution into pore water/shallow groundwater and subsequent lateral migration	CW	Aberderfyn Brook	**Mild**	**Unlikely**	**Very Low risk**	The risk classification reflects the reasonable distance (~175 m) to the nearest surface water feature and hence the uncertainty over whether a relevant contaminant linkage exists.

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
9	Potential for **inorganic** and low volatility organic contaminants to be present within the sub-surface **soils**	Dissolution into pore water/shallow groundwater and subsequent lateral migration	ECO	Stryt Las a'r Hafod SSSI and Johnstown Newt Sites SAC	**Medium**	**Unlikely**	**Low risk**	The risk classification reflects the modest source area/volume and the uncertainty over whether a relevant contaminant linkage exists.
10	Potential for **volatile organic** contaminants to be present within the sub-surface **soils**	Dermal contact, soil and soil dust ingestion, inhalation of soil dust	HH	Future Site users (of the bowling green pavilion)	**Mild**	**Unlikely**	**Very low risk**	The presence of the redeveloped pavilion structure will likely constrain any direct exposure to any Made Ground/contamination present in the locality.
11		Dermal contact, soil and soil dust ingestion, inhalation of soil dust	HH	Construction workers	**Minor**	**Likely**	**Low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the potential to impact on workers (during ground works for construction). However, it is likely that potential risks can be mitigated through the use of appropriate personal protection equipment and good hygiene practices.
12		Migration of vapours to surface; inhalation indoors	HH	Future Site users (of the bowling green pavilion)	**Mild**	**Low likelihood**	**Low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
13	Potential for **volatile organic** contaminants to be present within the sub-surface **soils**	Migration of vapours to surface; inhalation outdoors	HH	Future Site users (of the bowling green pavilion)	**Mild**	**Low likelihood**	**Low risk**	potential to impact on current and future Site users. However, given the land use the frequency of potential exposure is likely to be limited. Furthermore, it is plausible that the source mass associated with any volatile contaminants that were originally present on-Site may have been significantly reduced due to the effects of volatilisation and degradation.
14		Migration of vapours to surface; inhalation outdoors	HH	Construction workers	**Minor**	**Low Likelihood**	**Very low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the potential to impact on workers (during ground works for construction). However, it is likely that potential risks can be mitigated through the use of appropriate personal protection equipment and good hygiene practices. Furthermore, it is plausible that the source mass associated with any volatile contaminants that were originally present on-Site may have been significantly reduced due to the effects of volatilisation and degradation.
15		Ingress into water supply pipework and subsequent water ingestion	HH	Future Site users (of the bowling green pavilion)	**Mild**	**Low Likelihood**	**Low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the potential to impact on water supply pipework. However, given the nature of the pavilion the frequency of potential exposure is likely to be low.

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
16	Potential for **volatile organic** contaminants to be present within the sub-surface **soils**	Building materials in direct contact with aggressive ground	**PROP**	New bowling pavilion	**Medium**	**Low Likelihood**	**Moderate / low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the potential to impact on building materials associated with the new pavilion.
17		Dissolution into pore water/shallow groundwater and subsequent migration	**CW**	Glacial Till (Unproductive Strata)	**Minor**	**Likely**	**Low risk**	The risk classification reflects the local groundwater sensitivity (low resource value) and the uncertainty over the nature of any residual contamination associated with Made Ground present at the Site.
18		Dissolution into pore water/shallow groundwater and subsequent migration	**CW**	Glaciofluvial deposits (a Secondary (A) Aquifer)	**Mild**	**Low Likelihood**	**Low risk**	The risk classification reflects the local groundwater sensitivity (moderate resource value), the modest source area/volume, the uncertainty over any residual contamination associated with any Made Ground, and the uncertainty over whether the Glaciofluvial deposits are present on the Site or whether a pathway to them may exist.
19		Dissolution into pore water/shallow groundwater and subsequent migration	**CW**	Etruria Formation (a Secondary (A) Aquifer)	**Mild**	**Low Likelihood**	**Low risk**	The risk classification reflects the local groundwater sensitivity (moderate resource value), the modest source area/volume, the uncertainty over any residual contamination associated with any Made Ground, and the likely protection offered by the Glacial Till to the underlying groundwater.

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
20	Potential for **volatile organic** contaminants to be present within the sub-surface **soils**	Dissolution into pore water/shallow groundwater and subsequent lateral migration	CW	Aberderfyn Brook	**Mild**	**Unlikely**	**Very Low risk**	The risk classification reflects the reasonable distance (~175 m) to the nearest surface water feature and hence the uncertainty over whether a contaminant linkage exists.
21		Dissolution into pore water/shallow groundwater and subsequent lateral migration	ECO	Stryt Las a'r Hafod SSSI and Johnstown Newt Sites SAC	**Medium**	**Unlikely**	**Low risk**	The risk classification reflects the modest source area/volume and the uncertainty over whether a relevant contaminant linkage exists.
22	Potential for **asbestos** containing materials within the sub-surface **soils**	Liberation of sub surface ACMs and inhalation of asbestos fibres	HH	Future Site users (of the bowling green pavilion)	**Medium**	**Unlikely**	**Low risk**	Given the likely presence of Made Ground beneath the Site, any ACM present has the potential to impact on future Site users. However, the presence of the redeveloped pavilion structure will likely constrain any release of asbestos fibres and minimise future exposure
23	Potential for **asbestos** containing materials within the sub-surface **soils**	Liberation of sub surface ACMs and inhalation of asbestos fibres	HH	Construction workers	**Medium**	**Likely**	**Moderate risk**	Given the likely presence of Made Ground beneath the Site, any ACM present has the potential to impact on workers (during ground works for construction). However, it is likely that potential risks can be mitigated through the use of appropriate personal protection equipment and good hygiene practices.

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
24	Potential for **dissolved phase** contaminants to be present within **shallow groundwater**	Lateral and vertical groundwater movement via natural or artificial flow paths	CW	Glacial Till (Unproductive Strata)	**Minor**	**Likely**	**Low risk**	The risk classification reflects the local groundwater sensitivity (low resource value) and the uncertainty over the nature of any residual contamination associated with Made Ground present at the Site.
25		Lateral and vertical groundwater movement via natural or artificial flow paths	CW	Glaciofluvial deposits (a Secondary (A) Aquifer)	**Mild**	**Low Likelihood**	**Low risk**	The risk classification reflects the local groundwater sensitivity (moderate resource value), the modest source area/volume, the uncertainty over any residual contamination associated with any Made Ground, and the uncertainty over whether the Glaciofluvial deposits are present on the Site or whether a pathway to them may exist.
26		Lateral and vertical groundwater movement via natural or artificial flow paths	CW	Etruria Formation (a Secondary (A) Aquifer)	**Mild**	**Low Likelihood**	**Low risk**	The risk classification reflects the local groundwater sensitivity (moderate resource value), the modest source area/volume, the uncertainty over any residual contamination associated with any Made Ground, and the likely protection offered by the Glacial Till to the underlying groundwater.

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
27	Potential for **dissolved phase** contaminants to be present within **shallow groundwater**	Lateral and vertical groundwater movement via natural or artificial flow paths	CW	Aberderfyn Brook	**Mild**	**Unlikely**	**Very low risk**	The risk classification reflects the reasonable distance (~175 m) to the nearest surface water feature and hence the uncertainty over whether a contaminant linkage exists.
28		Lateral and vertical groundwater movement via natural or artificial flow paths	ECO	Stryt Las a'r Hafod SSSI and Johnstown Newt Sites SAC	**Medium**	**Unlikely**	**Low risk**	The risk classification reflects the modest source area/volume and the uncertainty over whether a relevant contaminant linkage exists
29	Potential for elevated **methane** to be present within the sub-surface **soils**	Lateral and vertical migration into on Site building; potential to cause an explosion	HH	Current/future Site users (of the bowling green pavilion)	**Medium**	**Low Likelihood**	**Moderate / low risk**	Based on the prevailing conceptual understanding an appreciable gas source is considered unlikely although possible given the likely presence of Made Ground and the former use of the Site as a sewage works. Biodegradable material in sewage work sludges can lead to the generation of methane and carbon dioxide (and where sulphur compounds exist the generation of hydrogen sulphide is also possible). Note: the passive ventilation currently provided beneath the existing bowling green pavilion makes any contaminant linkage to this structure unlikely. Risks to the proposed structure will depend on the nature of the building construction.
30		Lateral migration towards off Site buildings; potential to cause an explosion	HH	Off-site properties and occupants	**Medium**	**Unlikely**	**Low risk**	
31	Potential for elevated **carbon dioxide** to be present within the sub-surface **soils**	Lateral and vertical migration into on Site building; potential to cause asphyxiation	HH	Current/future Site users (of the bowling green pavilion)	**Medium**	**Low Likelihood**	**Moderate / low risk**	
32		Lateral migration towards off-site buildings; potential to cause asphyxiation	HH	Off-site properties and occupants	**Medium**	**Unlikely**	**Low risk**	

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
33	Potential for **radon** within the sub-surface	Vertical migration towards on-site buildings; potential to cause long term health effects	HH	Current/future Site users (of the bowling green pavilion)	**Medium**	**Low likelihood**	**Moderate / low risk**	Note: the passive ventilation currently provided beneath the existing bowling green pavilion makes any contaminant linkage to this structure unlikely. Risks to the proposed structure will depend on the nature of the building construction. Given the anticipated use of the new pavilion the frequency of potential exposure is likely to be limited.
						OVERALL **RISK RATING**	**Low / moderate risk**	

Table 6.2 Preliminary Risk Assessment: Wider Nant Parc Area

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
1	Potential for **inorganic** and low volatility organic contaminants to be present within the sub-surface **soils**	Dermal contact, soil and soil dust ingestion, inhalation of soil dust	**HH**	Current/future Site users (including children using playground)	**Mild**	**Low Likelihood**	**Low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the potential to impact on current and future Site users. However, given the nature of the land use the frequency of potential exposure is likely to be limited.
2		Dermal contact, soil and soil dust ingestion, inhalation of soil dust	**HH**	Maintenance workers	**Minor**	**Likely**	**Low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the potential to impact on workers (during general on-going ground maintenance). However, it is likely that potential risks can be mitigated through appropriate working methods and good hygiene practices.
3		Dissolution into pore water/shallow groundwater and subsequent migration	**CW**	Glacial Till (Unproductive Strata)	**Minor**	**Likely**	**Low risk**	The risk classification reflects the local groundwater sensitivity (low resource value) and the uncertainty over the nature of any residual contamination associated with Made Ground present at the Site.
4		Dissolution into pore water/shallow groundwater and subsequent migration	**CW**	Glaciofluvial deposits (a Secondary (A) Aquifer)	**Medium**	**Low Likelihood**	**Moderate / low risk**	The risk classification reflects the local groundwater sensitivity (moderate resource value), the uncertainty over the nature of any residual contamination associated with Made Ground present at the Site and the uncertainty over whether the Glaciofluvial deposits are present on the Site or whether a pathway to them may exist.

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
5	Potential for **inorganic** and low volatility organic contaminants to be present within the sub-surface **soils**	Dissolution into pore water/shallow groundwater and subsequent migration	CW	Etruria Formation (a Secondary (A) Aquifer)	**Medium**	**Low Likelihood**	**Moderate / low risk**	The risk classification reflects the local groundwater sensitivity (moderate resource value), the uncertainty over the nature of any residual contamination associated with Made Ground present at the Site and the uncertainty over the level of protection offered by the Glacial Till.
6		Dissolution into pore water/shallow groundwater and subsequent lateral migration	CW	Aberderfyn Brook	**Medium**	**Low Likelihood**	**Moderate / low risk**	The risk classification reflects the reasonable distance (~175 m) to the nearest surface water feature and hence the uncertainty over whether a contaminant linkage exists.
7		Dissolution into pore water/shallow groundwater and subsequent lateral migration	ECO	Stryt Las a'r Hafod SSSI and Johnstown Newt Sites SAC	**Medium**	**Unlikely**	**Low risk**	The risk classification reflects uncertainty over whether a contaminant linkage exists.
8	Potential for **volatile organic** contaminants to be present within the sub-surface **soils**	Dermal contact, soil and soil dust ingestion, inhalation of soil dust	HH	Current/future Site users (including children using playground)	**Mild**	**Low Likelihood**	**Low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the potential to impact on current and future Site users. However, given the land use the frequency of potential exposure is likely to be limited.
9		Dermal contact, soil and soil dust ingestion, inhalation of soil dust	HH	Maintenance workers	**Minor**	**Likely**	**Low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the potential to impact on workers (during general on-going ground maintenance). However, it is likely that potential risks can be mitigated through appropriate working methods and good hygiene practices.

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
10	Potential for **volatile organic** contaminants to be present within the sub-surface **soils**	Migration of vapours to surface; inhalation outdoors	**HH**	Current/future site users (including children using playground)	**Mild**	**Low likelihood**	**Low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the potential to impact on current and future Site users. However, given the prevailing land use the frequency of potential exposure is likely to be limited. Furthermore, it is plausible that the source mass associated with any volatile contaminants that were originally present on-Site may have been significantly reduced due to the effects of volatilisation and degradation.
11		Migration of vapours to surface; inhalation outdoors	**HH**	Maintenance workers	**Minor**	**Low likelihood**	**Very low risk**	Given the likely presence of Made Ground beneath the Site any residual contamination has the potential to impact on workers, however the degree and frequency of exposure is likely to be limited Note: it is plausible that the source mass associated with any volatile contaminants that were originally present on-Site may have been significantly reduced due to the effects of volatilisation and degradation.
12		Dissolution into pore water/shallow groundwater and subsequent migration	**CW**	Glacial Till (Unproductive Strata)	**Minor**	**Likely**	**Low risk**	The risk classification reflects the local groundwater sensitivity (low resource value) and the uncertainty over the nature of any residual contamination associated with Made Ground present at the Site.

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
13	Potential for **volatile organic** contaminants to be present within the sub-surface **soils**	Dissolution into pore water/shallow groundwater and subsequent migration	CW	Glaciofluvial deposits (a Secondary (A) Aquifer)	**Medium**	**Low Likelihood**	**Moderate / low risk**	The risk classification reflects the local groundwater sensitivity (moderate resource value), the uncertainty over the nature of any residual contamination associated with Made Ground present at the Site and the uncertainty over whether the Glaciofluvial deposits are present on the Site or whether a pathway to them may exist.
14		Dissolution into pore water/shallow groundwater and subsequent migration	CW	Etruria Formation (a Secondary (A) Aquifer)	**Medium**	**Low Likelihood**	**Moderate / low risk**	The risk classification reflects the local groundwater sensitivity (moderate resource value), the uncertainty over the nature of any residual contamination associated with Made Ground present at the Site and the uncertainty over the level of protection offered by the Glacial Till.
15		Dissolution into pore water/shallow groundwater and subsequent lateral migration	CW	Aberderfyn Brook	**Medium**	**Low Likelihood**	**Moderate / low risk**	The risk classification reflects the reasonable distance (~175 m) to the nearest surface water feature and hence the uncertainty over whether a contaminant linkage exists.
16		Dissolution into pore water/shallow groundwater and subsequent lateral migration	ECO	Stryt Las a'r Hafod SSSI and Johnstown Newt Sites SAC	**Medium**	**Unlikely**	**Low risk**	The risk classification reflects uncertainty over whether a contaminant linkage exists.

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
17	Potential for **asbestos** containing materials within the sub-surface **soils**	Liberation of sub surface ACMs and inhalation of asbestos fibres	**HH**	Current/future site users (including children using playground)	**Medium**	**Low Likelihood**	**Moderate / low risk**	Given the likely presence of Made Ground beneath the Site any ACM present has the potential to impact on current and future Site users. However, given the land use the likelihood of disturbance and frequency of potential exposure is likely to be limited.
18	Potential for **asbestos** containing materials within the sub-surface **soils**	Liberation of sub surface ACMs and inhalation of asbestos fibres	**HH**	Maintenance workers	**Medium**	**Low Likelihood**	**Moderate / low risk**	Given the likely presence of Made Ground beneath the Site any ACM present has the potential to impact on workers (during general on-going ground maintenance). However, it is likely that potential risks can be mitigated through appropriate working methods and good hygiene practices.
19	Potential for **dissolved phase** contaminants to be present within **shallow groundwater**	Lateral and vertical groundwater movement via natural or artificial flow paths	**CW**	Glacial Till (Unproductive Strata)	**Minor**	**Likely**	**Low risk**	The risk classification reflects the local groundwater sensitivity (low resource value) and the uncertainty over the nature of any residual contamination associated with Made Ground present at the Site.
20	Potential for **dissolved phase** contaminants to be present within **shallow groundwater**	Lateral and vertical groundwater movement via natural or artificial flow paths	**CW**	Glaciofluvial deposits (a Secondary (A) Aquifer)	**Medium**	**Low Likelihood**	**Moderate / low risk**	The risk classification reflects the local groundwater sensitivity (moderate resource value), the uncertainty over the nature of any residual contamination associated with Made Ground present at the Site and the uncertainty over whether the Glaciofluvial deposits are present on the Site or whether a pathway to them may exist.

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
21	Potential for **dissolved phase** contaminants to be present within **shallow groundwater**	Lateral and vertical groundwater movement via natural or artificial flow paths	CW	Etruria Formation (a Secondary (A) Aquifer)	**Medium**	**Low Likelihood**	**Moderate / low risk**	The risk classification reflects the local groundwater sensitivity (moderate resource value), the uncertainty over the nature of any residual contamination associated with Made Ground present at the Site and the uncertainty over whether the overlying Glacial Till offer some protection to the underlying groundwater and hence whether a contaminant linkage exists.
22		Lateral and vertical groundwater movement via natural or artificial flow paths	CW	Aberderfyn Brook	**Medium**	**Low Likelihood**	**Moderate / low risk**	The risk classification reflects the reasonable distance (~175 m) to the nearest surface water feature and hence the uncertainty over whether a contaminant linkage exists.
23		Lateral and vertical groundwater movement via natural or artificial flow paths	ECO	Stryt Las a'r Hafod SSSI and Johnstown Newt Sites SAC	**Medium**	**Unlikely**	**Low risk**	The risk classification reflects uncertainty over whether a contaminant linkage exists.
24	Potential for elevated **methane** to be present within the sub-surface **soils**	Lateral migration towards off Site buildings; potential to cause an explosion	HH	Off-site properties and occupants	**Medium**	**Low Likelihood**	**Moderate / low risk**	Based on the prevailing conceptual understanding an appreciable gas source is considered possible given the likely presence of Made Ground and the former use of the Site as sewage works. Biodegradable material in sewage work sludges can lead to the generation of methane and carbon dioxide (and where sulphur compounds exist the generation of hydrogen sulphide is also possible).

Nr	Sources	Pathways	Type	Receptors	Consequence	Probability	Risk classification	Comment
25	Potential for elevated **carbon dioxide** to be present within the sub-surface **soils**	Lateral migration towards off-site buildings; potential to cause asphyxiation	**HH**	Off-site properties and occupants	**Medium**	**Low Likelihood**	**Moderate / low risk**	Based on the prevailing conceptual understanding an appreciable gas source is considered possible given the likely presence of Made Ground and the former use of the Site as sewage works. Biodegradable material in sewage work sludges can lead to the generation of methane and carbon dioxide (and where sulphur compounds exist the generation of hydrogen sulphide is also possible).
						OVERALL **RISK RATING**	**Moderate / low risk**	

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

Based on the documentary information collated and also observations made during a recent site walkover there are considered to be a potential contaminant sources associated with the former use of the Site as a sewage treatment works. The likelihood that appreciable contamination has resulted from this former land use is considered to be relatively low.

The environmental risks posed by in situ ground conditions anticipated in the immediate vicinity of the pavilion structure are considered to be low to moderate. In the context of the pavilion redevelopment the main identified risks relate to potential construction worker exposure to any asbestos containing materials present within Made Ground, plus possible exposure of future Site users (within the pavilion structure) to radon or bulk gases (i.e., relating to any residual organic materials associated with the former sewage works).

The environmental risks posed by in situ ground conditions anticipated across the wider Nant Parc area are also considered to be low to moderate. The main risks identified relate to the possible dissolution of any residual contamination present within the sub surface to the underlying Etruria Formation Secondary 'A' Aquifer and potentially to the neighbouring Glaciofluvial deposits Secondary 'A' Aquifer. It is noted that risks to the Etruria Formation may be constrained by the presence of potentially clayey superficial deposits. Additional moderate to low risks have been identified in relation to possible worker and amenity user exposure to residual asbestos fibres within anticipated Made Ground deposits. Potential risks have also been identified relating to the off-Site migration of any bulk gases generated within the on-Site materials.

7.2 Recommendations

The purpose of this preliminary assessment was to establish whether any further phases of assessment (e.g. an intrusive investigation) were required for either the proposed pavilion or for the on-going use of the wider Nant Parc site. Based on the conclusions outlined above the following recommendations are made for these two land uses:

New pavilion – the principal risk that has been identified associated with the proposed construction of the new pavilion that warrants further consideration is associated with the possible migration and accumulation of bulk gases/radon within built structures. Further investigation and assessment could be undertaken to clarify any risks. However, given the associated costs of investigation and the likelihood of residual uncertainties following any investigation, it may be prudent to adopt a precautionary approach and include gas protection measures within the structure of the new pavilion.

Given what is known it is considered that providing gas protection measures that are suitable for a Characteristic Situation 2 (equivalent of 'typical' Made Ground and natural soils with a high peat / organic content according to Table 8.5 of CIRIA C665 (2007)) is likely to provide an appropriate level of precaution.

Nevertheless, a watching brief is also recommended during the proposed redevelopment activities and associated ground works (which would include a thorough inspection of any exposed sub surface soils/Made Ground by a suitable qualified contaminated land practitioner) to confirm the nature and gas generation potential of these materials.

It is noted that any potentially significant risks to construction workers will likely be mitigated through the use of appropriate working methods, personal protection equipment and good hygiene practices.

On-going use of the wider Nant Parc site - there is only limited evidence to suggest that there are any significant risks from any contamination associated with the on-going use of the wider Nant Parc site. If there was future redevelopment or a change of use was planned then intrusive site investigations to assess the composition and extent of any residual

contamination may be required. Otherwise the Site should be kept under review in the light of any new information and in accordance with the Council's Contaminated Land inspection strategy as part of their duties under Part IIA of the Environmental Protection Act 1990.

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APPENDICES

APPENDIX A

Environmental Data Report

GroundSure EnviroInsight

Address:	**NANT PARC, JOHNSTOWN,**
Date:	**25 Mar 2015**
Reference:	**CMAPS-CM-413940-28216-250315EDR**
Client:	**CENTREMAPS**

NW N NE



W E

SW S SE

Aerial Photograph Capture date:	09-Jun-2013
Grid Reference:	330526,346206
Site Size:	1.14ha

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Overview of Findings

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Section 1: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
1.1.1 Records of historic IPC Authorisations	0	0	0	0
1.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0
1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0
1.1.5 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
1.1.6 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
1.1.7 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	1
1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
1.1.9 Records of Licensed Discharge Consents	0	0	1	9
1.1.10 Records of Planning Hazardous Substance Consents and Enforcements	0	0	0	1
1.2 Records of COMAH and NIHHS sites	0	0	0	1
1.3 Environment Agency Recorded Pollution Incidents				
1.3.1 National Incidents Recording System, List 2	0	0	0	1
1.3.2 National Incidents Recording System, List 1	0	0	0	0
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 2: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-5000
2.1 Landfill Sites						
2.1.1 Environment Agency Registered Landfill Sites	0	0	1	0	0	Not searched
2.1.2 Environment Agency Historic Landfill Sites	0	0	1	1	0	1
2.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
2.1.4 GroundSure Local Authority Landfill Sites Data	0	0	0	0	0	0
2.2 Landfill and Other Waste Sites Findings						
2.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
2.2.2 Environment Agency Licensed Waste Sites	0	0	0	0	26	9

Section 3: Current Land Use

	On-site	0-50m	51-250	251-500
3.1 Current Industrial Sites Data	0	0	6	Not searched
3.2 Records of Petrol and Fuel Sites	0	0	0	0
3.3 Underground High Pressure Oil and Gas Pipelines	0	0	0	0

Section 4: Geology

4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 5: Hydrogeology and Hydrology

	0-500m
5.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes
5.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
5.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
5.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
5.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
5.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
5.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
5.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	2	1	Not searched	Not searched

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
5.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
5.10 Detailed River Network entries within 500m of the site	0	0	10	13	Not searched	Not searched
5.11 Surface water features within 250m of the study site	No	No	Yes	Not searched	Not searched	Not searched

Section 6: Flooding

6.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	No
6.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site?	No
6.3 Are there any Flood Defences within 250m of the study site?	No
6.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
6.5 Are there any areas used for Flood Storage within 250m of the study site?	No
6.6 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface
6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Moderate

Section 7: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	1	1	2	0
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
7.3 Records of Special Areas of Conservation (SAC)	0	0	1	1	2	0
7.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
7.5 Records of Ramsar sites	0	0	0	0	0	0
7.6 Records of Ancient Woodlands	0	0	0	0	2	26
7.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
7.8 Records of World Heritage Sites	0	0	0	0	0	0
7.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
7.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
7.11 Records of National Parks	0	0	0	0	0	0
7.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
7.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
7.14 Records of Green Belt Data	0	0	0	0	0	0

Section 8: Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	Very Low
8.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Very Low
8.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
8.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
8.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Negligible
8.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
8.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Very Low

Section 9: Mining

9.1 Are there any coal mining areas within 75m of the study site?	Yes
9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site?	Moderate
9.3 Are there any brine affected areas within 75m of the study site?	No

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between GroundSure and the Client. The document contains the following sections:

1. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

2. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

3. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure underground oil and gas pipelines.

4. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

5. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

6. Flooding

Provides information on surface water flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

7. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence.

9. Mining

Provides information on areas of coal and shallow mining.

10. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, GroundSure provide a free Technical Helpline (08444 159000) for further information and guidance.

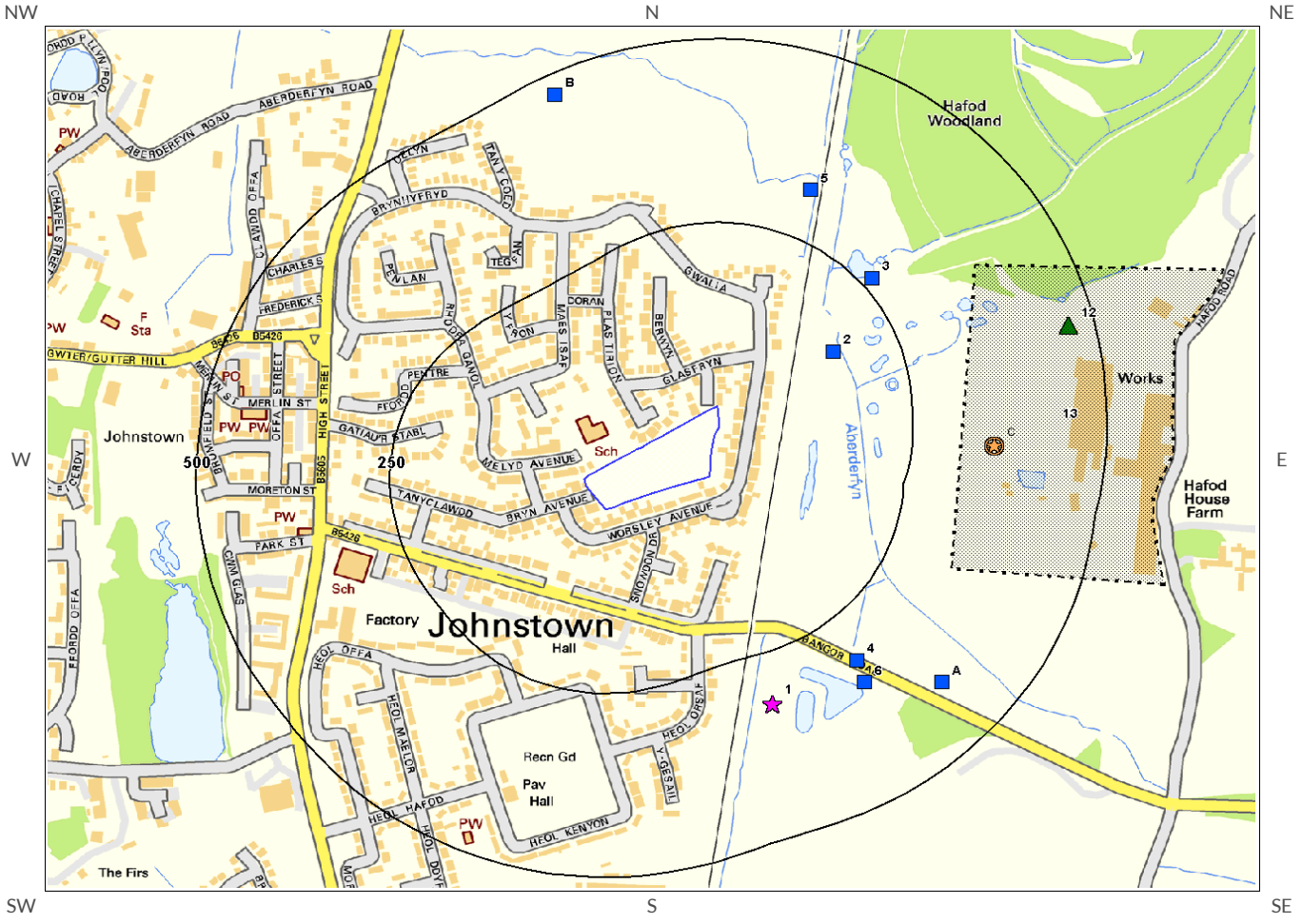
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Environmental Permits, Incidents and Registers Map



Environmental Permits, Incidents and Registers Legend

Mapping sourced from Ordnance Survey

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- Site Outline
- Search Buffers (m) — 250 — 500
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements



1. Environmental Permits, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

1.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

1.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

1.1.5 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

1.1.6 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

1.1.7 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

1

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
12	465.0	E	331063 346383	Address: Eco ReadyMix Batching Plank, Dennis Ruabon Site, Hafod Road, Ruabon, Wrexham, LL14 6ET Process: Cement Batching Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified. Date of Enforcement: No Enforcement Notified. Comment: No Enforcement Notified.

1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

1.1.9 Records of Licensed Discharge Consents within 500m of the study site:

10

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
2	167.0	NE	330760 346350	Address: Johnstown Tan-y-clawdd Nant Park Es, Johnstown Tan-y-clawdd Nant Park, Tan-y-clawdd Nant Park Estate, Nant Park Estate Effluent Type: Unspecified Permit Number: CM0080902 Permit Version: 1	Receiving Water: Aberderfyn Brook Status: Consent Expired - Time Limit Issue date: 5/2/1976 Effective Date: 5/2/1976 Revocation Date: 24/9/1992
3	265.0	NE	330810 346450	Address: Ruabon, Ruabon Effluent Type: Unspecified Permit Number: CM0147601 Permit Version: 1	Receiving Water: Aberderfyn Brook Status: Consent Expired - Time Limit Issue date: 4/4/1986 Effective Date: 4/4/1986 Revocation Date: 7/8/1986
4	314.0	SE	330790 345930	Address: Hafod Quarry Bangor Road, Hafod Quarry, Bangor Road, Ruabon, Wrexham, LL14 6ET Effluent Type: Trade Discharges - Site Drainage Permit Number: CG0397901 Permit Version: 1	Receiving Water: Aberderfyn Brook Status: Revoked (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 25/3/2002 Effective Date: 25/3/2002 Revocation Date: 1/11/2004

ID	Distance	Direction	NGR	Details	
5	318.0	N	330730 346570	Address: Johnstown Tan-y-clawdd Nant Park Es, Johnstown Tan-y-clawdd Nant Park, Tan-y-clawdd Nant Park Estate, Nant Park Estate Effluent Type: Unspecified Permit Number: CM0080901 Permit Version: 1	Receiving Water: Aberderfyn Brook Status: Consent Expired - Time Limit Issue date: 5/2/1976 Effective Date: 5/2/1976 Revocation Date: 24/9/1992
6	344.0	SE	330800 345900	Address: Johnstown Bangor Road - Sso, Johnstown Bangor Road - Sso Effluent Type: Unspecified Permit Number: CM0197501 Permit Version: 1	Receiving Water: Aberderfyn Status: Consent Expired - Time Limit Issue date: - Effective Date: - Revocation Date: 4/3/1994
7A	410.0	SE	330900 345900	Address: Johnstown Combined Sewerage System, Johnstown Combined Sewerage Syst, Combined Sewerage System Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: CM0050101 Permit Version: 2	Receiving Water: Black Brook Status: Modified - (wra 91 Sched 10 - As Amended By Env Act 1995) Issue date: 8/3/2005 Effective Date: 31/3/2009 Revocation Date: 30/3/2007
8A	410.0	SE	330900 345900	Address: Johnstown Combined Sewerage System, Johnstown Combined Sewerage Syst, Combined Sewerage System Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: CM0050101 Permit Version: 3	Receiving Water: Black Brook Status: Modified - (wra 91 Sched 10 - As Amended By Env Act 1995) Issue date: 31/3/2007 Effective Date: 31/3/2007 Revocation Date: -
9A	410.0	SE	330900 345900	Address: Johnstown Combined Sewerage System, Johnstown Combined Sewerage Syst, Combined Sewerage System Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: CM0050101 Permit Version: 1	Receiving Water: Black Brook Status: New Consent, By Application (wra 91, Section 88) Issue date: 20/5/1968 Effective Date: 20/5/1968 Revocation Date: 30/3/2009
10 B	473.0	NW	330400 346700	Address: Ruabon Ps, Ruabon Ps, LL14 1US Effluent Type: Sewage Discharges - Pumping Station - Water Company Permit Number: CM0190801 Permit Version: 1	Receiving Water: Eitha Status: New Consent, By Application (wra 91, Section 88) Issue date: - Effective Date: - Revocation Date: 7/9/2010
11 B	473.0	NW	330400 346700	Address: Ruabon Ps, Ruabon Ps, LL14 1US Effluent Type: Sewage Discharges - Pumping Station - Water Company Permit Number: CM0190801 Permit Version: 2	Receiving Water: Eitha Status: Varied Under Epr 2010 Issue date: 8/9/2010 Effective Date: 8/9/2010 Revocation Date: -

1.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

1

The following records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	Application Reference Number	NGR	Application Status	Application Date	Address	Details	Details of Enforcement Action
15C	355.0	E	6/0002/0809	330967 346221	Approved	20/10/1992	Dennis Ruabon Ltd, Hafod Tileries, Ruabon, Wrexham, LL14 6ET	Deemed Hazardous Substance Consent 20809	Enforcement: No Enforcement Notified. Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 1

The following COMAH & NIHHS Authorisation records provided by the Health and Safety Executive are represented as polygons or buffered points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	Company	Address	Operational Status	Tier
13	313.0	E	Denis Ruabon Ltd	Denis Ruabon Ltd, Hafod Y Bwch, Johnstown Ruabon, Wrexham, LI14 6et	Historical NIHHS Site	-

1.3 Environment Agency Recorded Pollution Incidents

1.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

1

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
1	320.0	S	330680 345870	Incident Date: 13/06/2003 Incident Identification: 165449 Pollutant: Organic Chemicals/Products Pollutant Description: Surfactants and Detergents	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)

1.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

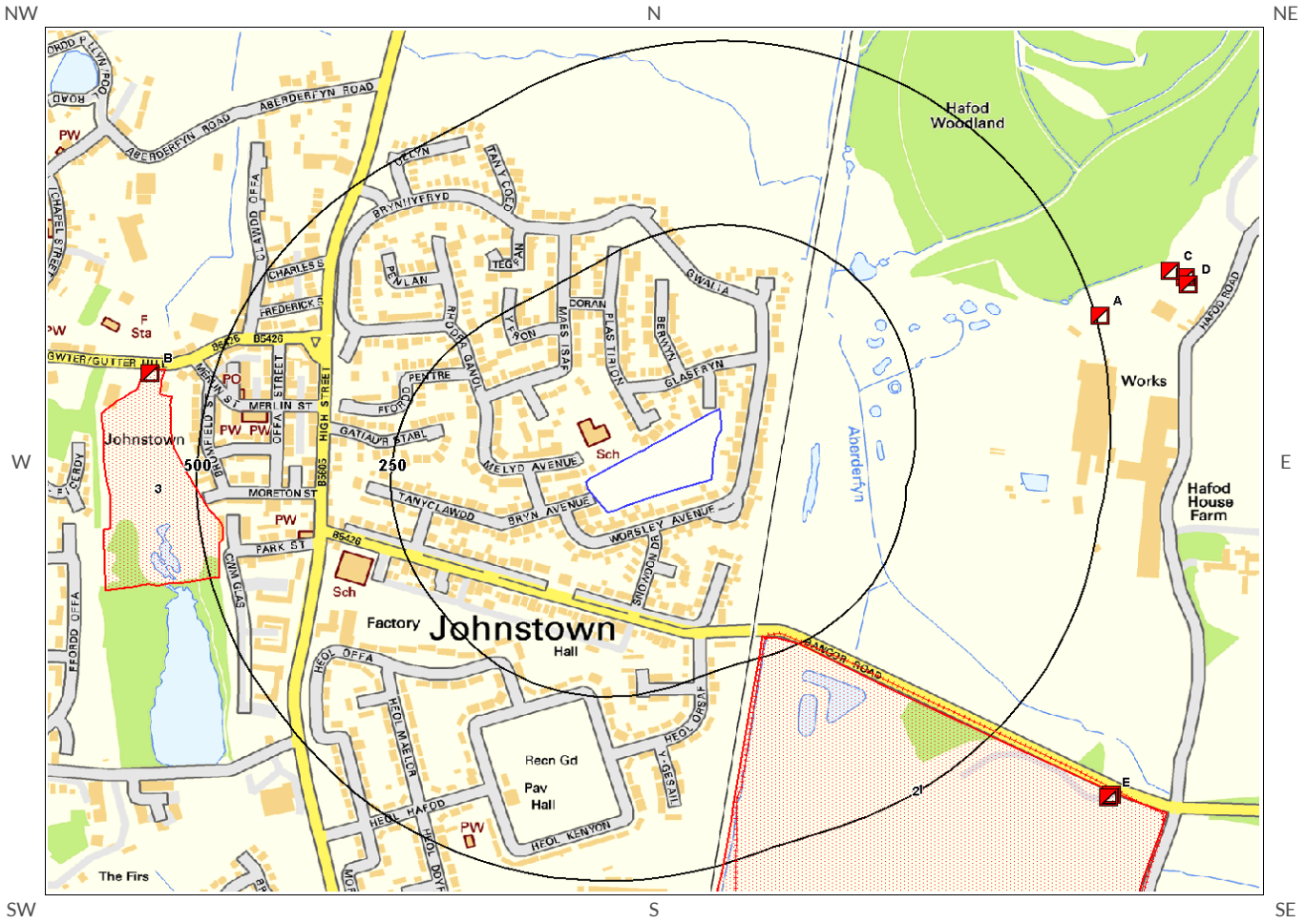
Database searched and no data found.

1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? 0

Database searched and no data found.

2. Landfill and Other Waste Sites Map



Landfill and Other Waste Sites Legend

Mapping sourced from Ordnance Survey

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- Site Outline
- Search Buffers (m) 250 / 500
- E.A. Active Landfill
- E.A. Historic Landfill
- Local Authority Landfill
- Historic and Planned Waste Sites
- E.A. Licensed Waste Site
- BGS / DoE Survey Landfill



2. Landfill and Other Waste Sites

2.1 Landfill Sites

2.1.1 Records from Environment Agency landfill data within 1000m of the study site:

1

The following Environment Agency landfill records are represented as polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
1	223.0	S	331114 345752	Address: Bangor Road, Johnstown, Wrexham, Clwyd, LL14 6ET Landfill Reference: 37286.0 Environmental Permitting Regulations (Waste) Reference: SWM002 Landfill Type: A4 : Household, Commercial & Industrial Waste Landfill	Operator: Cory Environmental (Central) Ltd Status: To PPC IPPC Reference: EPR Reference:

2.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

3

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
2	223.0	S	330800 345500	Site Address: Hafod Quarry, Bangor Road, Johnstown, Wrexham Waste Licence: Yes Site Reference: - Waste Type: - Environmental Permitting Regulations (Waste) Reference: WW1/L/SWM001	Licence Issue: 30-Apr-1999 Licence Surrendered: 23-May-2005 Licence Hold Address: - Operator: -
3	470.0	W	329800 346100	Site Address: Stryt Las, Stryd Las, Johnstown, Wrexham Waste Licence: Yes Site Reference: NOW-513-L, WMBC L75 Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: WW1/L/WAT001	Licence Issue: 22-Jul-1993 Licence Surrendered: 17-Aug-2005 Licence Hold Address: - Operator: -
Not shown	1348.0	S	330100 344500	Site Address: Gardden Clay Pit, Gardden Lodge, Tatham Road, Ruabon, Wrexham, Clywd Waste Licence: Yes Site Reference: WMBC L/23, WMBC L82 Waste Type: Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 01-Apr-1977 Licence Surrendered: Licence Hold Address: A8 Edinburgh Road, Coatbridge, Lanarkshire Operator: -

2.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

2.1.4 Records of Local Authority landfill sites within 1500m of the study site:

0

Database searched and no data found.

2.2 Other Waste Sites

2.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

Database searched and no data found.

2.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

35

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
5A	505.0	E	331099 346403	Site Address: Hafod Yard, Hafod Road, Johnstown, Wrexham, Clwyd, LL14 2AT Type: HCI Waste TS + treatment + asbestos Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: DAV097 EPR reference: /A001 Operator: Davies Michael Waste Management licence No: 100343 Annual Tonnage: 0.0	Issue Date: 03/12/2008 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: M & J T Davies Group Correspondence Address: -, -
6A	505.0	E	331099 346403	Site Address: Hafod Yard, Hafod Road, Johnstown, Wrexham, Clwyd, LL14 2AT Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ENV992 EPR reference: EA/EPR/NB3339RH/T001 Operator: Enviroclear Site Services Limited Waste Management licence No: 100343 Annual Tonnage: 20001.0	Issue Date: 03/12/2008 Effective Date: 01/02/2013 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Hafod Yard Correspondence Address: -, -

ID	Distance (m)	Direction	NGR	Details	
7A	505.0	E	331099 346403	Site Address: Hafod Yard, Hafod Road, Johnstown, Wrexham, Clwyd, LL14 2AT Type: Special Waste Transfer Station Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ENV992 EPR reference: EA/EPR/NB3339RH/V002 Operator: Enviroclear Site Services Limited Waste Management licence No: 100343 Annual Tonnage: 20001.0	Issue Date: 03/12/2008 Effective Date: 01/02/2013 Modified: 18/12/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Hafod Yard Correspondence Address: -, -
8A	505.0	E	331099 346403	Site Address: Hafod Yard, Hafod Road, Johnstown, Wrexham, Clwyd, LL14 6HF Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: DAV097 EPR reference: EA/EPR/CB3133RG/T002 Operator: Davies Michael Waste Management licence No: 100343 Annual Tonnage: 24999.0	Issue Date: 03/12/2008 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Part-Tran Site Name: M & J T Davies Group Correspondence Address: -, -
9A	505.0	E	331099 346403	Site Address: Hafod Yard, Hafod Road, Johnstown, Wrexham, Clwyd, LL14 6HF Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: DAV097 EPR reference: EA/EPR/CB3133RG/T002 Operator: Davies Michael Waste Management licence No: 100343 Annual Tonnage: 24999.0	Issue Date: 03/12/2008 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Part-Tran Site Name: M & J T Davies Group Correspondence Address: -, -
10B	579.0	W	329878 346325	Site Address: Stryd Las, Johnstown, Wrexham, LL14 2AN Type: Landfill taking Non-Biodegradeable Wastes Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAT001 EPR reference: - Operator: Watkin Jones & Sons Waste Management licence No: 37077 Annual Tonnage: 0.0	Issue Date: 22/07/1993 Effective Date: - Modified: 31/03/2003 Surrendered Date: 17/08/2005 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Stryt Las Correspondence Address: -, Unit 21, Llandegai Ind Est, Bangor, Gynedd, LL57 4YH
11B	579.0	W	329878 346325	Site Address: Stryd Las, Johnstown, Wrexham, LL14 2AN Type: Landfill taking Non-Biodegradeable Wastes Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAT001 EPR reference: - Operator: Watkin Jones & Sons Waste Management licence No: 37077 Annual Tonnage: 0.0	Issue Date: 22/07/1993 Effective Date: - Modified: 31/03/2003 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Stryt Las Correspondence Address: -, Unit 21, Llandegai Ind Est, Bangor, Gynedd, LL57 4YH
12B	579.0	W	329878 346325	Site Address: Stryd Las, Johnstown, Wrexham, Clwyd, LL14 2AN Type: Landfill taking Non-Biodegradeable Wastes Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WAT001 EPR reference: EA/EPR/GP3694FY/S002 Operator: Watkin Jones & Son Ltd Waste Management licence No: 37077 Annual Tonnage: 150000.0	Issue Date: 22/07/1993 Effective Date: - Modified: 31/03/2003 Surrendered Date: 17/08/2005 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Stryd Las Correspondence Address: -, -

ID	Distance (m)	Direction	NGR	Details	
13C	610.0	E	331190 346464	Site Address: Former A R C Conblock Yard, Off Old Hafod Road, Hafod, Wrexham, LL13 0YH Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ROB001 EPR reference: - Operator: Roberts Hayden Waste Management licence No: 37150 Annual Tonnage: 0.0	Issue Date: 30/09/1997 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Hayden Roberts Skip Hire Correspondence Address: -, Hill Crest, Bangor Road, Gyfelia, Wrexham, LL13 0YH
14C	625.0	E	331209 346455	Site Address: Hafod Yard, Hafod Road, Johnstown, Wrexham, Clwyd, LL14 6HF Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HAR221 EPR reference: EA/EPR/WP3990VL/T001 Operator: Harper Nigel Waste Management licence No: 102687 Annual Tonnage: 4999.0	Issue Date: 02/08/2011 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Tran Part Site Name: N J Skip Hire, Hafod Yard Correspondence Address: -, -
15D	627.0	E	331213 346446	Site Address: Former A R C Conblock Yard, Off Old Hafod Road, Hafod, Wrexham, Clwyd, LL14 6HF Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: ROB001 EPR reference: - Operator: Roberts Haydn Waste Management licence No: 37150 Annual Tonnage: 2544.0	Issue Date: 9/30/1997 Effective Date: - Modified: 12/10/2003 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Hayden Roberts Skip Hire Correspondence Address: -, Former A R C Conblock Yard, Off Old Hafod Road, Hafod, Wrexham, Wrexham, LL14 6HF
16D	627.0	E	331213 346446	Site Address: Former A R C Conblock Yard, Off Old Hafod Road, Hafod, Wrexham, Clwyd, LL14 6HF Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: FBS002 EPR reference: EA/EPR/DP3691SB/T001 Operator: F B Skips Ltd Waste Management licence No: 37150 Annual Tonnage: 24999.0	Issue Date: 30/09/1997 Effective Date: 06/01/2009 Modified: 10/12/2003 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired Site Name: F B Skips Ltd Correspondence Address: -, -
17E	668.0	SE	331110 345749	Site Address: Bangor Road, Johnstown, Wrexham, Clwyd, LL14 6ET Type: Co-Disposal Landfill Site Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SWM001 EPR reference: EA/EPR/VP3094FP/S002 Operator: Sita U K Ltd Waste Management licence No: 37201 Annual Tonnage: 300000.0	Issue Date: 30/04/1999 Effective Date: - Modified: - Surrendered Date: 23/05/2005 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Hafod Quarry Correspondence Address: -, -
18E	668.0	SE	331110 345749	Site Address: Bangor Rd, Johnstown, Wrexham, LL14 6ET Type: Co-Disposal Landfill Site Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SWM002 EPR reference: - Operator: Sita Uk Waste Management licence No: 37286 Annual Tonnage: 0.0	Issue Date: 08/03/2005 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: IPPC Site Name: Hafod Quarry Correspondence Address: -, Packington House, Packington Rd, Little Packington, Meliden, Coventry, CV7 7HN

ID	Distance (m)	Direction	NGR	Details	
19E	668.0	SE	331110 345749	Site Address: Bangor Road, Johnstown, Wrexham, LL14 6ET Type: Other Landfill Site taking Special Waste Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: SWM001 EPR reference: - Operator: Shropshire Waste Management Ltd Waste Management licence No: 37201 Annual Tonnage: 105000.0	Issue Date: 30/04/1999 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Hafod Quarry Correspondence Address: -, 107 Longden Road, Shrewsbury, Shropshire, SY3 9DS
20E	668.0	SE	331110 345749	Site Address: Bangor Road, Johnstown, Wrexham, LL14 6ET Type: Co-Disposal Landfill Site Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SWM001 EPR reference: - Operator: Shropshire Waste Management Ltd Waste Management licence No: 37201 Annual Tonnage: 105000.0	Issue Date: 30/04/1999 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Hafod Quarry Correspondence Address: -, 107 Longden Road, Shrewsbury, Shropshire, SY3 9DS
21E	668.0	SE	331110 345749	Site Address: Bangor Rd, Johnstown, Wrexham, LL14 6ET Type: Co-Disposal Landfill Site Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SWM002 EPR reference: - Operator: Sita Uk Waste Management licence No: 37286 Annual Tonnage: 0.0	Issue Date: 08/03/2005 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: IPPC Site Name: Hafod Quarry Correspondence Address: -, Packington House, Packington Rd, Little Packington, Meliden, Coventry, CV7 7HN
22E	668.0	SE	331110 345749	Site Address: Bangor Road, Johnstown, Wrexham, Clwyd, LL14 6ET Type: Co-Disposal Landfill Site Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SWM001 EPR reference: EA/EPR/VP3094FP/S002 Operator: Sita U K Waste Management licence No: 37201 Annual Tonnage: 300000.0	Issue Date: 30/04/1999 Effective Date: - Modified: - Surrendered Date: 23/05/2005 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Hafod Quarry Correspondence Address: -, -
23E	668.0	SE	331110 345749	Site Address: Bangor Road, Johnstown, Wrexham, LL14 6ET Type: Co-Disposal Landfill Site Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SWM001 EPR reference: - Operator: Sita Uk Waste Management licence No: 37201 Annual Tonnage: 105000.0	Issue Date: 30/04/1999 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Hafod Quarry Correspondence Address: -, Packington House, Packington Lane, Little Packington, Meriden, Coventry, CV7 7HN
24E	668.0	SE	331110 345749	Site Address: Bangor Road, Johnstown, Wrexham, LL14 6ET Type: Co-Disposal Landfill Site Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SWM001 EPR reference: - Operator: Sita Uk Waste Management licence No: 37201 Annual Tonnage: 0.0	Issue Date: 30/04/1999 Effective Date: - Modified: - Surrendered Date: 23/05/2005 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Hafod Quarry Correspondence Address: -, Packington House, Packington Lane, Little Packington, Meriden, Coventry, CV7 7HN

ID	Distance (m)	Direction	NGR	Details	
25E	669.0	SE	331114 345752	Site Address: Bangor Road, Johnstown, Wrexham, Clwyd, LL14 6ET Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SWM002 EPR reference: EA/EPR/JP3294FV/A001 Operator: Cory Environmental (Central) Ltd Waste Management licence No: 37286 Annual Tonnage: 500000.0	Issue Date: 08/03/2005 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: To PPC Site Name: Hafod Quarry Landfill Correspondence Address: -, -
26E	669.0	SE	331114 345752	Site Address: Bangor Road, Johnstown, Wrexham, LL14 6ET Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SWM002 EPR reference: - Operator: M W H Associates Ltd Waste Management licence No: 37286 Annual Tonnage: 500000.0	Issue Date: 08/03/2005 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: IPPC Site Name: Hafod Quarry Landfill Correspondence Address: -, 2nd Floor, Port Of Liverpool Building, Pier Head, Liverpool, L3 1BY
27E	669.0	SE	331114 345752	Site Address: Bangor Road, Johnstown, Wrexham, Clwyd, LL14 6ET Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SWM002 EPR reference: EA/EPR/JP3294FV/A001 Operator: Cory Environmental Central Ltd Waste Management licence No: 37286 Annual Tonnage: 500000.0	Issue Date: 3/8/2005 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: IPPC Site Name: Hafod Quarry Landfill Correspondence Address: -, Greyfriars Business Park, 3-6, Frank Foley Way, Greyfriars, Stafford, Staffordshire, ST16 2ST
28E	669.0	SE	331114 345752	Site Address: - Type: Co-Disposal Landfill Site Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SWM002 EPR reference: - Operator: M W H Associates Ltd Waste Management licence No: 37286 Annual Tonnage: 500000.0	Issue Date: 08/03/2005 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: IPPC Site Name: Hafod Quarry Correspondence Address: -, 2nd Floor, Port Of Liverpool Building, Pier Head, Liverpool, L3 1BY
29E	669.0	SE	331114 345752	Site Address: Hafod Quarry, Bangor Rd, Johnstown, Wrexham, LL14 6ET Type: Co-Disposal Landfill Site Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SWM002 EPR reference: - Operator: M W H Associates Limited Waste Management licence No: 37286 Annual Tonnage: 0.0	Issue Date: 08/03/2005 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: IPPC Site Name: Hafod Quarry Correspondence Address: -, 2nd Floor, Port Of Liverpool Building, Pier Head, Liverpool, L3 1BY
Not shown	821.0	SW	330100 345400	Site Address: Brother Industries (U K) Ltd, Vauxhall Industrial Estate, Ruabon, Wrexham, Clwyd, LL14 6HA Type: Material Recycling Treatment Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BRO197 EPR reference: EA/EPR/FB3234AY/A001 Operator: Brother Industries (U K) Ltd Waste Management licence No: 103896 Annual Tonnage: 300.0	Issue Date: 06/08/2012 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Brother Industries (U K) Ltd Correspondence Address: -, -

ID	Distance (m)	Direction	NGR	Details	
Not shown	1128.0	S	330096 345069	Site Address: H K Motors, Gardden Industrial Estate, Ruabon, Wrexham, Clwyd, LL14 6RG Type: Metal Recycling Site (Vehicle Dismantler) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HKM002 EPR reference: EA/EPR/AP3194FU/V002 Operator: Williams H K; K; D H; A K; C A; I J And N G Williams Waste Management licence No: 37231 Annual Tonnage: 4999.0	Issue Date: 28/03/2003 Effective Date: - Modified: 10/12/2003 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: H K Motors, Ruabon Correspondence Address: -, -
Not shown	1208.0	S	330082 344990	Site Address: I Hayward Ltd, Gardden Ind Est, Ruabon, Wrexham, Clwyd, LL14 6RG Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HAY001 EPR reference: EA/EPR/EP3794FY/V003 Operator: I Hayward Limited Waste Management licence No: 37162 Annual Tonnage: 24999.0	Issue Date: 31/03/1999 Effective Date: - Modified: 31/01/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: I Hayward Ltd Correspondence Address: -, -
Not shown	1208.0	S	330082 344990	Site Address: Gardden Ind Est, Ruabon, Wrexham, LL14 6RG Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HAY001 EPR reference: - Operator: Haywards I Waste Management licence No: 37162 Annual Tonnage: 0.0	Issue Date: 31/03/1999 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: I Haywards Ltd Correspondence Address: -, Gardden Ind Est, Ruabon, Wrexham, LL14 6RG
Not shown	1248.0	S	330053 344957	Site Address: Gardden Industrial Estate, Ruabon, Wrexham, Clwyd, LL14 6RG Type: Vehicle depollution facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CLW002 EPR reference: EA/EPR/NP3290VM/A001 Operator: Clwyd Breakers Ltd Waste Management licence No: 102006 Annual Tonnage: 74999.0	Issue Date: 07/10/2010 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Clwyd Breakers Ltd Correspondence Address: -, -
Not shown	1253.0	S	330083 344942	Site Address: Land / Premises At, Gardden Ind Est, Ruabon, Wrexham, Clwyd, LL14 6RG Type: Metal Recycling Site (mixed MRS's) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BEN001 EPR reference: EA/EPR/VP3394FX/A001 Operator: Bennett D Waste Management licence No: 37163 Annual Tonnage: 30000.0	Issue Date: 31/03/1999 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired Site Name: Clwyd Car Breakers Correspondence Address: -, -
Not shown	1464.0	S	330087 344721	Site Address: Tatham Road, Ruabon, Wrexham, LL14 6DR Type: Household, Commercial & Industrial Waste Landfill Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SHA005 EPR reference: - Operator: Shanks Midlands Ltd Waste Management licence No: 37014 Annual Tonnage: 0.0	Issue Date: 02/05/1989 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Gardden Claypit 1 Midlands Correspondence Address: -, Woodside House, Church Road, Woburn Sands, Milton Keynes, MK17 8TA

ID	Distance (m)	Direction	NGR	Details	
Not shown	1466.0	S	330077 344722	Site Address: Tatham Road, Ruabon, Wrexham, Clwyd, LL14 6RF Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SHA001 EPR reference: EA/EPR/HP3694FJ/A001 Operator: Shanks Northern Ltd Waste Management licence No: 37109 Annual Tonnage: 51712.0	Issue Date: 06/07/1994 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Gardden Claypit 2 Northern Correspondence Address: -, -
Not shown	1469.0	S	330087 344716	Site Address: Gardden, Tatham Road, Ruabon, Wrexham, Clwyd, LL14 6RF Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SHA005 EPR reference: EA/EPR/BP3494FC/A001 Operator: Shanks Midlands Ltd Waste Management licence No: 37014 Annual Tonnage: 400.0	Issue Date: 02/05/1989 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Gardden Claypit 1 Midlands Correspondence Address: -, -
Not shown	1470.0	S	330083 344716	Site Address: Tatham Road, Ruabon, Wrexham, LL14 6DR Type: Household, Commercial & Industrial Waste Landfill Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SHA001 EPR reference: - Operator: Shanks Northern Ltd Waste Management licence No: 37109 Annual Tonnage: 0.0	Issue Date: 06/07/1994 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Closure Site Name: Gardden Claypit 2 Northern Correspondence Address: -, Unit 9, Abbey Lane Industrial Estate, Burscough, Ormskirk, Merseyside, L40 7SR

3. Current Land Use Map

NW N NE

W E

SW S SE



Current Land Use Legend

Mapping sourced from Ordnance Survey

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Site Outline

Search Buffers (m)

250

500

Current Industrial Sites

Petrol & Fuel Sites

Underground High Pressure Oil & Fuel Pipelines



3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 6

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	64.0	S	Electricity Sub Station		LL14	Electrical Features	Infrastructure and Facilities
2	94.0	NE	Pylon		LL14	Electrical Features	Infrastructure and Facilities
3	121.0	NW	Electricity Sub Station		LL14	Electrical Features	Infrastructure and Facilities
4	158.0	E	Gas Valve Compound		LL14	Gas Features	Infrastructure and Facilities
5	220.0	NE	Pylon		LL14	Electrical Features	Infrastructure and Facilities
6	231.0	W	Electricity Sub Station		LL14	Electrical Features	Infrastructure and Facilities

3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: 0

Database searched and no data found.

3.3 Underground High Pressure Oil and Gas Pipelines

Records of high pressure underground pipelines within 500m of the study site: 0

Database searched and no data found.



4. Geology

4.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

4.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
TILLD	TILL, DEVENSIAN	DIAMICTON
GFDUD	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]

4.3 Bedrock and Solid Geology

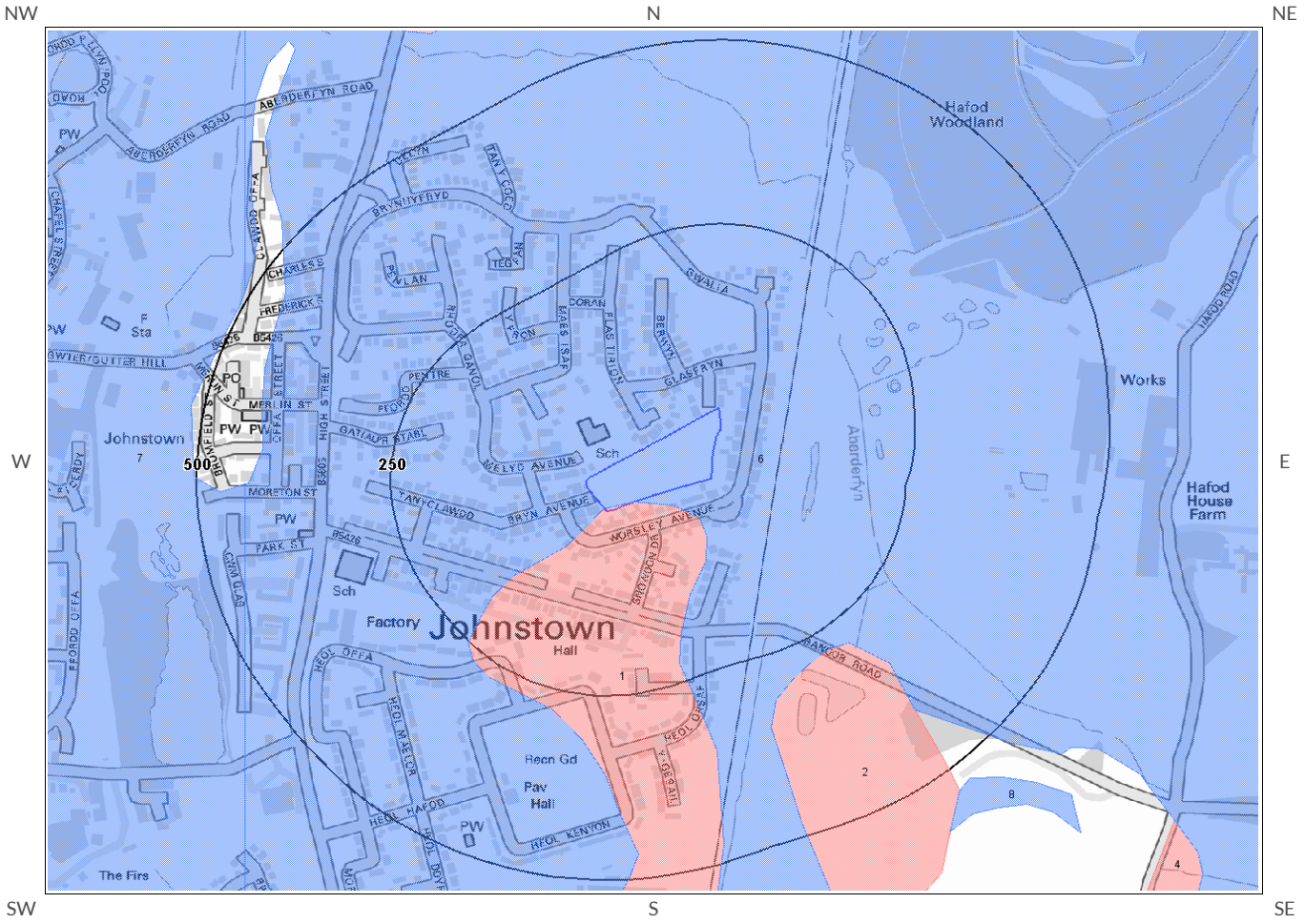
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
ETM-MDST	ETRURIA FORMATION	MUDSTONE

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

5. Hydrogeology and Hydrology

5a. Aquifer Within Superficial Geology



Aquifer Within Superficial Geology

Mapping sourced from Ordnance Survey

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Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

5b. Aquifer Within Bedrock Geology and Abstraction Licenses



Aquifer Within Bedrock Geology and Abstraction Licenses

Mapping sourced from Ordnance Survey

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- Site Outline
- Search Buffers (m): 250, 500
- Principal Aquifer
- Secondary (A) Aquifer - Permeable Layers
- Secondary (B) Aquifer - Lower Permeability Layers
- Secondary Aquifer - Undifferentiated Layers
- Unproductive
- Unknown (lakes and landslip)
- Groundwater Abstraction Licence
- Surface Water Abstraction Licence

5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses

NW N NE



W E

SW S SE

Map LegendSource Protection Zonesand PotableWater Abstraction Licenses

Mapping sourced from Ordnance Survey

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Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

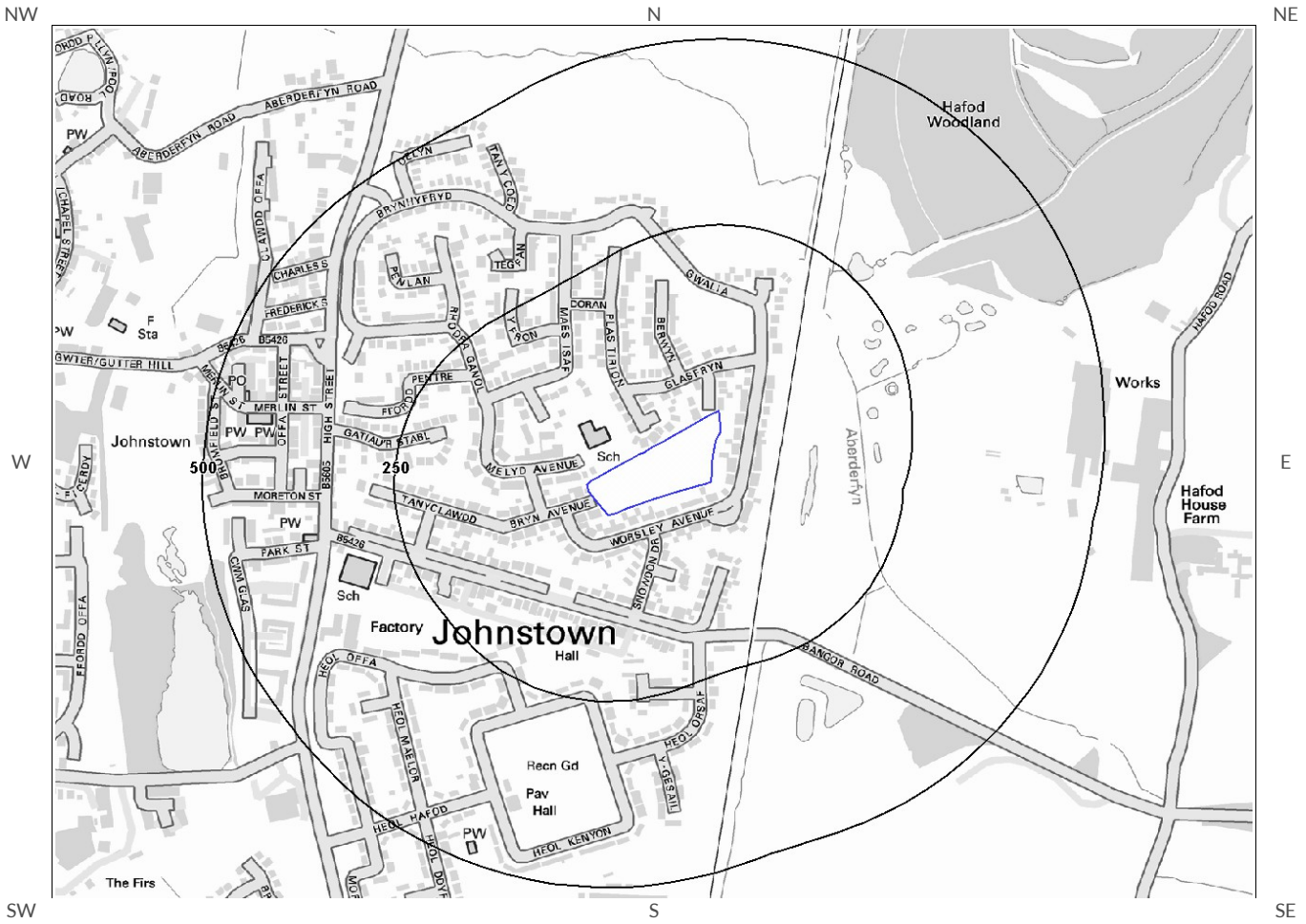
Source Protection Zone 2 - Outer Catchment

Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

5d. Hydrology Source Protection Zones within confined aquifer



Hydrology Source Protection Zones

Mapping sourced from Ordnance Survey

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Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1C - Inner Catchment within Confined Aquifer

Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

Potable Water Abstraction Licence

5 e. Hydrology – Detailed River Network and River Quality

NW N NE

W E



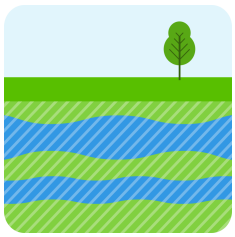
SW S SE

Hydrology – Detailed River Network and River Quality

Mapping sourced from Ordnance Survey

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- Site Outline
- Search Buffers (m): 250, 500
- Primary River
- Secondary River
- Tertiary River
- Lake/Reservoir
- Underground River (inferred)
- General Quality Assessment: Biology
- General Quality Assessment: Chemistry
- Canal
- Canal Tunnel
- Culvert
- Multiple Channel Culvert
- Underground River (Potential Sewer)
- Underground River (local knowledge)



5. Hydrogeology and Hydrology

5.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

ID	Distance (m)	Direction	Designation	Description
1	0.0	On Site	Secondary A	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
6	0.0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
2	276.0	SE	Secondary A	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
7	438.0	W	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

5.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	Designation	Description
1	0.0	On Site	Secondary A	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
2	438.0	W	Secondary A	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

5.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

5.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

5.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

5.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

5.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site?

No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

5.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
194	N	Minor Aquifer/High Leaching Potential	H2	Deep, permeable, coarse textured soils which readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential.
220	E	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.
438	W	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

5.9 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? No

5.9.1 Biological Quality:

Database searched and no data found.

5.9.2 Chemical Quality:

Database searched and no data found.

5.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site?	Yes

The following Detailed River Network records are represented on the Hydrology Map (5e):

ID	Distance (m)	Direction	Details	
1	175.0	NE	River Name: Aberderfyn Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
2	179.0	E	River Name: Aberderfyn Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
3	179.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
4	225.0	S	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
5	229.0	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
6	231.0	NE	River Name: Aberderfyn Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
7A	231.0	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
8	232.0	NE	River Name: Aberderfyn Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
9	238.0	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
10 A	238.0	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
11 B	254.0	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
12	258.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
13	266.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
14	267.0	SE	River Name: Aberderfyn Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
15 B	276.0	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
16	284.0	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
17	293.0	NE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
18	308.0	N	River Name: Aberderfyn Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
19	336.0	NE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
20 C	359.0	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
21 C	373.0	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined

ID	Distance (m)	Direction	Details	
22	387.0	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
23	391.0	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined

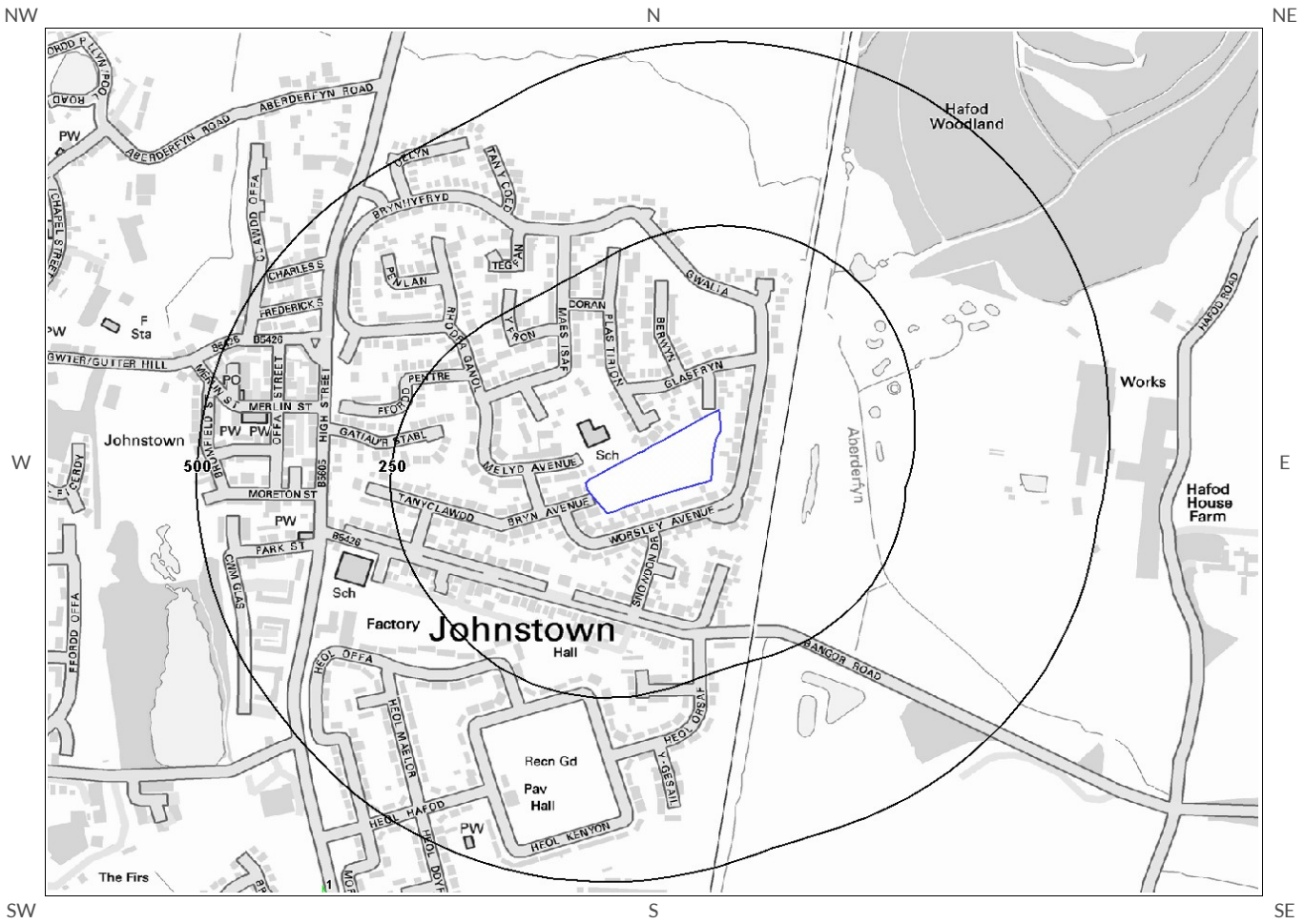
5.11 Surface Water Features

Are there any surface water features within 250m of the study site? Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
117.0	E
175.0	E
178.0	E
179.0	E
190.0	E
193.0	NE
204.0	E
209.0	NE
217.0	E
227.0	S
229.0	E
229.0	NE
229.0	NE
238.0	NE
238.0	NE
247.0	NE

6. Environment Agency Flood Map for planning (from rivers and the sea)



Environment Agency Flood Map for planning (from rivers and the sea)

Mapping sourced from Ordnance Survey

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Site Outline

250
500
Search Buffers (m)

Zone 2 Floodplain

Zone 3 Floodplain

Flood Storage Area

Area Benefiting from Flood Defences

Flood Defences



6. Flooding

6.1 Zone 2 Flooding

Environment Agency Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 1 – Environment Agency Flood Map for Planning:

Is the site within 250m of an Environment Agency Zone 2 floodplain? No

Database searched and no data found.

6.2 Zone 3 Flooding

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 1 – Environment Agency Flood Map for Planning.

Is the site within 250m of an Environment Agency Zone 3 floodplain? No

Database searched and no data found.

6.3 Flood Defences

Are there any Flood Defences within 250m of the study site? No

Database searched and no data found.

6.4 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

6.5 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

6.6 Groundwater Flooding Susceptibility Areas

6.6.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site?

Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Superficial Deposits Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

6.6.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

6.7 Groundwater Flooding Confidence Areas

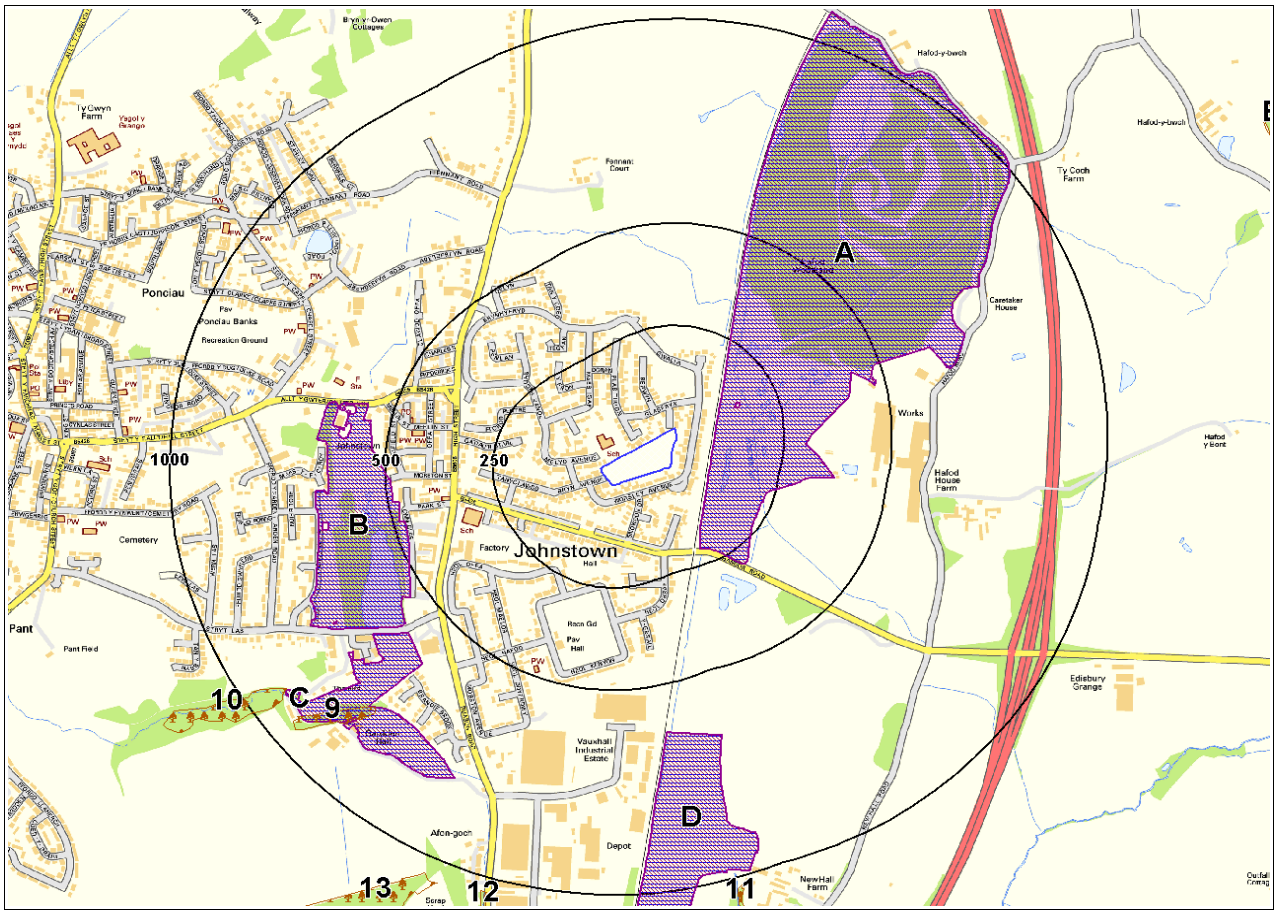
What is the British Geological Survey confidence rating in this result? Moderate

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

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7. Designated Environmentally Sensitive Sites Map



Designated Environmentally Sensitive Sites Map

Mapping sourced from Ordnance Survey

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- Site Centre
- Site Outline
- 100 / 250 Search Buffers (m)
- AONB
- National Park
- SSSI
- Special Protection Areas
- Nitrate Vulnerable Zones
- Green Belt
- Environmentally Sensitive Areas
- Special Areas of Conservation
- World Heritage Sites
- Nitrate Sensitive Areas
- Ancient Woodland
- National Nature Reserve
- Local Nature Reserves
- RAMSAR Sites



7. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

7.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

4

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
5A	87.0	E	STRYT LAS A'R HAFOD	Natural Resources Wales
6B	472.0	W	STRYT LAS A'R HAFOD	Natural Resources Wales
7C	595.0	SW	STRYT LAS A'R HAFOD	Natural Resources Wales
8D	615.0	S	STRYT LAS A'R HAFOD	Natural Resources Wales

7.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

7.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

4

The following Special Area of Conservation (SAC) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SAC Name	Data Source
1A	87.0	E	Johnstown Newt Sites	Natural Resources Wales
2B	472.0	W	Johnstown Newt Sites	Natural Resources Wales
3C	595.0	SW	Johnstown Newt Sites	Natural Resources Wales
4D	615.0	S	Johnstown Newt Sites	Natural Resources Wales

7.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

7.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

7.6 Records of Ancient Woodland within 2000m of the study site:

28

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
9	773.0	SW	Unknown	Ancient and Semi-Natural Woodland
10	903.0	SW	Unknown	Ancient and Semi-Natural Woodland
11	1018.0	S	Unknown	Restored Ancient Woodland Site
12	1034.0	S	Unknown	Restored Ancient Woodland Site
13	1042.0	SW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1328.0	SW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1504.0	NW	Unknown	Restored Ancient Woodland Site
16E	1515.0	E	Unknown	Restored Ancient Woodland Site
Not shown	1530.0	NE	Unknown	Ancient and Semi-Natural Woodland
18E	1553.0	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1594.0	NW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1617.0	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1623.0	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1632.0	NW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1639.0	NW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1671.0	NW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1683.0	NW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1686.0	SW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1688.0	S	Unknown	Ancient and Semi-Natural Woodland
Not shown	1695.0	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1728.0	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1771.0	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1778.0	NW	Unknown	Ancient and Semi-Natural Woodland
Not shown	1791.0	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1891.0	NE	Unknown	Ancient and Semi-Natural Woodland
Not shown	1934.0	NW	Unknown	Restored Ancient Woodland Site
Not shown	1961.0	S	Unknown	Restored Ancient Woodland Site
Not shown	1984.0	NE	Unknown	Ancient and Semi-Natural Woodland

7.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.

7.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

7.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

7.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

7.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

7.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

7.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

0

Database searched and no data found.

7.14 Records of Green Belt land within 2000m of the study site:

0

Database searched and no data found.



8. Natural Hazards Findings

8.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a GroundSure GeoInsight, available from our website. The following information has been found:

8.1.1 Shrink Swell

What is the maximum Shrink-Swell* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

8.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

* This indicates an automatically generated 50m buffer and site.

8.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

8.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

8.1.6 Running Sand

What is the maximum Running Sand* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

* This indicates an automatically generated 50m buffer and site.



9. Mining

9.1 Coal Mining

Are there any coal mining areas within 75m of the study site? Yes

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance	Direction	Details
0.0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

9.2 Shallow Mining

What is the subsidence hazard relating to shallow mining on-site*? Moderate

*Please note this data is searched with a 150m buffer.

9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No

Guidance: No Guidance Required.

Contact Details

CENTREMAPS
Telephone: 01886 832972
groundsure@centremaps.co.uk
CENTREMAPS, Brockamin House, Leigh, Worcester, London, WR6 5JU

Directors: M C Walker, MInst C.E.S., C M Walker,
S J Hawkins BSc (Hons), S E Stewart BSc (Hons)
Registered No. 1890261 Registered in England and Wales
Registered Company: Laser Surveys Limited
Brockamin House, Leigh, Worcester, WR6 5JU.

centremapslive.com
the mapping portal from Laser Surveys

British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email: **enquiries@bgs.ac.uk**
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 08708 506 506
Web:**www.environment-agency.gov.uk**
Email:**enquiries@environment-agency.gov.uk**

Environment Agency

Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
https://www.gov.uk/government/organisations/public-health-england
Email:**enquiries@phe.gov.uk**
Main switchboard**: 020 7654 8000**

Public Health England

The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

The Coal Authority

Ordnance Survey

Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Mapping sourced from Ordnance Survey

Local Authority
Authority: Wrecsam - Wrexham County Borough Council
Phone: 01978 292 000
Web: http://www.wrexham.gov.uk/
Address: The Guildhall, Wrexham, Wrexham, LL11 1AY

Gemapping PLC

Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444

getmapping®

Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, Natural England who retain the Copyright and Intellectual Property Rights for the data. PointX © Database Right/Copyright, Thomson Directories Limited © Copyright Link Interchange Network Limited © Database Right/Copyright and Ordnance Survey © Crown Copyright and/or Database Right. All Rights Reserved. Licence Number [03421028].
This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:

"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with GroundSure.

"Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

"Third Party Data Provider" means any third party providing Third Party Content to GroundSure.

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.

"GroundSure Materials" means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

"Order" means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.

"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.

"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services.

"Third Party Content" means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.GroundSure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.

2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by GroundSure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(i) the Beneficiary,

(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

(iv) the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.

6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 GroundSure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in

GroundSure's possession or control; and

(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond GroundSure's reasonable control.

In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law. **© GroundSure Limited June 2013**

APPENDIX B

Historical Mapping

Ordnance Survey®
Historical Mapping Extract

www.centremaps*live*.com

Site Details:

NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: County Series

Map date: **1873**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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Surveyed 1873
Revised 1873
Edition N/A
Copyright N/A
Levelled N/A

Produced by
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www.groundsure.com

Supplied by:
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groundsure@centremaps.com

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Production date: 25 March 2015

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Site Details:

NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: County Series

Map date: **1898**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1873
Revised 1898
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1873
Revised 1898
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

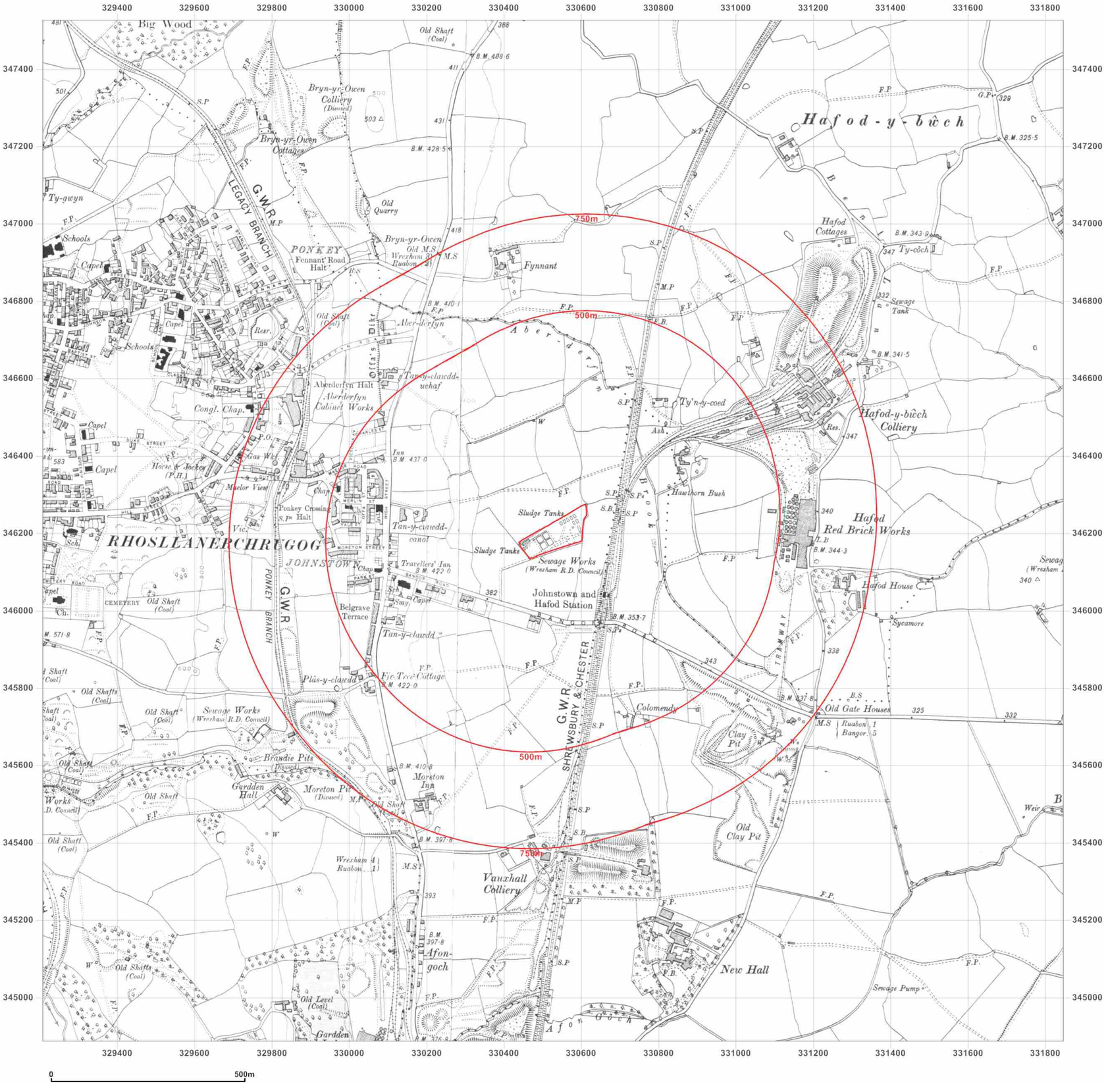
Map Name: County Series

Map date: **1909**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1872
Revised 1909
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1871
Revised 1909
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1872
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A

Surveyed 1871
Revised 1938
Edition 1938
Copyright N/A
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Site Details:

NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

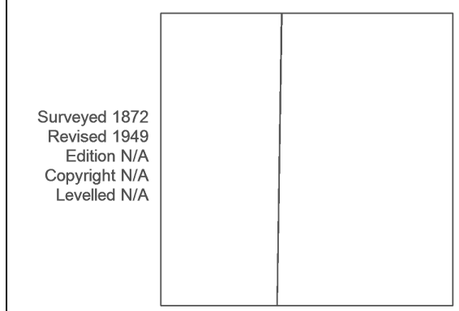
Map Name: County Series

Map date: **1949**

Scale: 1:10,560

Printed at: 1:10,560

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NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: Provisional

Map date: **1960-1964**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1960
Revised 1960
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1964
Revised 1964
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1960
Revised 1960
Edition N/A
Copyright N/A
Levelled N/A

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NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: National Grid

Map date: **1974-1977**

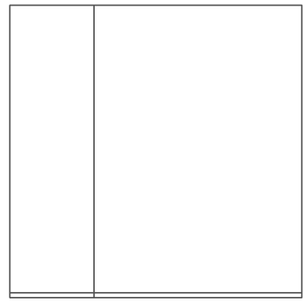
Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1973
Revised 1974
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1975
Revised 1977
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1971
Revised 1974
Edition N/A
Copyright N/A
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Site Details:

NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: National Grid

Map date: **1992-1994**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1987
Revised 1992
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1971
Revised 1994
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1991
Revised 1993
Edition N/A
Copyright N/A
Levelled N/A

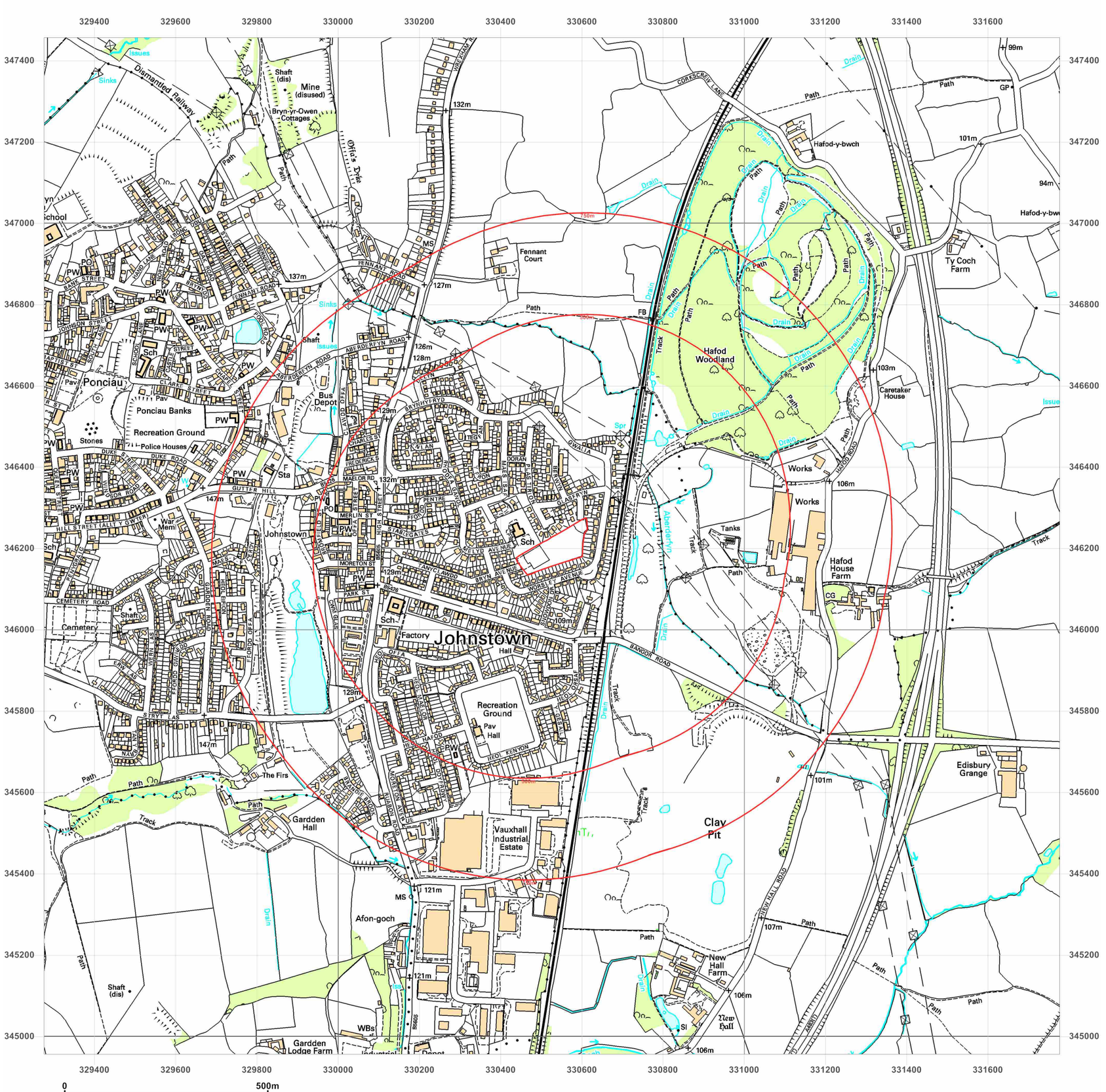
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Site Details:

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Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: 1:10,000 Raster

Map date: **2002**

Scale: 1:10,000

Printed at: 1:10,000

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Site Details:

NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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2010

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Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: National Grid

Map date: **2014**

Scale: 1:10,000

Printed at: 1:10,000

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2014

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Site Details:

NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: County Series

Map date: **1873-1875**

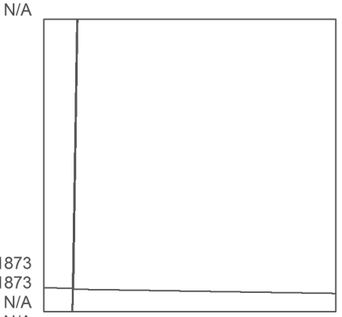
Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1875
Revised 1875
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1873
Revised 1873
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1873
Revised 1873
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1873
Revised 1873
Edition N/A
Copyright N/A
Levelled N/A

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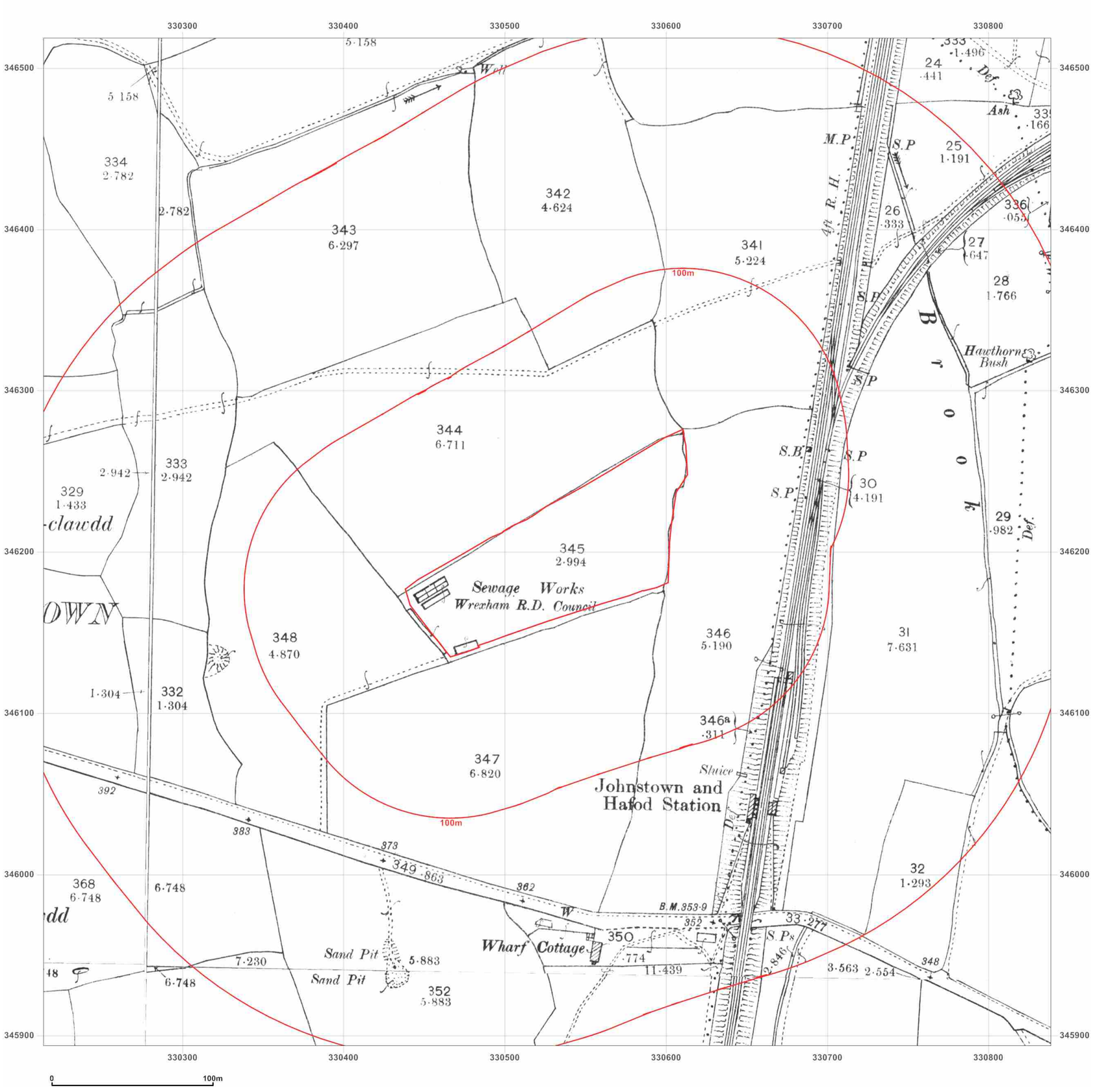
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Site Details:

NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

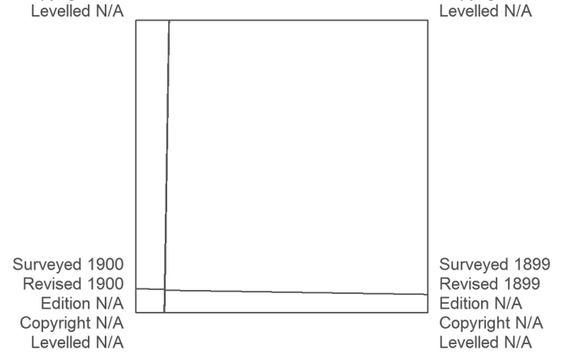
Map Name: County Series

Map date: **1899-1900**

Scale: 1:2,500

Printed at: 1:2,500

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Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: County Series

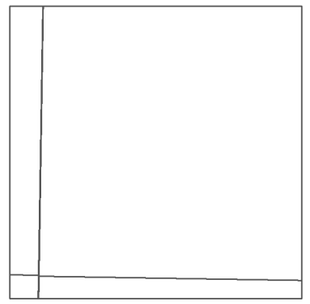
Map date: **1912**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1912
Revised 1912
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1912
Revised 1912
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1912
Revised 1912
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1912
Revised 1912
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Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: National Grid

Map date: **1960**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1960
Revised 1960
Edition N/A
Copyright 1962
Levelled 1960

Surveyed 1960
Revised 1960
Edition N/A
Copyright 1961
Levelled 1960

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Site Details:

NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: National Grid

Map date: **1967**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1967
Revised 1967
Edition N/A
Copyright 1968
Levelled 1960

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Site Details:

NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: National Grid

Map date: **1981**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1981
Revised 1981
Edition N/A
Copyright 1982
Levelled 1960

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Site Details:

NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: National Grid

Map date: **1986**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1960
Revised 1986
Edition N/A
~~Copyright 1986~~
Levelled 1960

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Site Details:

NANT PARC, JOHNSTOWN

Client Ref: 28216
Report Ref: CMAPS-CM-413940-28216-250315HIS
Grid Ref: 330526, 346206

Map Name: National Grid

Map date: **1989-1992**

Scale: 1:2,500

Printed at: 1:2,500

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To view map legend click here *Legend*

APPENDIX C

Photographs from site walkover

Photograph 1: View of existing pavilion on Site looking northwest.



Photograph 2: View of north-western corner of the Site.



Photograph 3: View across the bowling green looking northeast.



Photograph 4: View of water tanks adjacent to the northern boundary of the Site.



Photograph 5: View along the southern boundary of the Site, edge of bowling green visible on left hand-side of the picture.



Photograph 6: View of edge of bowling green looking north-east



Photograph 7: View of park looking southeast



Photograph 8: View of play area in northeast corner.



Photograph 9: View of planting beds surrounding the bowling green and carpark.



Photograph 10: Close-up of planting beds surrounding the bowling green and carpark.



Photograph 11: Drainage associated with the pavilion on-Site



Photograph 12: Manhole cover on-Site.



APPENDIX D

Risk Assessment Methodology

The method of risk evaluation adopted in this document is consistent with CIRIA C552 (2001). Hence, risk is considered to be a function of both the probability (likelihood) of contamination occurring at the study site and also the potential severity (consequence) of the environmental impacts associated with this contamination.

The classification system used to define contaminant probability, consequence and risk is described in the following tables.

Table A: Classification of probability

Classification	Definition
High Likelihood	There is a contaminant linkage and an event that appears either very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Likely	There is a contaminant linkage and all the elements are present and in the right place, which means that it is probably that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term, and likely over the long term.
Low Likelihood	There is a contaminant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is contaminant linkage but circumstances are such that it is improbable that an event would occur even in the long term.

Table B: Classification of consequence

Classification	Receptor	Definition	Examples
Severe	Humans	Short-term (acute) risk to human health likely to result in "significant harm" as defined in the CTL Statutory Guidance	High concentrations of cyanide on the surface of an informal recreation area
	Controlled waters	Short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource	Major spillage of contaminants from site into controlled water
	Property	Catastrophic damage to buildings/property	Explosion, causing building collapse (can also equate to an acute human health risk if buildings are occupied)
	Ecology	A short-term risk to a particular ecosystem, or organism forming part of such eco-system	Potentially long term derogation of a designated site or protected species
Medium	Humans	Chronic damage to human health ("significant harm" as defined in the CTL Statutory Guidance)	Concentrations of a contaminant from a residential site exceed the site-specific assessment criteria
	Controlled waters	Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution)	Leaching of contaminants from a site to a principal or secondary aquifer
	Property	Significant damage to crops, buildings, structures and services	Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
	Ecology	A significant change in a particular ecosystem	Death of a species within a designated nature reserve
Mild	Humans	Contamination present although unlikely to constitute a significant chronic health risk	Concentrations of a contaminant from a public access site moderately exceed the generic assessment criteria

Classification	Receptor	Definition	Examples
	Controlled waters	Pollution of non-water resources	Pollution of non-classified groundwater
	Property	Damage to sensitive. buildings/structures/services	Aggressive ground conditions leading to potential for long term degradation of buried concrete
	Ecology	Damage to the environment	Localised damage to aquatic habitat causing temporary relocation of certain species
Minor	Humans	Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc.)	The presence of contaminants at such concentrations that protective equipment is required during site works.
	Controlled waters	Potential minor release of contamination to local water features	Short term or low volume release of potentially polluting material to a secondary surface water course of low existing quality
	Property	Easily reparable effects of damage to buildings, structures and services. Harm which may result in a financial loss, or expenditure to resolve.	The loss of plants in a landscaping scheme. Discolouration of concrete
	Ecology	Short term, localised damage may occur; consequences are spatially and temporally limited	Short term or localised disruption to in situ flora or fauna; no lasting effects

Table C: Risk classification (comparison of consequence and probability)

Probability (likelihood)		**Consequence (severity)**			
		Severe	***Medium***	***Mild***	***Minor***
	High likelihood	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk