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Originator / Author	Reviewer	Approver
Scott Smith	Steven Taylor	Tim Smith
BSc, (Hons)	BSc, MSc	MA, MSc, FGS, Cgeol
[redacted]		
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YORKSHIRE

Yorkshire: 1 City Square, Leeds LS1 2ES Tel: 0113 300 2014 Fax: 0113 300 2576
Email: enquiries@woodfordgroup.com Website: www.woodfordgroup.com

Woodford Consulting Engineers Limited. Company Registration no. 04456670 VAT Registration no. 800 1441 87

WOMBWELL
BARNSLEY ROAD
WOMBWELL MILLS

REMEDIATION STATEMENT

DECEMBER 2006

WOODFORD CONSULTING ENGINEERS LIMITED
1 City Square
Leeds
LS1 2ES

896/03

WOMBWELL
BARNSLEY ROAD
WOMBWELL MILLS

REMEDIATION STATEMENT

DECEMBER 2006

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EXECUTIVE SUMMARY

Woodford Consulting Engineers Ltd (Consult) was instructed by Woodford Land Ltd (Woodford Land), to prepare a remediation statement for the site located off Barnsley Road, Wombwell. This followed a desk study and site investigation undertaken by Consult in 2005/06. The remediation works are to be undertaken by Woodford Environmental Ltd (Woodford Environmental).

The site is approximately rectangular in shape, and covers approximately 2.0ha. The site is split over two levels with the area in the south west of the site elevated above the remainder, which houses all structures on site including the main factory building and a large water storage tank. There are no known historic developments on the site beyond its current use.

The previous site investigation undertaken identified a small amount of made ground on site, overlying the solid geology of Oaks Rock (Middle Coal Measures) comprising sandstone and mudstone

No significant groundwater observations were encountered during the investigation works although groundwater was recorded in monitoring wells to be at approximately 2m below the ground level in the main site area The monitoring wells allow a much longer response period than will be provided by excavations into the material. It is therefore considered that excavations during the remediation and main development works are unlikely to encounter difficulties associated with groundwater.

Elevated concentrations of some contaminants were encountered in the made and natural ground, which poses a risk to human health without mitigation measures. Therefore a cover layer of 650mm is to be employed in all garden and landscaped areas during redevelopment to break the potential pollution linkage. Groundwater and gas are considered to not pose a risk to controlled waters or humans respectively.

The works to be undertaken by Woodford Environmental are to include:

- *General site clearance,*
- *Disconnection of relevant services,*
- *Demolition of existing structures on site,*
- *Breaking out of hardstand surfaces,*
- *Removal of any below ground obstructions,*
- *Provision of basic construction platform, and;*
- *Validation of excavations and replaced materials.*

Relevant validation and reporting of the works will be completed. A number of post remediation constraints for the developer of the site are envisaged including easement and relocation of retained services, a cover layer to be placed in any garden areas, any necessary regulatory authority approval and the disposal of any future excavated arisings.

1 INTRODUCTION

Subject to confirmation from the Environmental Health Officer (EHO) and the Environment Agency (EA) that the site has been adequately remediated, Homes By Woodford intends to develop the site for residential with gardens.

This document contains the Woodford Consulting Engineers Limited (Consult) remediation strategy for the site. The strategy is based on the reports of previous investigations by Consult, known constraints to the development, and The Woodford Group's extensive experience in the remediation of such sites.

It is recommended that this strategy be read in conjunction with Consult's Desk Study and Site Investigation reports. These reports provide details of the site history, geology and hydrogeology and other details to support the remediation strategy. A summary of this information is provided and copies of the previous reports are presented on a CD in Appendix A.

This remediation statement forms the basis of the remediation proposals for the site together with a detailed appraisal of the investigations of the site conditions performed to date.

The proposals laid out in this document will be submitted to the Local Planning Authority for their consideration to enable planning conditions to reflect that an acceptable remediation strategy is in place. The Environment Agency has also been provided with copies of the Desk Study and Site Investigation Results. The full response from the Environment Agency is provided in Appendix B although in general their position is that as the site is unlikely to pose a significant risk to controlled waters they are not able to comment further on the scheme.

The strategy will be reviewed throughout the project in consultation with all interested parties, and modified to reflect site findings, changes in layout or other relevant conditions.

All reclamation work will be undertaken in accordance with CDM Regulations 1994. Woodford has its own planning supervisor and the HSE will be informed in accordance with the legal framework. All work will be undertaken by personnel experienced in the conditions anticipated at this site. Any new personnel will be fully inducted. Woodford's site procedures have been developed over time to afford best practice on such sites.

The remediation strategy outlined in this document is considered by Woodford to be an acceptable approach to address the site issues and constraints. Woodford reserves the right to amend its proposals at any time, provided always that its actions do not prejudice future building activities nor contravene any regulations, laws or planning requirements, nor its contract with the client.

On completion of the works Consult would ensure that as a result of the remediation strategy having been implemented the Local Authority does not object to the development proceeding and requested to discharge any relevant planning conditions and to be ensured environmental health matters have been addressed.

A deed of Warranty and Certificate would be issued for the benefit of the developer and the first house owners, on completion of the works.

The report should be read in accordance with the disclaimer appended to the Quality Assurance sheet at the start of this report. This report on land potentially affected by contamination has been carried out by or under the direction of a suitably qualified competent person as defined in PPS23.

2 SITE LOCATION AND DESCRIPTION

2.1 General

The site is located on Barnsley Road, Wombwell at Ordnance Survey Grid Reference 438890, 404160 (Drawing W896/01). The site is approximately 5 acres (2.02 hectares) in size and rectangular in shape.

A site plan is presented in Drawing No W896/02.

2.2 Current Site Use

Prior to Woodford Land purchasing the land, the site was used by Perfecta Beds for the assembly and distribution of pre-manufactured beds. The site is currently unoccupied.

The site comprises one (1no.) parcel of land. A large factory building covers the majority of the site. This building comprises a large warehouses and associated offices. The offices have both a single and two storey elements. A loading yard is present in the northern corner of the site, with multiple loading bays providing access to the main warehouse. There are two entrances to the yard.

Access is also possible to the south of the main building via Aldman House Lane. This access leads to a car park area located along the south western boundary. The car park is present on a plateau approximately three metres higher than the main building area. A vegetated slope connects this raised area with the rest of the site and a pedestrian walkway connects it to the main warehouse.

The site is bound by fences on all sides. Brick walls topped with metal fences are present on the north eastern and western boundaries, with the south eastern boundary comprising a wire mesh fence. The south western boundary comprises both wire mesh and wooden fencing.

A large water tank is located adjacent to the warehouse in the south western part of the site. This was formerly used to store water to be used in the warehouse sprinkler system.

A small former fuel storage hut is located adjacent to a portacabin in the north western part of the site. During the initial walkover some staining was noted on the floor in this area.

No invasive plants were noted during the site walkover.

2.3 Current Site Ownership and Occupation

The site is currently in the ownership of the Woodford Land. It was purchased from Perfecta Beds Ltd in December 2005.

2.4 Planning Status

An outline planning application (reference 2006/1172) for a residential development was submitted to Barnsley Metropolitan Borough Council in July 2006.

Tree preservation orders have been served on a number of trees on the vegetated slope. This area, shown on Drawing W896/09, will require protection throughout the remediation works.

3 ENVIRONMENTAL SETTING

3.1 Surrounding Area

The site is located approximately four miles south east of Barnsley Town Centre. It is bound by residential areas to the south west and south east, with playing fields located beyond these areas to the south. Aldham House Lane runs adjacent to the western boundary with both residential and industrial units beyond. Barnsley Road (A633) is located adjacent to the north east boundary with industrial units beyond (Aldham Industrial Estate).

3.2 Site Topography

The majority of the site is generally flat, with the surrounding area sloping from the south west down to the north east.

Within the site boundary, a sloped area of vegetation is located to the south west and east of the buildings, leading to a raised area where the car park and driveway are situated.

The majority of ground cover on site is hardstanding (approximately 80%) of concrete or tarmac, which is all in good condition where visible. Vegetation (approximately 20%) is present along sections of the south west, south and south east boundaries. The vegetation is located on the banking in between the employees car park and main building areas.

A topographical survey of the site is shown on Drawing W896/04.

3.3 Site Access

The site has three vehicular access points, which comprise one access point to the main service yard from Barnsley Road and two from Aldham House Lane, one to the main service yard and one to the employee car parking area (spaces for approximately 100 vehicles) to the south of the factory. A pedestrian access gate is also located on both Barnsley Road and Aldman House Lane.

3.4 Provision of Services

Service searches were carried out for the site by Woodford Land, prior to the site investigation taking place. The location of buried services in the vicinity of the site are shown on Drawing W896/09.

The following plant was known to be present on site:

- Transco/British Gas - A low pressure main enters the site from Aldham House Lane in the north western corner. The pipe runs east to the north western corner of the main warehouse building. A second low pressure main enters the western boundary of the site from Aldham House Lane and travels a short distance east before entering the main warehouse building in the south west corner.

- Electricity - Cables enter from Barnsley Road near the north west corner and run directly in to a substation located in the north of the warehouse building. The substation serves much of the surrounding industrial and residential area and it is understood it will need to remain live until a new substation is located as part of the wider residential development. Two additional spurs enter the site from Barnsley Road at the north western corner but do not appear to connect to any buildings or marked structures.
- Water - Two water mains are shown to enter the site. The first enters on the north eastern boundary, close to the northern corner of the warehouse. The plan shows it to run in a south west direction before terminating in the hardstanding area to the north of the warehouse. It is assumed that from this point, private mains run into the warehouse through the northern corner and this is the location of the water stop tap inside the building. A second 'private' main enters the site via the western boundary from Aldham House Lane close to the warehouse building. It runs east for a short distance before terminating outside the building.
- Drainage - A plan from Yorkshire Water shows a combined sewer running across the northern part of the site. The sewer enters via the western boundary slightly to the north of the warehouse building and travels in an approximate easterly direction. The sewer travels under the northern tip of the warehouse building, before then turning in the south east direction and travelling adjacent to Barnsley Road. The sewer exits the site via the north east boundary. This sewer will require locating and protecting during the remediation works with a diversion likely to be required by the ultimate developer to facilitate development. A second plan from Barnsley Council shows the same combined sewer as on the Yorkshire Water plan, as well as the location of all surface water drains on site. The majority are located close to the perimeter of the warehouse. The only shown exit point for surface water is located via the north eastern boundary.
- BT - The connection to the site is shown to enter the site midway along the north eastern boundary and travel north west before turning south west towards the warehouse building. Upon meeting the warehouse building the cables turn to the south east to run along the outer wall before entering the building approximately half way along the north eastern wall.
- NTL and Cable & Wireless have confirmed that no apparatus is present within the site boundary.

3.5 Site History

Full details of the site history and the historical maps on which the following assessment is based are given in Woodford Consult's Desk Study Report[1]. The historical ordnance survey plans show that the site was undeveloped until some time between 1966 and 1970. The development at this time was similar, with the exception of an extension added later to the existing factory layout.

3.6 Published Geology

A review of the BGS solid and drift edition geology map (6 inch Yorkshire Series Map 275 SW) indicates that no drift geology underlies the site. The solid geology underlying the site comprises Middle Coal Measures of the Oaks Rock, which is described as sandstone of significant thickness. No known BGS boreholes are present on site.

A plan of the geology is presented as Drawing W896/03.

3.7 Coal Mining

The Coal Authority report identified the site as being within the likely zone of influence on the surface from historical workings in seven seams of coal at depths of 100m to 610m, the last date of working being 1985. The Coal Authority note that ground movement from these workings should by now have ceased. The report states that although coal reserves exist in the area, the site is not within the likely zone of physical influence at the surface of any known present or future underground mining. The Coal Authority has no knowledge of any shafts or adits on site, or within 20 metres of the site boundary.

A notice of entitlement to withdraw support, likely to have been associated with the historical workings beneath the site, was published in 1983. Although this notice still applies, given developments in the UK coal industry subsequent to 1985, it is considered unlikely that further mining will present a risk to development.

3.8 Hydrogeology

The groundwater vulnerability map (Sheet 11, South Pennines) shows the underlying Middle Coal Measures to be a minor aquifer. Minor aquifers do not produce large quantities of water for abstraction, but are important for local supplies and in supplying base flow to rivers.

The soils in the area are given a high leaching potential classification. This is based on a worst case scenario due to fewer observations being undertaken in urban environments.

[1] Wombwell Mills, Barnsley Road, Wombwell - Final Desk Study Report. Woodford Consulting Engineers, November 2005.

The site has not been found to be within a Groundwater Source Protection Zone, although a licensed groundwater abstraction for general farming and domestic use was previously present within 1km of the site.

The anticipated local groundwater flow is to the north or north west, towards the River Dove.

3.9 Proximity to Surface Waters

The closest watercourse to the site is the River Dove, which flows from west to east and is approximately 140m north of the site at its closest point. Historically, the South Yorkshire Navigation 'Dearne and Dove' Canal was closer to the site (approximately 40m to the north), however this became disused and was infilled between 1967 and 1970.

3.10 Flooding

A flood risk assessment was undertaken by ARP Associates in March 2006. This report concluded that as the site is not located within a 1 in 100 year flood plain, no measures to protect against flooding are required.

3.11 Presence of Radon

The National Radiological Protection Board describes the area as being one in which less than 1% of homes are above the recommended action level. The BGS Information Services Group indicates that basic radon protection measures are not considered necessary for buildings in the area.

3.12 Invasive Species

No invasive plants are known to be present on site.

4 LEGISLATIVE AND RISK ASSESSMENT FRAMEWORK

Under the Town and Country Planning Legislation, in order that a site may be redeveloped, it needs to be suitable for its intended use. Part IIA of the Environmental Protection Act 1990 (EPA) provides a legal framework for identifying and dealing with contaminated land.

The Contaminated Land (England) Regulations 2000 were issued in accordance with the provision with the EPA. The regulations define Contaminated Land as land "in such condition, by reason of substances in, on, or under the land, that: significant harm is being caused, or pollution of controlled waters is being or likely to be caused". A Local Authority has from time to time to survey the land within its boundaries to identify "Contaminated Land". In the UK the determination of whether land is contaminated land and the determination of whether land is suitable for its intended use is by risk assessment.

The methodology for undertaking risk assessment has been published by The Department of the Environment, Food and Rural Affairs (DEFRA) and the Environment Agency. The risk assessment focuses on the definition of contaminated land. The process of risk assessment examines potential source-pathway-receptor relationships in order to determine whether there is a pollutant linkage. A pollutant linkage is complete where there is a source, a receptor and a viable pathway linking the two.

In this instance, we refer to the source as being contaminants or potential contaminants at a point or in an area of impacted ground. The pathway is a mechanism by which any contamination within the impacted ground could reach the receptor. Pathways include digestion of soil or plant take-up of contaminants through the roots; and inhaling dust or ingesting polluted water. Other pathways include directly causing degradation of buried building materials such as plastic or concrete. Further indirect routes include groundwater transporting contamination to a groundwater abstraction point or to a river or stream and thus causing it to become polluted.

The model framework for conducting a risk assessment is presented in the Environment Agency's Publication CLR11 Model Procedures for the Management of Contaminated Land. Further guidance is provided by the Environment Agency regarding a tiered approach to risk assessment. Tier 1 is an assessment of potential pollutant linkages through production of a conceptual site model (CSM), and Tier 2 is a comparison of found concentrations with soil guideline values. Tier 3 is a quantitative risk assessment based on site specific conditions.

All risk assessments have a common approach, which is one of a tiered assessment. At each stage of the assessment further detail can be applied to the model to provide a detailed interpretation on a site by site basis. This is to determine whether the criteria are being met to prevent contamination of controlled waters and to protect human health and the environment. The process of risk assessment begins with the derivation of a conceptual model.

5 PREVIOUS INVESTIGATIONS

Woodford Consulting Engineers undertook a desk study report and three stage site investigation on site which were completed in October 2005 and November 2006[2] respectively. No other site investigations are known to have taken place prior to these works.

5.1 General

The investigation included trial pits, windowless sample boreholes, rotary boreholes and soakaway tests. Trial pits were used to assess shallow ground conditions, along with windowless sample boreholes, of which the latter were located within the main warehouse building. Rotary boreholes were drilled to examine deeper strata and install standpipes to observe groundwater on site. The location of all excavations on site can be found on Drawing W896/05.

The ground conditions encountered comprised made ground overlying natural strata, which vary in both type and depth across the site. Made ground was found to be between 0.2m and 1.5m thick, with an average depth of approximately 0.6m. Natural ground comprised Middle Coal Measures of sandstone and mudstone, which were mainly recovered as a stiff gravely clay. Coal was encountered in very discreet bands in three locations. No voids or shafts were identified.

Soakaway tests identified that the underlying strata would be unsuitable for soakaway drainage in the future, as the calculated infiltration rates represent poor drainage conditions.

Gas monitoring recorded no gas volumetric flow from the boreholes, and very low composition of methane within the borehole gas. Slightly elevated carbon dioxide levels were recorded on two separate occasions in one location. Despite this, the site would fall within Ciria Characteristic Situation 1, i.e. no special precautions for new developments.

5.2 Encountered Ground Conditions

Ground Surface

Reinforced concrete hardstanding was present at the surface of the majority of exploratory locations. The concrete hardstand was found to be reinforced across the whole of the site and vary in thickness between 0.15 and 0.25m. Tarmacadam surfacing present in the upper car park and was found to be 100mm thick.

[2] Wombwell, Barnsley Road, Wombwell Mills - Final Desk Study Report. Woodford Consulting Engineers, October 2005.
Wombwell, Barnsley Road, Wombwell Mills - Site Investigation Report. Woodford Consulting Engineers, November 2006.

Made Ground

Apart from in one location (WWS10), made ground on site was found to be less than 1.0m in depth. In general, the made ground was slightly deeper towards the northern end of the site.

Made ground generally comprised a sandy gravel or gravely sand of concrete, brick and sandstone with occasional coal, wood, ash and glass fragments. No visual or olfactory contamination was encountered apart for small pockets of ash and tarmac at depths generally of less than 0.5m.

A limited number of particle size distribution tests undertaken on the materials classified the samples as suitable for reuse as a Class 1 (General Fill) material in accordance with Series 600 of the Specification for Highway Works.

No perched groundwater within made ground deposits was encountered.

Natural Deposits

Solid geology strata of sandstone and mudstone, with occasional siltstone and coal deposits were encountered beneath the made ground, although strata directly beneath the made ground were highly weathered and mostly recovered as clays, sands and gravels.

In the upper car park area solid geology comprised sandstone in all locations. The lower area was more variable in nature and included bands of mudstone as well as sandstone.

Thin bands of coal (less than 0.3m thick) were encountered in three locations in the south east of the site. The depth to the top surface of these bands varied between 34.3m and 35.1m AOD or between 2.5m and 3.0m below existing ground level in the lower site area. These bands seem to be relatively intermittent and confined to the east of the site as no coal, voids or loss of drilling flush were encountered in any excavations in the west of the site.

No visual or olfactory evidence of contamination was present within the solid strata encountered.

A mean infiltration rate for the coal measures was calculated from three soakaway tests to be 5.6×10^{-7}.

5.3 Groundwater

Five locations encountered groundwater during the investigation works. These were encountered as minor seepages. Groundwater was encountered in the three monitoring boreholes at significantly varying depths although in the context of the different topographic levels from which the boreholes were excavated it is possible that the groundwater, although representing a very low volume, is in continuity. Groundwater levels indicate that flow in the area is in a north easterly direction towards the River Dove.

No significant groundwater observations were encountered during the investigation works although groundwater was recorded in monitoring wells to be at approximately 2m below the ground level in the main site area. It is not anticipated that therefore that groundwater will react quickly enough to affect any excavations required during the remediation or development works.

5.4 Soil and Water Condition

Chemical testing and statistical analysis of soil samples found that the site had elevated levels of benzo(a)pyrene, chromium and Aromatic hydrocarbons within the equivalent carbon band of C16-C35. With no remedial measures these contaminants were found to pose a significant risk to human health. Hotspots of elevated metal concentrations were also found within the made ground strata. The natural ground was found to have elevated concentrations of benzo(a)pyrene and contain one hotspot of elevated zinc.

Groundwater samples tested indicated that contamination present within the boreholes is minimal. Because of this the groundwater on site is considered to not pose a risk to controlled waters either underlying or close to the site.

An asbestos screening test was conducted on all made ground samples. Asbestos fibres were detected in one (1no.) location. The fibres were identified as chrysotile (white) asbestos, and further identification by the laboratory indicated that the material was typical of asbestos cement.

The concentrations of sulphate found on site, both in the made ground and natural strata indicated that the Design Sulphate Class for the site will be DS-1, and that an Aggressive Chemical Environment for Concrete Class (ACEC Class) of AC-1 is applicable.

5.5 Ground Gas

The monitoring recorded no occasions where there was sufficient positive pressure differential between the gas in the boreholes and atmospheric pressure to allow gas to flow of gas out into the atmosphere. Therefore flow concentrations were always below the threshold of 0.07l/hr.

The composition of carbon dioxide exceeded the guidance value of 5%v/v on two (2no.) occasions within borehole WRO02. All other readings of carbon dioxide composition were below the 5%v/v limit. All recorded methane composition readings were below the guidance value of 1%v/v. Using the Wilson & Card guidance[3] based on flow concentrations, the gas monitoring results show that the site is within the Characteristic Situation 1.

[3] Reliability and risk in gas protection design. Ground Engineering. S.A.Wilson and G.B.Card, 1999.

6 PRE-REMEDIATION CONSTRAINTS

The pre-remediation constraints for the site are summarised on Drawing W896/09. The sections below detail the constraints for the site prior to works commencing, based on the currently proposed layout, which is shown in Appendix C.

6.1 Buildings, Foundations and Hardstanding

The main and ancillary buildings cover the majority of the lower area. A substation owned by Yorkshire Electricity is present on site. All buildings would need to be demolished to facilitate development and a new substation provided as part of the development. A type 3 asbestos survey has been undertaken on the buildings on site, which identified asbestos requiring specialist removal. The site is also currently covered (across approximately 80%) by concrete hardstanding and tarmac that requires removal to facilitate development. The existing substation will require protection throughout the works until an alternative substation is provided by the main developer.

6.2 Buried Concrete, Pipework and Obstructions

There is extensive drainage and manholes associated with the existing buildings and car parking area. These are likely to create obstructions to development if not removed

6.3 Land Condition

Chemical testing and statistical analysis of the soils present found that the site may pose a risk to human health. Elevated levels of contaminants were found in both the made and natural ground. Without mitigation to break this pollutant linkage, the concentrations of contaminants within soils would pose a risk to human health.

Site investigation found that groundwater and gas conditions present on site do not pose risks to controlled waters or humans health.

6.4 Development Platform

The proposed layout shows part of the existing embankment in the south of the site requires removal to facilitate the current development.

6.5 Suitability for Foundations

The site investigation has shown that made ground is shallow across the majority of the site.

The firm and stiff weathered coal measures that underlies the made ground is considered suitable for strip/trench fill foundations.

It is not currently thought that any large scale relict foundations or areas of deep made ground are present on site other than foundations from the existing building. Alternative foundation strategies may need to be considered in areas where deep made ground is created by removal of existing foundations or obstructions. A preliminary plan showing depths to founding strata is provided as Drawing W896/11. This is based on the current proposed layout and anticipated finished floor levels. If either of these should change the zoning plan will require review of updating.

6.6 Tree Preservation Orders

Some of the site is landscaped, and there are a number of mature trees within the site boundary. The trees present on the southern embankment are protected by preservation orders. An appropriate stand off from these trees will have to be maintained during the remedial works.

6.7 Boundary and Party Walls/Neighbouring Structures

The areas around the site are sloping with a general landform from the south west down to the north east. Neighbouring properties around the eastern and southern boundaries of the site may need to be assessed for stability, should any excavations take place close to these areas.

6.8 Security

The site is currently fenced and gates are kept locked at all times. Trespassers have been known to go on to site and enter the main building. A secure site will need to be maintained during the works.

6.9 Services

A number of services exist on site, which are currently still in-situ (these are known to include water, electricity, drainage, gas and telecoms). The current status of these services should be established before work commences. Electricity and drainage will require protecting during the works and relocation of the existing substation will be required to facilitate the main development.

6.10 Mining Subsidence

Three small bands of coal were encountered during the works. No evidence of mining was encountered within these seams or is suggested from the desk study. The risk to future development from subsistence associated with the collapse of mine workings is therefore considered low.

6.11 Regulators

The Environment Agency and Local Authority Environmental Health Officer have been contacted and copies of the desk study and site investigation reports have been sent to both. Copies of correspondence with the Environment Agency are provided in Appendix B. On completion of the works Consult would ensure that as a result of the remediation strategy having been implemented the Local Authority does not object to the development proceeding and requested to discharge any relevant planning conditions and to be ensured environmental health matters have been addressed.

7 REMEDIATION STRATEGY

7.1 Outline Remediation Strategy

The outline strategy for the works to be undertaken on site is as follows:

- General site clearance including surface vegetation, and the installation of measures to protect trees covered by TPOs;
- The disconnection of any redundant services on site, and the protection of any services to be retained;
- Demolition and removal of buildings and structures on site;
- The breakout and crushing of all surface concrete including and former building foundations;
- Removal of any obstructions and below ground structures; and,
- Provide a platform for development.

7.2 Site Clearance and Tree Protection Measures

Measures and locations to protect trees are to be agreed with the Local Authority Tree Officer or other appointed person.

There are however some small verge areas along the eastern boundary, local to the existing water tank and adjacent to the western boundary which will be stripped of vegetation and removal of topsoil. This topsoil can be used on the higher plateau, which will be developed as a landscape area without any public access, as part of the main development.

7.3 Services

Details of the services to be disconnected and those to be retained and protected are shown on Drawing W896/10. In addition, any manholes, gully's or pipe work that does not form part of the Yorkshire Water combined sewer that is to be retained shall be excavated and removed from the site.

The retained services are to comprise the main electricity cable, which runs in to site from the north and is connected to the sub station on site, the combined sewer, which runs across the northern part of the site, and the water supply in the south of the site.

Any other dead services encountered will be removed during the site works.

7.4 Demolition of Buildings

All buildings are to be demolished with the exception of the existing sub station, which is to be protected and maintained during the remediation works. Bricks and concrete are to be crushed to meet the specification of *Class 6F2 as defined in Series 600 of the Highways Specification. These will* then be reused on site.

The main building has been identified as containing ACM's (asbestos containing materials) as detailed in the asbestos survey undertaken in December 2005[4]. Specific health and safety procedures and techniques will required during the initial asbestos strip that is to be undertaken prior to the main demolition works.

7.5 Areas of Hardstanding

Tarmac is limited to the upper car park area and driveway. This material along with kerbs, drainage and ancillary items are to be broken out, taken up and removed from site.

Concrete hardstand, reinforced with steel, covers the bottom area of the site and is on average 0.3m in thickness. After demolition of the buildings have taken place all hardstand is to be broken out, crushed to meet the specification of Class 6F2 as defined in the highways specification and reused on site.

7.6 Removal of Obstructions/Foundations

It is expected that foundations for the main building will be present. Upon removing the building and hardstanding, any remaining foundations will have be broken out to natural ground. Manholes and drainage, with the exception of those associated with adopted combined sewer that is to be retained, will also require removal.

7.7 Land Condition

The previous site investigation showed that some soil contamination is present in both the made and natural ground. No groundwater or gas contamination was found to be present on site.

A risk assessment for site concluded that a cover layer should be employed in all garden areas to break all pollutant pathways and linkages, meaning there is no risk posed to human health.

As pollutant linkages are to be broken through the use of a cover layer, no specific remediation techniques will be employed on the soils.

[4] Asbestos Survey for Woodford Land Ltd at Former Perfects Beds, Barnsley Road, Wombwell. Birstalls, December 2005.

The import of subsoil and topsoil will be undertaken by the ultimate developer. The imported materials will comply with the acceptance criteria as set out in Section 11.

7.8 Creation of a Landform for Development

Earthworks on site will involve a cut and fill of materials to provide a landform suitable for development.

Primarily, this will involve the excavation of a section of the upper car park area and banking located midway along the south west boundary. This will create a uniform embankment along the southern boundary between 15 and 20m in width.

To provide the projected levels, areas of the site will require excavation where as some may need to be in filled. It has been calculated that given current projected levels for site, the 'cut and fill' of material will provide a balance with no material needing to be being removed from site.

An indication of the proposed remediation levels is shown on Drawing W896/06B. It should be noted that proposed contours/levels may need to be vary given actual ground conditions found during site works.

8 POST REMEDIATION CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is shown pictorially for the development following the remediation works as drawing W896/08. This shows the identified sources and mitigation measures to be employed, which are also summarised below :

- The site has been identified to have contamination within both the made and natural ground in the form of both organic and inorganic contamination.
- A cover layer is to be employed within all gardens and landscaped areas to cut any potential pathways for contamination to affect receptors (in this case humans through ingestion/dermal contact). This is to be 650mm in thickness in accordance with Consult internal guidelines.

The CSM shows that there are no anticipated pollutant linkages following the remediation.

9 SITE MANAGEMENT PROCEDURES

The strategy will be reviewed throughout the project in consultation with all interested parties, and modified to reflect site findings, changes in layout or other relevant conditions.

This remediation statement will be reviewed and revised, were necessary, following determination of planning application to reflect any specific conditions relating to the remediation.

9.1 Health and Safety Procedures

All reclamation work will be undertaken in accordance with CDM regulations 1994 (as amended). Woodford has its own planning supervisor and the HSE will be informed in accordance with the legal framework. All work will be undertaken by personnel experienced in the conditions anticipated at this site. Any new personnel will be fully inducted. Woodford's site establishment and procedures have been developed over time to afford best practice on such sites.

Woodford Environmental shall provide an appropriate method statement for the proposed works outlined in the previous sections and sections below. The works are currently programmed to last approximately sixteen (16no.) weeks. This comprises approximately eight (8no.) weeks of demolition and eight (8no.) weeks of earthworks.

In general the following items will be considered and included in the detailed specification of works:

- The control of vehicle access/ingress into the site. This shall be controlled to mitigate impacts to the local area and to ensure appropriate recording of materials leaving site;
- The control of any materials stockpiled on site. This shall include the provision of an area for stockpiling on hardstanding or other suitable material, the location and control of which will be agreed on site with Woodford Consult.

These are discussed in more detail in the following sections.

9.2 Personnel Safety Equipment

The contractor shall ensure that all workers are provided with and use appropriate PPE (Personal Protective Equipment).

No excavations shall take place until all underground services have been identified and this status determined on site by the contractor. All surface water drainage runs shall be identified and suitably sealed prior to the commencement of the excavation of contaminated materials to prevent contaminated waters leaving the site.

9.3 Clean and Dirty Areas

Due to the limited potential for contaminants being present on site, no clean or dirty areas are deemed necessary.

9.4 Dust, Noise and Odour Controls

The contractor should make provision for ensuring that the release of potentially contaminated dusts and odours are kept to a minimum.

Where site works are undertaken during dry periods, consideration should be given to damping down the made ground with minimal application of water sprays to suppress dust generation. All wagons shall be adequately sheeted prior to leaving site.

9.5 Control of Surface Water Run - Off

During the earthworks phase it may be necessary to ensure that surface water run-off does not impact adjacent properties, watercourses or roadways. It will be the contractor's responsibility to ensure that appropriate measures are in place to minimise this.

9.6 Control and Disposal of Excavated / Waste Materials

Excavations are to proceed in a controlled manner with disposal at suitable licensed facilities with accompanying documentation as required by the Environmental Protection Act 1990: Duty of Care Regulations and relevant current Waste Management Legislation.

Any heavily contaminated arisings encountered shall be immediately removed from the site unless specific protection and control facilities are made available to enable such material to be stockpiled. Materials requiring further classification should only be stockpiled on site if such control measures are in place.

The provision of an area for stockpiling on hard standing or other suitable material and site location will be agreed on site with Consult prior to the commencement of works. The generation of leachate from stockpiles remaining on site will either be prevented by covering stockpiles or will be controlled and collected. Leachate should be disposed of or discharged as trade effluent.

9.7 Washing of Vehicles

It is not considered necessary that a wheel wash facility or similar will be required during the works.

Should it be necessary, the contractor should make provision for the prevention of mud and dust spreading onto the public highway and/or into the associated highways drainage system.

9.8 Removal of Contaminated Perched Groundwater

If groundwater displaying visual or olfactory evidence of contamination is encountered during the earthworks programme this should be removed and disposed of under appropriate license with Yorkshire Water to the foul sewer or by tanker to an appropriate facility.

The contractor shall be responsible for ensuring that the relevant licenses are in place and appropriate chemical analysis and treatment carried out if necessary, prior to disposal of water. The contractor should contact the consultant for advise in relation to the disposal of contaminated water.

9.9 Asbestos

The Control of Asbestos at Work Regulations (1987) shall apply to the delineation of any areas of asbestos. If areas of suspected asbestos are encountered during the earthworks, samples shall be taken for analysis for identification and precautions shall be taken to minimise the generation of dust.

10 RESPONSIBILITIES

The main remediation works, comprising the demolition of all structures and the earthworks to the base of the subsoil layer, will be undertaken by Woodford Environmental.

10.1 Consultant

Woodford Consult shall be appointed as consultant for the works to advise on relevant matters during the remedial contract.

Woodford Consult will have full time attendance on the site during the earthworks. It shall be the responsibility of the contractor to contact the consultant to validate areas determined within this strategy or if any unexpected contamination is encountered during the course of the works. Barnsley MBC and the Environment Agency will be advised as necessary.

10.2 Contractor

Woodford Environmental shall be appointed as the contractor and be responsible for the following: -

- Ensure that all aspects of the relevant regulations relating to the excavation, carriage and disposal of contaminated soil are complied with;
- Ensure that all necessary further soil testing for purposes of disposing of materials from site is carried out;
- Ensure that all works are carried out in accordance with the requirements of:
  - This strategy;
  - The Control of Substances Hazardous to Heath Regulations, 1988;
  - The Health and Safety at Work Act, 1974; and
  - Any other relevant available guidance.

The contractor should keep daily work records which shall be provided to the consultant where applicable to enable the recording of all relevant matters. A summary of the records which must be kept by the contractor and be made available to the consultant and/or regulator as required.

The contractor will keep a record of the types and sources of materials used in individual plots and provide a marked up drawing to the consultant for inclusion within the validation report.

10.3 Programme Timescale

The works are currently programmed to last for approximately sixteen (16no.) weeks. This is to include mobilisation and setting up on site, undertaking the works, and demobilising from site. The timescale of the programme may vary dependant on the findings on site, and the need for any further works on site to be undertaken. Any variations in the remediation statement or in the timescale of the works, will be brought to the attention of the relevant parties as soon as is reasonably possible.

On completion of the works, a health & safety file will be collated, according to the CDM Regulations, by the planning supervisor. This report will include all pertinent information to the works, including reclamation proposals and a completion report, relevant documentation, results of sampling, testing and other findings. The file will include post-remediation constraints and advice to future site users. The completion report will be forwarded to the relevant authorities for approval.

Details of any variations to the programme on site will be provided in the completion report.

11 VALIDATION AND CERTIFICATION

Chemical and geotechnical tests will be undertaken to validate the remedial works.

11.1 Chemical Validation

Chemical samples will be taken from any subsoil or topsoil material imported onto site to form the cover layer in garden areas. Representative samples will be taken approximately every 250m^3 of imported material. Samples for leachate testing will also be carried out at the engineer's discretion.

Previous site investigations have shown that given the encountered ground conditions, a cover layer employed in garden and landscaped areas provides sufficient protection to break any potential pollutant pathways that may be present. Because of this, additional validation testing will not be undertaken in the base of excavations.

Validation testing analysis will endeavour to show that the material brought onto site is considered safe to use in garden areas. The testing suite undertaken on every sample will reflect a broad range of contaminants of concern as stated in Table 1. All samples are to contain concentrations less than the stated acceptance guideline in the table.

Table 1: Imported Material Acceptance Guidelines

ANALYTE	Soil	Acceptance Guideline
Asbestos Presence	✓	None detected
Total Ammonia (ionized plus unionized)		0.5mg/l
Arsenic	✓	20mg/kg
Cadmium	✓	1mg/kg
Chromium	✓	130mg/kg
Copper	✓	200mg/kg[1]
Cyanide (Total)	✓	None detected
Lead	✓	450mg/kg
Mercury	✓	8mg/kg
Nickel	✓	50mg/kg
Selenium	✓	35mg/kg
pH	✓	6-8
Phenol	✓	78 mg/kg
PAH (USEPA 16)	✓	0.7 mg/kg BaP 7mg/kg naphthalene Total PAH <10mg/kg
Zinc	✓	300mg/kg[1]
Gasoline Range Organics (inc BTEX & MTBE)	✓	None Detected
Diesel Range Organics	✓	100mg/kg
PCBs (7 congeners)	✓	None Detected

Notes:
[1] Zinc and copper acceptance criteria assume soil pH>7. More stringent acceptance criteria may apply to soil with pH<7.

In addition, should any visual or olfactory signs of contamination be noted during the earthworks, which would be outside the scope of the site investigation works completed to date, additional samples will be taken for analysis.

11.2 Geotechnical Validation

Plate loading tests will be undertaken on the proposed road footprints. It is proposed that material is compacted to achieve an equivalent CBR of 3.0%. The compaction of soils will be carried out in accordance with the relevant method specification from Series 600 of the Specification of Highway Works.

Unacceptable materials as defined in Series 600 will not be re-engineering on site. Should any unsuitable material be encountered, it will be dealt with accordingly. If the material can be handpicked before being re-engineered e.g. for pieces of wood, then this shall take place. However should the volume of unsuitable material comprise the majority of a strata layer, then the material will be removed from site to a suitable landfill.

Testing will be undertaken on materials re-engineered on site is likely to include the following:

- Moisture Content
- Particle Size Distribution
- In-Situ Dry Density
- In-Situ Plate Bearing Test
- Standard Proctor test
- Particle Density

The above list is not intended to be a definite specification. All geotechnical testing will be undertaken at the consultant's discretion.

As built surveys that show all obstructions removed, depths to natural ground, where encountered, and the finished levels post remediation works will be prepared by the contractor.

11.3 Completion Report

On completion of the main remediation works Consult shall submit a validation report detailing the main remediation works and including any relevant validation analysis.

It would be Consults intention to ensure that as a result of the remediation strategy having been completed, both the Local Authority and the Environment Agency is satisfied that the development may proceed. The Local Authority would also be approached in like manner with a request to discharge any relevant planning conditions.

A (Deed of) Warranty and certificate would be issued for the benefit of the developer and the first home owners, on completion of the works.

12 POST REMEDIATION CONSTRAINTS

The following are post remediation constraints that a future developer of the site would need to take into account when developing the site.

12.1 Foundations

It is envisaged that foundations for the future residential development will be in the form of strip or trench foundations. An initial plan showing depths to founding strata is shown on Drawing W896/11. This is based on the proposed layout provided in Appendix C and approximate finished level contours as shown in Drawing W896/11. The zoning plan will need to be reviewed should either of these be amended.

The disposal of material removed for foundation trenches is the responsibility of the developer.

12.2 Roads and Car Parking Areas

Formation levels in roads and pavement areas will be engineered to achieve a minimum CBR value of 3% at completion of the remediation works. The developer should anticipate that deterioration may occur of the surface, from to surface water ingress, between the completion of remediation works and surfacing of the road areas and should therefore make an allowance when determining the appropriate thickness of pavement construction.

12.3 Obstructions

All known near surface obstructions will be removed. However there may be areas (for example the base of any retaining structures) where it will be impractical to remove all impediments. Where this is the case details will be included within the completion report. Obstructions may also be present that have not been identified by the investigations to date.

12.4 Cover Layer

Following remediation, the developer is required to place a cover layer of 650mm in garden and landscaped areas to break any pollution linkages. This is to comprise 200mm of a granular sub-base 'hard dig' layer, 300mm of subsoil followed by 150mm of topsoil. Imported soils are to be validated chemically in accordance with Section 11.

12.5 Developable Area

Tree preservation orders have now been placed on the trees located in two areas along the banking on the site restricting development in the upper area of the site is no longer available for development.

12.6 Services

Following remediation it is intended that the majority of services will have been disconnected and removed. Details of any remaining services, including the public combined sewer which crosses the site will be contained within the completion report. The diversion of this sewer and relocation of the substation are the responsibility of the developer.

12.7 Party Walls

Any party wall notices served as part of the remediation works are solely for the reclamation of the site. The developer will need to serve similar notices should they require to undertake further work to or adjacent to the boundary walls.

12.8 Regulators

Consultations will be undertake with regulators to ensure that they are happy for development to proceed following the remediation works.

REFERENCES

British Standards and Codes of Practice

BS1377:1990: Methods of test for soils for civil engineering purposes. British Standards Institution.

BS5930:1999: Code of practice for site investigation. British Standards Institution.

BS10175:2001: Investigation of potentially contaminated sites - code of practice.

Eurocode 7:1994: EN1997

DoT: Specification for Highway Works, Volume 1, Series 600, Earthworks. Department of Transport, London. November 2004.

CLR8: Priority Contaminants for the Assessment of Land. DEFRA, The Environment Agency March 2002.

DEFRA and the Environment Agency - Model Procedure for the Management of Land Contamination, Contaminated Land Report 11. September 2004.

Reliability and risk in gas protection design. Ground Engineering. S.A.Wilson and G.B.Card, February 1999.

Reports

Envirocheck Report: Agency & Hydrological Information, Waste information, Hazardous Substances listings, Geological information and Industrial Land Use information.

Coal Authority Mining Report

Previous Site Investigation and Desk Study reports (see Sections 3 & 4)

Geological and Ordnance Survey Maps

British Geological Survey sheet 87 (Barnsley) Solid & Drift 1:50,000.

British Geological Survey sheet 275 SW (Yorkshire) Solid & Drift 1:10,560

Envirocheck Report: Historical Ordnance Survey Maps, 1:10,000, 1:10,560, 1:2,500

Groundwater Vulnerability of the South Pennines (Sheet 11), Environment Agency, 1:100,000.