

**HEADLAND AGROCHEMICALS LTD**  
**CONTAMINATION ASSESSMENT**  
**PROPOSED SITE**  
**RECTORS LANE**  
**SANDYCROFT**

**REF: J419a/V2/12.2001**

**DECEMBER 2001**

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**1.0 INTRODUCTION**

1.1 In November 2001, the Environmental Advice Centre Ltd. (EAC) was commissioned by Headland Agrochemicals Ltd to carry out a site investigation and contamination assessment at Rectors Lane, Sandycroft for relocation of their existing operational activities (also based at Rectors Lane) which comprise the storage handling, management and production of agricultural chemicals.

1.2 The purpose of this study was to characterise the nature and extent of any soil and groundwater contamination present at the site prior to occupation of the site by Headland Agrochemicals Ltd., and to determine its significance with respect to potential impact upon proposed site usage and environmental receptors.

1.3 The scope of the work included intrusive site investigations comprising drilling of boreholes and window sampling holes, soil and groundwater sample collection and laboratory analysis. Additionally, limited desk study was carried out to determine the environmental setting of the site and to allow appropriate data interpretation.

**2.0 SITE DESCRIPTION**

2.1 The site is located at Rectors Lane, Sandycroft and is centred on National Grid Reference SJ 328 676 (Figure 1). Light industrial units border the site to the west and south, with Rectors Lane running along part of the south western boundary. A residential property (an occupied bungalow) fronts onto Rectors Lane and shares a common boundary with the proposed relocation site. The site boundary is clearly marked on Figure 2. The Chester to Holyhead rail line runs along the north eastern boundary of the site, with the River Dee approximately 500m to the north, north east.

2.2 The relocation site comprises a steel framed warehouse building with accompanying offices and staff welfare facilities surrounded by extensive areas of hardstanding. The buildings have been used predominantly for the storage and distribution of goods. The property is currently in the ownership of CWS.

2.3 The relocation site is currently part of a larger site which will be divided into two once Headland Agrochemicals transfer their activities. Vehicular access to both sites will be maintained via the existing gated site access and egress points onto Rectors Lane.

2.4 An inspection of the interior of the building by EAC Ltd staff indicates that the main warehouse area is compartmentalised with compartments being formed by single thickness block walls. Within the main warehouse areas the flooring is comprised of concrete that was found to be in excellent condition with little sign of cracking, subsidence or other damage. No internal drainage was evident within the main warehouse area. In places however, some damage at a low level was evident to the internal breeze block walls.

- 2.5 The buildings are surrounded on all sides by hardstanding comprising predominantly concrete with localised areas of tarmacadam surfacing. A thorough inspection of the integrity of the existing hardstanding has been undertaken by EAC Ltd. It is apparent that all external hardstanding areas are in excellent condition with very few signs of cracks, subsidence or other forms of damage.
- 2.6 Surface water drainage of external hardstanding areas is achieved by a series of linear gullies and grids which feed into subsurface drains which then discharge either to the frontage of the property on Rectors Lane or into a drainage ditch running parallel and adjacent to the north eastern boundary of the property. Discharge to the drainage ditch currently occurs under agreement with the owner of the land within which the ditch is located (i.e. the British Railways Board). The surface drainage system is separate from the foul drainage system.

### 3.0 ENVIRONMENTAL SETTING

#### 3.1 Geology and Hydrology

- 3.1.1 The British Geological Solid and Drift Map Sheet 108 for Flint shows that the proposed relocation site is underlain by superficial deposits comprising undifferentiated, organic-rich clay, silt, sand and gravel drift over red, purple and maroon mudstones and seatearths with breccia horizons and 'Spirorbis' limestones.
- 3.1.2 The Groundwater Vulnerability Map of West Cheshire, (Sheet 16) published by the Environment Agency indicates that the site overlies a minor aquifer of high leaching potential. The soils will readily transmit liquid discharges because they are either shallow or susceptible to rapid flow directly to rock, gravel and groundwater.

- 3.1.3 The Environment Agency has defined Source Protection Zones (SPZ) surrounding nearly two thousand groundwater abstraction points used for supply purposes. The SPZ provides an indication of the risk to groundwater supplies that may result from potentially polluting activities and accidental releases of pollutants. The site does not feature within an SPZ but a Zone III (total catchment) of an SPZ lies approximately 1.2 km to the south east of the site. This zone is defined as the total area needed to support the abstraction or discharge from the protected groundwater source.

#### 3.2 Surface Water

- 3.2.1 The Ordnance Survey Landranger map of Chester and Wrexham (Sheet 117) shows several surface water courses close to the site. The River Dee lies approximately 500m to the north, the Queensferry Drain lies approximately 1 km to the north west and the Sandycroft Drain lies approximately 1 km to the south east.
- 3.2.2 A small section of an unnamed stream lies some 200m to the south of the site, and another some 300m to the south east. It is not clear where these watercourses flow beyond these points as they become culverted, but it may be possible that they flow

into the Sandycroft Drain leading away from the site on Rectors Lane. An open drainage ditch runs along the northern boundary between the site and the railway lines and it is into this feature that some surface water from the external hardstanding and roof downspouts on the relocation site discharges under agreement with the British Railways Board. The remaining surface water discharges to the frontage of the site onto Rectors Lane.

3.2.3 The GQA results for the Queensferry Drain (Tidal Pumping Station to Mancot Road Pumping Station) are as follows:

- 1991-1997 Grade F (bad)
- 1998 Grade E (poor)
- 1999 Grade C (fairly good)

3.2.4 The GQA results for the Sandycroft Drain (Tidal Limit to B5125 Road Bridge) are as follows:

- 1992 Grade F (bad)
- 1993-1994 Grade C (fairly good)
- 1995 Grade D (fair)
- 1996-1998 Grade C (fairly good)
- 1999 Grade E (poor)

### 3.3 Groundwater

3.3.1 Information provided by the Environment Agency has confirmed that groundwater flows in the sands beneath the site will be to the north i.e. in the direction of the River Dee. It is possible that groundwater from the site may discharge into the drainage ditch running parallel to the railway line immediately to the north of the site. The Environment Agency further confirms that the River Dee (which is tidal along the stretch to the north of the site) is thought not to be in hydraulic continuity with the groundwater in the sands due to the presence of clays at the bed and banks of the River.

## 4.0 HISTORICAL LAND USE AND POTENTIAL FOR CONTAMINATION

4.1 Inspection of historical maps indicates that in 1870 there had been no development of the site and that at this time the land use was agricultural. The railway line to the east of the site had been emplaced by this time. No other industrial development had been established in the immediate vicinity of the site.

4.2 The existing buildings present on the site have been used predominantly for the storage and distribution of goods. Planning and land use information supplied to Headland Agrochemicals Ltd by their solicitors, Leathers Prior indicates that the Co-Operative Group (CWS) acquired the relocation site in the mid 1960s and that the current buildings were constructed around 1966 with an extension being added



in about 1971. At the time of acquisition, other buildings were present on the site and a historical map from 1960 shows two buildings (subsequently demolished and replaced for the existing site layout) identified as a bakery facility. By this time adjacent land had been developed for industrial uses. Immediately to the west a concrete products works had been established and to the north east a bleach works had been constructed.

4.3 It is understood that CWS utilised the site for food storage and distribution until 1998, subsequent to which, new tyres were stored on the site until February 2001. No significant potential for contamination of soils, groundwaters and nearby surface waters is indicated from these historical uses. Part of the building (in the north east corner) does appear to have been used for vehicle maintenance housing a vehicle inspection pit indicating the potential for contamination by hydrocarbons, degreasing solvents and possibly asbestos from vehicle brake linings.

4.4 At the time of the investigation no material use was being made of the site.

4.5 Observations from a walkover of the site indicates that no uncontained solid or liquid waste residues were present either within the building or on external hardstanding. Two small waste oil tanks were evident on the hardstanding to the east of the vehicle wash facility. In addition the remnants of the founding plinths to an oil storage tank were visible at the north east corner of the main warehouse building. Some highly weathered hydrocarbon staining was visible on the external walls of the building adjacent to the former tank position. It is considered probable that the tank housed heating oil.

4.6 It is understood from correspondence to Headland Agrochemicals Ltd from their solicitors Leathers Prior that at no time during their occupation has CWS been served with any enforcement or abatement notice with respect to any environmental issue.

## 5.0 SITE INVESTIGATION AND METHODOLOGY

5.1 EAC undertook intrusive site investigations on 9<sup>th</sup> to 12<sup>th</sup> November 2001. Intrusive investigations comprised the drilling of 4 No. shell and auger boreholes to 6.0m below ground level (bgl) which were subsequently installed with 50mm HDPE standpipes to allow for groundwater monitoring. In addition to this 9 No. window sampling holes were drilled on site to a depth of 3.0m bgl where possible.

5.2 The locations of boreholes were selected in order to provide information regarding ground conditions close to former oil storage areas and also to allow representative characterisation of ground conditions across the site. Window sampling holes were drilled in those areas not accessible to the shell and auger rig, particularly within the warehouse. Areas of hardstanding were broken out in order to advance boreholes whilst a corer was used within the production warehouse in order to minimise any damage to the concrete flooring.

- 5.3 Borehole and window sampling hole locations are shown in Figure 2. Borehole and window sampling logs are presented in Appendix I.
- 5.4 A total of 65 No. soil samples were collected of which 16 No. samples were scheduled for the analysis for the following parameters: arsenic, cadmium, chromium, lead, mercury, copper, nickel, zinc, boron, ammonia, total sulphate and pH. In addition 5 No. samples were analysed for total petroleum hydrocarbon (TPH), phenols and polycyclic aromatic hydrocarbons (PAH) and a further 3 No. for asbestos.
- 5.5 Four groundwater samples were taken on the 26<sup>th</sup> November 2001 and were analysed for the following: pH, copper, magnesium, manganese, ammoniacal nitrogen, calcium, nitrite, nitrate, total phosphorus, orthophosphate, potassium and TPH, whilst two of the samples were also analysed for a suite of acid herbicides including 2,4-D, Dicamba, Dichlorprop, MCPA and MCPB.

## 6.0 OBSERVATIONS ON GROUND CONDITIONS

- 6.1 Concrete hardstanding was noted in all exploratory hole locations with the exception of WS8 where a stone fill was noted. The concrete extended to depths ranging from 0.15m to 0.4m below ground level (bgl). This was underlain by a stone or concrete fill at all locations to depths of 0.4-1.3m bgl. Window sampling holes WS4, WS5 and WS6 were terminated on striking a concrete obstruction at 0.5m bgl.
- 6.2 A thin layer of black ash (0.2m) was noted in borehole BH3 above a single layer of brickwork at 0.6m bgl, which was subsequently underlain by a 0.2m thick concrete base. Beneath this was a light brown sand to the base of the borehole.
- 6.3 Ash and clay, ash and brick or ash and stone fill was noted in window sampling holes WS1, WS2, WS3, WS7 and WS8 extending to depths of 0.8-1.5m bgl. This was underlain by a stiff brown sandy clay in window sampling holes WS1, WS2 and WS4 to depths of 1.8-2.0m bgl. A light brown sandy clay was also noted at 0.8-1.6m bgl in borehole BH2.
- 6.4 All exploratory hole locations (with the exception of WS4-6) encountered a fine light brown sand at depths of 0.8-2.0m bgl, extending to the base of all holes at 3.0-6.0m bgl.
- 6.5 A recent site walkover has been conducted during which new services were being installed. A long service trench running from Rectors Lane alongside the existing vehicle wash facility and extending towards the north east corner of the main warehouse building was available for inspection. Inspection of the trench confirmed the presence of ash and clinker materials to relatively shallow depth (extending to approximately 0.5m below ground level) underlain by natural ground comprising clayey sand with sand below. The ash and clinker may have been imported to the site to allow a suitable sub base formation for the construction of the extensive external hardstanding.

- 6.6 During intrusive investigations, no evidence (either odour or visual colouration/staining) was found which might indicate the presence of significant obvious contamination of soils or made ground. Most notably, for those sampling positions located in the near vicinity of known or suspected oil storage facilities, there was no evidence of hydrocarbon staining of subsurface materials.
- 6.7 Groundwater samples were recovered from the installed cable percussive boreholes for analysis on 26<sup>th</sup> November. No evidence of odour, discoloration or the presence of a hydrocarbon film (which would indicate the presence of free phase hydrocarbon product) was found during monitoring and sample retrieval.

## 7.0 INTERPRETATION OF ANALYTICAL DATA

- 7.1 The UK Government has issued guidance to assist the process of assessment of site suitability for re-use with respect to the occurrence of a limited range of commonly encountered contaminants. The guidance is presented in numerous documents of which the most important are the papers prepared by the Interdepartmental Committee on the Redevelopment of Contaminated Land or ICRL.

- 7.2 Central to ICRL guidance is the concept that certain proposed end uses (redevelopment proposals) may result in a form of land use that presents a very limited potential for site end users to be exposed to contamination. Examples of such land uses would include hard cover and buildings. These are distinguished from end uses such as domestic gardens and allotments where end users could come into direct contact with contamination as a result of digging activities etc giving rise to the potential for exposure to contamination via ingestion of contaminated soil, inhalation of dust or direct skin contact. Indirect exposure could occur through the consumption of food crops grown in contaminated soils.

- 7.3 ICRL guidance consists of two categories of concentrations for the contaminants listed. These are referred to as threshold trigger levels and action trigger levels and are applicable to certain end use categories. If recorded concentrations fall below the threshold trigger level the site can be considered to be uncontaminated and no remedial action is required. If action trigger concentrations are exceeded for a particular end use then remedial action will normally be required to manage or eliminate the risk to future end users, building structures etc. Alternatively the end use may be changed to one which is less sensitive.

- 7.4 If contaminant concentrations fall between the threshold and action trigger levels, then professional judgement is required to determine whether the risk posed by the contamination is such that risk management is necessary in the form of remedial action.

- 7.5 As the proposed relocation site has been used for light industrial purposes and has a cover of hardstanding throughout, the chemical analysis results will be compared with the ICRL guidelines for buildings and hard cover. There are no trigger

concentrations set for Group A and B metals for buildings and hard cover as they do not pose a risk to site end users under these circumstances. As such in the case of these determinands the results will be compared with trigger concentration levels for domestic gardens and allotments and parks, playing fields and open space.

7.6 ICRCL guidance criteria only exists for a limited range of contaminants which are commonly encountered on brownfield sites in the UK. As result it is quite common for ICRCL guidance to be augmented by the use of other national and international guidance criteria. With respect to internationally recognised guidance reference is widely made to World Health Organisation (WHO) guidelines for water quality. More generally in the context of contaminated land assessment in the UK reference is made to the guidelines developed for soils and groundwaters in the Netherlands by the Ministry of Housing Spatial Planning and the Environment (VROM) and the National Institute of Public Health and Environmental Protection (RIVM). The former deals with policy issues and the latter with scientific issues relating to the establishment of soil quality objectives and risk assessment procedures.

7.7 Target values and intervention values have been established for approximately 100 hundred substance for soil and groundwater. These values are risk based having been derived from extensive reviews of ecotoxicological data. In simplistic terms if site concentrations do not exceed the target values then the soil is considered clean or multifunctional i.e. capable of being used for any purpose. If the intervention value is exceeded, the contamination is considered serious and indicates the need for remedial action. The target and intervention values are based on an assumption that exposure always occurs to its full extent.

7.8 It should be noted that new UK Government Guidance revising the existing ICRCL guidance is due for publication in the near future. It is our understanding that this guidance will be based more soundly upon ecotoxicological data and will recommend a risk-based approach, which takes site-specific conditions into account.

## 8.0 ANALYTICAL RESULTS

### 8.1 Soils Analysis

8.1.1 The chemical analyses for this study were conducted by ECOS Environmental using UKAS accredited methodologies and subject to appropriate quality control procedures.

8.1.2 The analytical results are presented as Appendix II.

8.1.3 In the absence of significant evidence of historical contaminating uses of the site, analysis has been carried out to characterise contamination status with respect to the made ground encountered during intrusive investigations and observations made with respect to the presence and location of hydrocarbon storage.

8.1.4 The pH of soil/made ground materials analysis ranged from pH 7.6 to pH 10.4 indicating the occurrence of neutral to moderately alkaline conditions across the site.

8.1.5 The principal made ground material with the potential to exhibit elevated concentrations of certain contaminating substances is the ash and clinker encountered at shallow depth beneath the site surface. Such material is commonly characterised by elevated levels of heavy metals and sulphate.

8.1.6 Analysis has been carried out to determine concentrations of arsenic, cadmium, lead and mercury. These metals are associated with the potential to cause adverse impact upon human health.

8.1.7 Concentrations of arsenic ranged from <1.0 mg/kg to 52.7 mg/kg. Cadmium concentrations ranged from 0.3 mg/kg to 6.6 mg/kg. Chromium concentrations ranged from 12 mg/kg to 39.7 mg/kg. In all samples mercury concentrations did not exceed the lower limit of detection of 1.0 mg/kg.

8.1.8 The highest concentrations of arsenic and cadmium were recorded in the same sample (a sample of made ground), i.e. WS8 0.5m.

8.1.9 The range of concentrations for is typical of that encountered on many industrial sites where ash and clinker is found as a component of the made ground. Rare exceedences of ICRCL threshold levels for the most sensitive end use of houses with gardens or allotments were noted for arsenic and cadmium. No exceedences of generic guidance criteria are evident for mercury or chromium. One sample WS8 0.5m also exceeded the ICRCL threshold trigger level applicable to end uses of parks, playing fields or open spaces.

8.1.10 Analysis has also been carried out for boron, copper, nickel and zinc. These heavy metals are associated with the potential for phytotoxicity i.e. deleterious effects upon the growth and establishment of plants. Occasional samples of made ground exceeded the ICRCL threshold trigger levels for copper and zinc with respect to land uses where plants are to be grown.

8.1.11 Due to the absence of characteristic odour or staining that might indicate the presence of soil/made ground contamination by hydrocarbons only a limited number of samples have been analysed for total petroleum hydrocarbons (TPH), monohydric phenols and polycyclic aromatic hydrocarbons (PAH). TPH concentrations ranged from 15.6 mg/kg to 253.5 mg/kg. Monohydric phenols concentrations did not exceed the lower limit of detection of 1.0 mg/kg. PAH concentrations ranged from < 10 mg/kg to 70 mg/kg. One sample exceeded the ICRCL threshold trigger level for domestic gardens, allotments and play areas. Taken as a whole, these data are not indicative of significant contamination by hydrocarbons.

8.1.12 Concentrations of total sulphate ranged from 146 mg/kg to 4074 mg/kg. The ICRCL threshold trigger level for domestic gardens, allotments and landscaped areas, the



- threshold trigger level for buildings and the threshold trigger level for hard cover are exceeded in 4 of the 16 samples analysed. Sulphate is a contaminant that can adversely affect plant growth (normally in conjunction with acid soil conditions) and can cause damage to sub surface concrete structures such as building foundations. The latter is normally restricted to sites where the substructure is in direct connectivity with groundwater and where soil pH conditions are acidic. These conditions are not met on the proposed relocation site. Nevertheless an assessment of water soluble sulphate concentrations is recommended if new foundations are planned in the context of facilitating the relocation of the business.
- 8.1.13 Concentrations of ammonia were determined and found to be low in all samples. Concentrations ranged from below the limit of detection of 4.0 mg/kg to a maximum of 6.6 mg/kg.
- 8.1.14 No asbestos was identified in either the natural soils or made ground during intrusive investigations. Three samples of made ground were however analysed to determine whether asbestos fibres were present. No asbestos was detected in any of the samples analysed.

## 8.2 Groundwater Monitoring and Sample Analysis

- 8.2.1 Groundwater levels varied from within the boreholes were 1.76m bgl in borehole BH1, 1.73m bgl in BH2, 2.19m bgl in BH3 and 2.08m bgl in BH4.
- 8.2.1 The chemical analyses for the 4 No. groundwater samples was conducted by ECOS Environmental and were subject to appropriate quality control procedures. The analytical results are presented as Appendix III.
- 8.2.2 The pH of samples ranged from 7.4 to 8.1, indicating the presence of slightly alkaline groundwater conditions.
- 8.2.3 The World Health Organisation (WHO) has published guidelines for drinking water quality, these are developed to protect public health with regards to drinking water supplies. Concentrations of nitrite (<1mg/l), nitrate (<1mg/l) and manganese (9.27-16.27mg/l) were all below WHO guideline levels.
- 8.2.4 The WHO also give drinking water quality guidelines for other determinands above which are likely to give rise to complaints. Concentrations of sulphate (49-124mg/l) were all below WHO guideline levels. Minor exceedences of ammonia (0.3-8.1mg/l) were noted in BH3 and BH4.
- 8.2.5 Concentrations of copper (<0.01mg/l), phosphorous (<0.1mg/l), orthophosphate (<0.1-0.3mg/L) and TPH (<0.01mg/l) were all low and do not indicate significant contamination.
- 8.2.6 Analysis was conducted for a suite of 22 No. acid herbicides for samples from boreholes BH1 and BH3. Detectable concentrations of MCPA (0.14µg/l) were noted

in sample BH3 and MCPP (0.17-0.45µg/l) in BH1 and BH3. If analytical data are compared to the WHO drinking water quality guidelines there are no exceedences.

## 9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 Review of historical land use data does not indicate that the proposed relocation site has been utilised for potentially contaminating uses in the past. Adjacent sites have been utilised for such purposes.

9.2 Intrusive investigations comprising the drilling of cable percussive boreholes and the sinking of window sampling holes have not identified the presence of obvious evidence (either odour, staining or colouration) of contamination of soils or made ground.

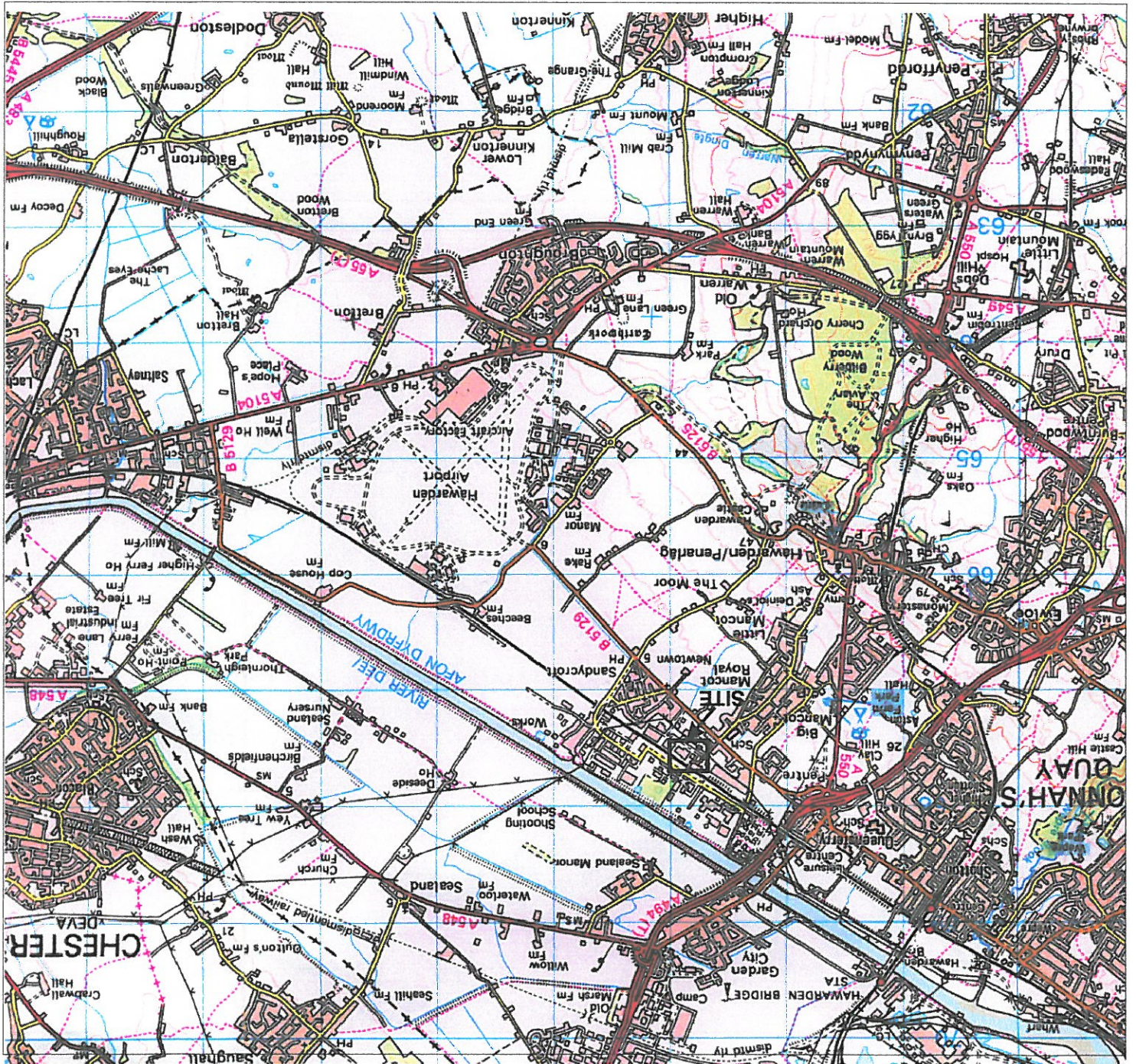
9.3 Analytical describing the contamination status of soils and made ground indicate a low degree of contamination restricted to the near surface made ground materials which include a proportion of ash and clinker. This material appears to have been imported to the site to allow the construction of buildings and external hardstanding.

9.4 The contamination status of the site is such that no significant risk is posed to persons, property or services in the context of the continued use of the site for industrial purposes. Limited remedial action may be required in the event that at some future date, a significant change of use was planned. An example of such a change would be redevelopment for residential purposes comprising private houses with gardens. Remedial action would be limited to the limited deposits of made ground on the site.

9.5 There is no evidence that the magnitude of contamination of soils or made ground is sufficient to cause adverse impact upon the quality of groundwaters or surface waters beneath or adjacent to the site. No evidence of groundwater contamination by petroleum hydrocarbons was found and concentrations of acid herbicides in groundwater were not significant. The ash and clinker, with which limited contamination by heavy metals and sulphate has been associated, does not typically demonstrate any significant leaching potential and thus these materials do not have the capacity to cause significant contamination of groundwater or surface waters.



|                                                                                                                                                                                                                 |               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
|  <b>Environmental Advice Centre Ltd</b>                                                                                        |               |
| Client: Headland Agrochemicals                                                                                                                                                                                  |               |
| Contract: Proposed Site,<br>Rectors Lane                                                                                                                                                                        | Job ref: J419 |
| Figure No: 1                                                                                                                                                                                                    | Drawn by: EAC |
| <b>Site Location Plan</b><br>Scale: 1:50 000<br>Reproduced from the Ordnance Survey Map of Chester and<br>Wrexham with the permission of the Controller of Her Majesty's<br>Stationery Office. Crown Copyright. |               |



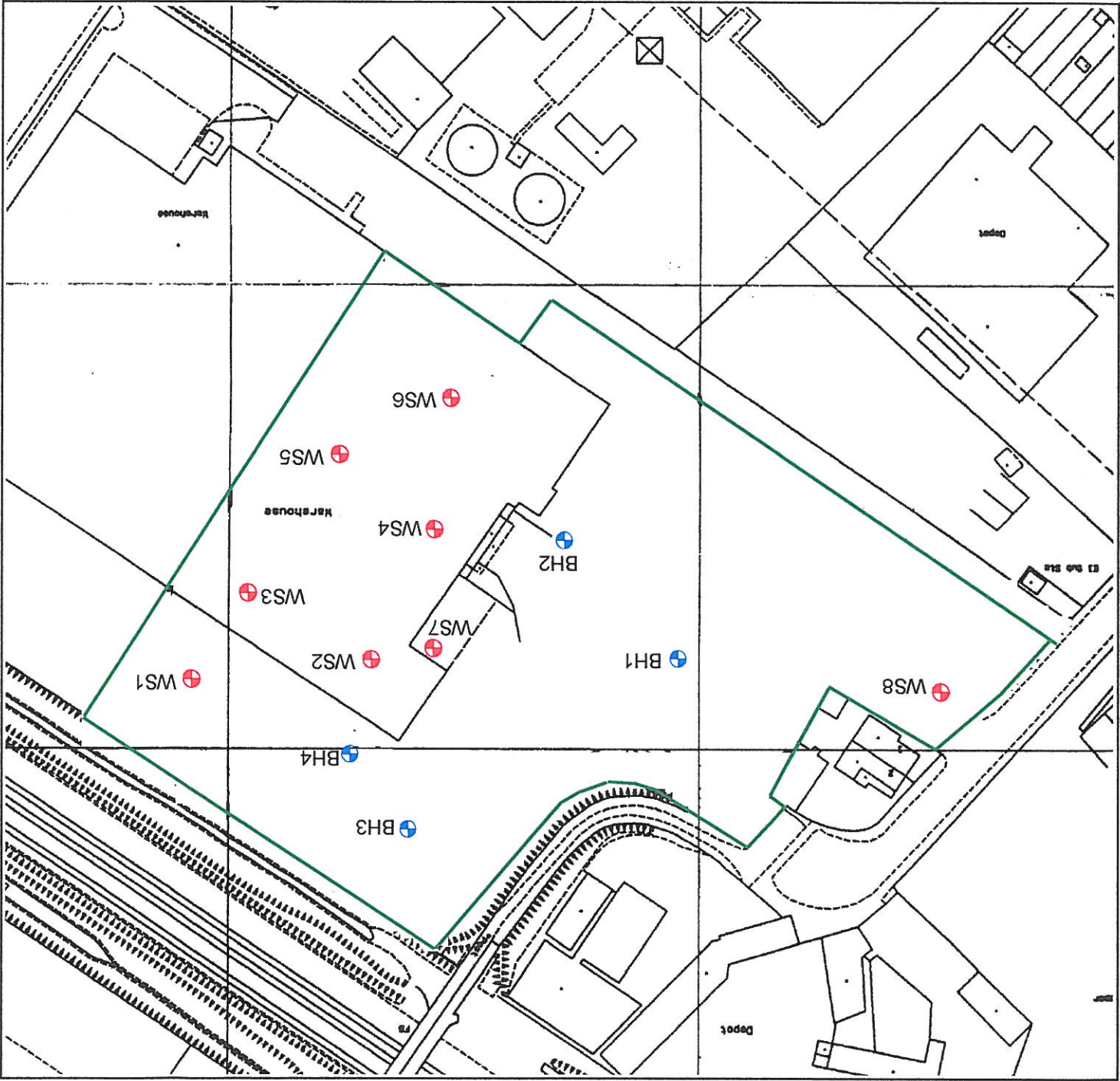



**Environmental Advice Centre Ltd**

Client: Headland Agrochemicals  
 Contract: Proposed Site, Rectors Lane  
 Job ref: J419

Figure No: 2  
 Date: 14.11.01  
 Drawn by: EAC

**Borehole and Window Sampling Locations**  
 Borehole Location  
 Window Sampling Location  
 Site Boundary  
 Not to Scale



## APPENDIX I

### BORHOLE AND WINDOW SAMPLING LOGS

# H.B. BORING & COMPANY LTD.

SITE INVESTIGATION SPECIALISTS

Relocation site, Sandycroft

|                 |   |
|-----------------|---|
| Borehole Number | 1 |
|-----------------|---|

|               |                  |          |                      |                    |                                     |        |                        |            |        |       |     |
|---------------|------------------|----------|----------------------|--------------------|-------------------------------------|--------|------------------------|------------|--------|-------|-----|
| Boring Method | Cable Percussion | Diameter | 150mm Cased to 6.00m | Ground Level (mOD) |                                     | Client | Headland Agrochemicals | Job Number | C2797A | Sheet | 1/1 |
| Location      | B N              | Dates    | 09/11/01 - 09/11/01  | Engineer           | Environmental Advice Centre Limited |        |                        |            |        |       |     |

|         |                 |                |               |               |             |                     |             |        |       |       |
|---------|-----------------|----------------|---------------|---------------|-------------|---------------------|-------------|--------|-------|-------|
| Depth m | Samples / Tests | Casing Depth m | Water Depth m | Field Records | Level (mOD) | Depth (Thickness) m | Description | Legend | Water | Inst. |
|---------|-----------------|----------------|---------------|---------------|-------------|---------------------|-------------|--------|-------|-------|

|      |   |  |  |  |  |        |                  |  |  |  |
|------|---|--|--|--|--|--------|------------------|--|--|--|
| 0.80 | D |  |  |  |  | 0.80   | Light brown SAND |  |  |  |
| 1.30 | D |  |  |  |  | (0.30) | CONCRETE         |  |  |  |
| 2.30 | D |  |  |  |  | (0.50) | Grey stone FILL  |  |  |  |
| 3.30 | D |  |  |  |  | (5.20) |                  |  |  |  |
| 4.30 | D |  |  |  |  |        |                  |  |  |  |
| 5.50 | D |  |  |  |  |        |                  |  |  |  |
| 6.00 | D |  |  |  |  | 6.00   |                  |  |  |  |

Seepage (1) at 2.70m, rose to 2.70m in 20 mins.

Borehole completed at 6.00m

Remarks  
Service pit to 1.20m  
Drillers descriptions of strata encountered

See key sheet for symbols and abbreviations

|            |          |
|------------|----------|
| Figure No. | C2797A.1 |
| Scale      | 1:50     |
| Logged By  | Crew     |



# H.B. BORING & COMPANY LTD. SITE INVESTIGATION SPECIALISTS

|                      |                                     |                                  |                      |                                                 |              |                                   |  |                                  |                    |                              |                 |         |                 |                |               |               |             |                     |             |        |             |                                                                                                                                |                                                |                                                                                                                                                                                      |                                                                                                                                              |                                                                                                                      |                                 |                                                                                                     |                                                                     |                                                        |                                               |                                            |                                |
|----------------------|-------------------------------------|----------------------------------|----------------------|-------------------------------------------------|--------------|-----------------------------------|--|----------------------------------|--------------------|------------------------------|-----------------|---------|-----------------|----------------|---------------|---------------|-------------|---------------------|-------------|--------|-------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------|--------------------------------------------|--------------------------------|
| Borehole Number<br>3 | Site<br>Relocation site, Sandycroft | Client<br>Headland Agrochemicals | Job Number<br>C2797A | Engineer<br>Environmental Advice Centre Limited | Sheet<br>1/1 | Boring Method<br>Cable Percussion |  | Diameter<br>150mm Cased to 6.00m | Ground Level (mOD) | Dates<br>09/11/01 - 09/11/01 | Location<br>E N | Depth m | Samples / Tests | Casing Depth m | Water Depth m | Field Records | Level (mOD) | Depth m (Thickness) | Description | Legend | Water Inst. | <div> <div>CONCRETE</div> <div>Stone FILL</div> <div>Black ash FILL</div> <div>BRICKWORK</div> <div>CONCRETE base</div> </div> | <div> <div>Light brown silty SAND</div> </div> | <div> <div>6.00</div> <div>(5.10)</div> <div>0.90</div> <div>(0.20)</div> <div>0.70</div> <div>0.60</div> <div>0.40</div> <div>(0.20)</div> <div>0.20</div> <div>(0.20)</div> </div> | <div> <div>0.40</div> <div>0.90</div> <div>1.50</div> <div>2.20</div> <div>3.00</div> <div>3.70</div> <div>4.50</div> <div>5.50</div> </div> | <div> <div>D</div> <div>D</div> <div>D</div> <div>D</div> <div>D</div> <div>D</div> <div>D</div> <div>D</div> </div> | <div> <div>Remarks</div> </div> | <div> <div>Drillers descriptions of strata encountered</div> <div>Service pit to 1.20m</div> </div> | <div> <div>See key sheet for symbols and abbreviations</div> </div> | <div> <div>Figure No.</div> <div>C2797A.3</div> </div> | <div> <div>Scale</div> <div>1:50</div> </div> | <div> <div>By</div> <div>Crew</div> </div> | <div> <div>Logged</div> </div> |
|                      |                                     |                                  |                      |                                                 |              |                                   |  |                                  |                    |                              |                 |         |                 |                |               |               |             |                     |             |        |             |                                                                                                                                |                                                |                                                                                                                                                                                      |                                                                                                                                              |                                                                                                                      |                                 |                                                                                                     |                                                                     |                                                        |                                               |                                            |                                |

Borehole completed at 6.00m







# H.B. BORING & COMPANY LTD.

SITE INVESTIGATION SPECIALISTS

Site Relocation site, Sandycroft

WS2

Boring Method  
Window Sampler

Diameter

Ground Level (mOD)

Client Headland Agrochemicals

Job Number  
G2797A

Location

R N

Dates  
09/11/01 - 09/11/01

Engineer Environmental Advice Centre Limited

Sheet  
1/1

Depth  
m

Samples / Tests

Casing  
Depth  
m

Water  
Depth  
m

Field Records

Level  
(mOD)

Depth  
m  
(Thickness)

Description

Legend

Water

Inst.

3.00

D

2.00

D

1.50

D

1.00

D

0.50

D

0.20

D

3.00

(1.20)

1.80

(0.30)

1.50

(1.10)

0.40

(0.25)

0.15

(0.15)

Borehole completed at 3.00m

Fine brown silty SAND

stiff brown silty CLAY

Ash and brick FILL

Stone FILL

CONCRETE

Remarks  
Drillers descriptions of strata encountered  
Became wet at 2.00m

See key sheet for symbols and abbreviations

Figure No.

Scale 1:50

Logged By  
Crew

C2797A.WS2

|                                                                                                                              |                 |                                     |               |                                                 |                             |
|------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------|---------------|-------------------------------------------------|-----------------------------|
| <b>H.B. BORING &amp; COMPANY LTD.</b><br>SITE INVESTIGATION SPECIALISTS                                                      |                 | Site<br>Relocation site, Sandycroft |               | Borehole Number<br>WS3                          |                             |
| Boring Method<br>Window Sampler                                                                                              |                 | Diameter                            |               | Client<br>Headland Agrochemicals                |                             |
| Location<br>B N                                                                                                              |                 | Dates<br>09/11/01 - 09/11/01        |               | Engineer<br>Environmental Advice Centre Limited |                             |
| Job Number<br>C2797A                                                                                                         |                 | Sheet<br>1/1                        |               | Legend<br>Water<br>Inst.                        |                             |
| Depth m                                                                                                                      | Samples / Tests | Casing Depth m                      | Water Depth m | Field Records                                   | Level (mOD)                 |
|                                                                                                                              |                 |                                     |               |                                                 | Depth m                     |
|                                                                                                                              |                 |                                     |               |                                                 | (Thickness)                 |
|                                                                                                                              |                 |                                     |               |                                                 | CONCRETE                    |
|                                                                                                                              |                 |                                     |               |                                                 | Stone FILL                  |
|                                                                                                                              |                 |                                     |               |                                                 | Ash and brick FILL          |
|                                                                                                                              |                 |                                     |               |                                                 | Fine brown silty SAND       |
|                                                                                                                              |                 |                                     |               |                                                 | Borehole completed at 3.00m |
| Remarks<br>Drillers descriptions of strata encountered<br>Became wet at 2.00m<br>See key sheet for symbols and abbreviations |                 |                                     |               |                                                 |                             |
| Figure No.<br>C2797A.WS3                                                                                                     |                 |                                     |               |                                                 |                             |



# **H.B. BORING & COMPANY LTD.** SITE INVESTIGATION SPECIALISTS

Site Relocation site, Sandycroft

WS4

Borehole Number

Job Number

C2797A

Sheet

1/1

Boring Method Window Sampler

Diameter

Ground Level (mOD)

Client Headland Agrochemicals

Engineer Environmental Advice Centre Limited

Dates 09/11/01 - 09/11/01

Location R N

Depth m

Samples / Tests

Casing Depth m

Water Depth m

Field Records

Level (mOD)

Depth m

(Thickness)

CONCRETE

Stone FILL onto concrete at base

Legend

Water

Inst.

0.20-0.50 D

0.15 (0.15)

0.15 (0.35)

0.50

Borehole completed at .50m

Remarks

Drillers descriptions of strata encountered

See key sheet for symbols and abbreviations

Figure No.

C2797A.WS4

Scale

Logged

By

(approx)

1:50

Crew

|                                                        |  |                                     |  |                                                              |  |                                  |  |                                                                                                   |  |                          |  |                                   |  |                             |  |                                                                                        |  |
|--------------------------------------------------------|--|-------------------------------------|--|--------------------------------------------------------------|--|----------------------------------|--|---------------------------------------------------------------------------------------------------|--|--------------------------|--|-----------------------------------|--|-----------------------------|--|----------------------------------------------------------------------------------------|--|
| Borehole Number<br>WS5                                 |  | Site<br>Relocation site, Sandycroft |  | H.B. BORING & COMPANY LTD.<br>SITE INVESTIGATION SPECIALISTS |  | Client<br>Headland Agrochemicals |  | Engineer<br>Environmental Advice Centre Limited                                                   |  | Job Number<br>C2797A     |  | Sheet<br>1/1                      |  |                             |  |                                                                                        |  |
| Boring Method<br>Window Sampler                        |  | Location<br>R N                     |  | Dates<br>09/11/01 - 09/11/01                                 |  | Ground Level (mOD)               |  | Description<br>CONCRETE<br>Stone and ash FILL onto concrete at base<br>Borehole completed at .50m |  | Legend<br>Water<br>Inst. |  | Depth m<br>0.20<br>0.50<br>D<br>D |  | Samples / Tests             |  | Casing Depth m<br>Water Depth m<br>Field Records<br>Level (mOD)<br>Depth m (Thickness) |  |
| Remarks<br>Drillers descriptions of strata encountered |  | Figure No.<br>C2797A.WS5            |  |                                                              |  |                                  |  |                                                                                                   |  |                          |  |                                   |  | Scale<br>1:50<br>By<br>Crew |  | See key sheet for symbols and abbreviations                                            |  |

| H.B. BORING & COMPANY LTD. |  | SITE INVESTIGATION SPECIALISTS |  | Client                 |  | Job    |  | Sheet |  | Boring Method |  | Window Sampler     |  | Location            |  | Dates               |  | Engineer  |  | Description |  | Legend |  | Water |  | Inst. |  |
|----------------------------|--|--------------------------------|--|------------------------|--|--------|--|-------|--|---------------|--|--------------------|--|---------------------|--|---------------------|--|-----------|--|-------------|--|--------|--|-------|--|-------|--|
| Site                       |  | Relocation site, Sandycroft    |  | Headland Agrochemicals |  | C2797A |  | 1/1   |  | Diameter      |  | Ground Level (mOD) |  | 09/11/01 - 09/11/01 |  | Depth (m)           |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  | 1/1           |  | Diameter           |  | Ground Level (mOD)  |  | 09/11/01 - 09/11/01 |  | Depth (m) |  | Description |  | Legend |  | Water |  | Inst. |  |
| Borehole Number            |  | WS6                            |  | Job Number             |  | C2797A |  | Sheet |  |               |  |                    |  |                     |  |                     |  |           |  |             |  |        |  |       |  |       |  |

| H.B. BORING & COMPANY LTD. |                | SITE INVESTIGATION SPECIALISTS |                    | Site   |                        | Relocation site, Sandycroft |              | Borehole Number<br>WS7                          |                 |                              |             |             |        |       |       |         |                 |                |               |               |             |                     |          |                           |                        |                       |                             |         |                                             |                                             |
|----------------------------|----------------|--------------------------------|--------------------|--------|------------------------|-----------------------------|--------------|-------------------------------------------------|-----------------|------------------------------|-------------|-------------|--------|-------|-------|---------|-----------------|----------------|---------------|---------------|-------------|---------------------|----------|---------------------------|------------------------|-----------------------|-----------------------------|---------|---------------------------------------------|---------------------------------------------|
| Boring Method              | Window Sampler | Diameter                       | Ground Level (mOD) | Client | Headland Agrochemicals | Job Number<br>C2797A        | Sheet<br>1/1 | Engineer<br>Environmental Advice Centre Limited | Location<br>E N | Dates<br>09/11/01 - 09/11/01 | Depth (mOD) | Description | Legend | Water | Inst. | Depth m | Samples / Tests | Casing Depth m | Water Depth m | Field Records | Level (mOD) | Depth m (thickness) | CONCRETE | Ash, stone and brick FILL | stiff brown silty CLAY | fine brown silty SAND | Borehole completed at 3.00m | Remarks | Drillers descriptions of strata encountered | See key sheet for symbols and abbreviations |
|                            |                |                                |                    |        |                        |                             |              |                                                 |                 |                              |             |             |        |       |       |         |                 |                |               |               |             |                     |          |                           |                        |                       |                             |         |                                             |                                             |

# H.B. BORING & COMPANY LTD.

SITE INVESTIGATION SPECIALISTS

Site Relocation site, Sandycroft

WS8

Boring Method

Window Sampler

Diameter

Ground Level (mOD)

Client

Headland Agrochemicals

Job Number  
C2797A

Location

R N

Dates

09/11/01 - 09/11/01

Engineer

Environmental Advice Centre Limited

Sheet

1/1

Depth  
m

Samples / Tests

Casing  
Depth  
m

Water  
Depth  
m

Field Records

Level  
(mOD)

Depth  
(Thickness)  
m

Description

Legend

Water

Inst.

3.00

D

2.00

D

1.50

D

1.00

D

0.50

D

0.10

D

3.00

(2.10)

0.90

(0.90)

Borehole completed at 3.00m

Fine brown silty SAND

Stone and ash FILL

Remarks  
Drillers descriptions of strata encountered

See key sheet for symbols and abbreviations

Figure No.

C2797A:WS8

Scale

1:50

By

Logged

Crew



**APPENDIX II**  
**CHEMICAL ANALYSIS RESULTS**  
**SOIL SAMPLES**



# Summary of Results Environmental Advice Centre Ltd. - J419

| ANALYTES              | UNITS | BH1<br>(0.80m) | BH1<br>(2.30m) | BH2<br>(0.60m) | BH3<br>(0.40m) | BH3<br>(1.50m) | BH4<br>(1.00m) | BH4<br>(0.50m) | WS1<br>(0.80m) | WS2<br>(0.50m) | WS2<br>(1.50m) | WS3<br>(1.00m) | WS5<br>(0.20m) |
|-----------------------|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                       |       | S0134811       | S0134812       | S0134813       | S0134814       | S0134816       | S0134817       | S0134818       | S0134819       | S0134820       | S0134821       | S0134822       | S0134823       |
| Arsenic               | mg/kg | 5.5            | <1.0           | 12.5           | 25.9           | 6.8            | 5.4            | 9.8            | 10.6           | 24.6           | 8.7            | 14.6           | 13.3           |
| Cadmium               | mg/kg | 0.3            | 0.5            | 0.9            | 0.4            | 0.3            | 0.9            | 0.7            | 0.6            | 5.3            | 0.5            | 0.5            | 1.1            |
| Chromium (total)      | mg/kg | 23.4           | 12.0           | 18.4           | 26.0           | 30.1           | 8.8            | 24.5           | 24.8           | 39.7           | 26.0           | 22.6           | 15.7           |
| Lead                  | mg/kg | 14.0           | 3.1            | 115.4          | 73.3           | 33.0           | 31.8           | 157.1          | 58.6           | 764.3          | 49.7           | 38.8           | 412.7          |
| Mercury               | mg/kg | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           | <1.0           |
| Boron (water soluble) | mg/kg | <0.5           | <0.5           | <0.5           | 0.6            | 0.8            | <0.5           | 0.5            | 2.0            | <0.5           | 0.6            | 0.9            | <0.5           |
| Copper                | mg/kg | <0.2           | <0.2           | 18.3           | 74.3           | 1.3            | <0.2           | 6.6            | 127.3          | 397.7          | 11.5           | 18.0           | 59.7           |
| Nickel                | mg/kg | 9.4            | 8.4            | 13.2           | 57.8           | 21.0           | 9.2            | 24.4           | 21.9           | 60.6           | 25.5           | 26.4           | 37.6           |
| Zinc                  | mg/kg | 39.2           | 25.1           | 383.2          | 158.8          | 51.0           | 28.0           | 117.0          | 92.3           | 802.0          | 86.6           | 616.5          | 112.8          |
| Sulphate (total)      | mg/kg | 146            | 258            | 703            | 4074           | 190            | 1348           | 427            | 611            | 3775           | 481            | 543            | 2052           |
| pH                    | N/A   | 8.2            | 8.5            | 9.9            | 10.8           | 8.3            | 10.4           | 8.8            | 7.6            | 10.3           | 8.0            | 7.9            | 8.2            |
| Ammonia               | mg/kg | 6.6            | <4.0           | <4.0           | <4.0           | 6.6            | <4.0           | <4.0           | <4.0           | <4.0           | <4.0           | <4.0           | <4.0           |
| TPH                   | mg/kg | #              | #              | #              | 253.5          | #              | 34.5           | #              | #              | #              | #              | 48.5           | 15.6           |
| Phenols (monohydric)  | mg/kg | #              | #              | #              | <1.0           | #              | <1.0           | #              | #              | #              | #              | <1.0           | <1.0           |
| PAH (total)           | mg/kg | #              | #              | #              | 70             | #              | 10             | #              | #              | #              | #              | 11             | <10            |
| Asbestos              | N/A   | #              | #              | #              | #              | #              | N              | #              | #              | N              | #              | #              | N              |

Results for soil samples expressed as dry weight  
# : Analyte not requested

**Summary Of Results**  
**Environmental Advice Centre Ltd. - J419**

| ANALYTES              | UNITS | MS7<br>(0.50m) | MS7<br>(2.00m) | MS8<br>(0.50m) | MS8<br>(1.50m) |   |   |   |   |   |   |   |   |   |
|-----------------------|-------|----------------|----------------|----------------|----------------|---|---|---|---|---|---|---|---|---|
|                       |       | S0134824       | S0134825       | S0134826       | S0134827       |   |   |   |   |   |   |   |   |   |
| Arsenic               | mg/kg | 12.9           | 5.3            | 52.7           | 5.9            | # | # | # | # | # | # | # | # | # |
| Cadmium               | mg/kg | 1.6            | 0.5            | 6.6            | 0.3            | # | # | # | # | # | # | # | # | # |
| Chromium (total)      | mg/kg | 18.8           | 29.2           | 27.5           | 18.6           | # | # | # | # | # | # | # | # | # |
| Lead                  | mg/kg | 305.0          | 17.8           | 304.4          | 5.0            | # | # | # | # | # | # | # | # | # |
| Mercury               | mg/kg | <1.0           | <1.0           | <1.0           | <1.0           | # | # | # | # | # | # | # | # | # |
| Boron (water soluble) | mg/kg | 0.7            | 0.5            | <0.5           | 0.6            | # | # | # | # | # | # | # | # | # |
| Copper                | mg/kg | 146.5          | 6.2            | 76.2           | 0.9            | # | # | # | # | # | # | # | # | # |
| Nickel                | mg/kg | 35.8           | 26.6           | 43.0           | 8.4            | # | # | # | # | # | # | # | # | # |
| Zinc                  | mg/kg | 191.3          | 71.0           | 2493.8         | 50.9           | # | # | # | # | # | # | # | # | # |
| Sulphate (total)      | mg/kg | 2400           | 367            | 1410           | 109            | # | # | # | # | # | # | # | # | # |
| pH                    | N/A   | 8.3            | 8.2            | 7.9            | 8.4            | # | # | # | # | # | # | # | # | # |
| Ammonia               | mg/kg | <4.0           | <4.0           | <4.0           | 5.2            | # | # | # | # | # | # | # | # | # |
| TPH                   | mg/kg | 101.4          | #              | #              | #              | # | # | # | # | # | # | # | # | # |
| Phenols (monohydric)  | mg/kg | <1.0           | #              | #              | #              | # | # | # | # | # | # | # | # | # |
| PAH (total)           | mg/kg | 17             | #              | #              | #              | # | # | # | # | # | # | # | # | # |

Results for soil samples expressed as dry weight  
# : Analyte not requested

| SAMPLE REF:                       | TYPE OF ASBESTOS FIBRE DETECTED |                    |                       |                                    |                        |
|-----------------------------------|---------------------------------|--------------------|-----------------------|------------------------------------|------------------------|
|                                   | CHRYSOPILE<br>(WHITE)           | AMOSITE<br>(BROWN) | CROCIDOLITE<br>(BLUE) | OTHER AMPHIBOLE<br>ASBESTOS FIBRES | NON-ASBESTOS<br>FIBRES |
| BH4 (1.00M)<br>ECOS ref: S0134817 | None<br>Detected                | None<br>Detected   | None<br>Detected      | None<br>Detected                   | None<br>Detected       |
| WS2 (0.50M)<br>ECOS ref: S0134820 | None<br>Detected                | None<br>Detected   | None<br>Detected      | None<br>Detected                   | None<br>Detected       |

The standard analytical method used for asbestos identification cannot give an accurate quantitative value for percentage asbestos content. The following values however may be used to assess the approximate quantity of asbestos present in the sample as submitted to the laboratory.

None Detected - no fibres detected (based on a detection limit of 0.01% by volume)

1 - more than 0.01% but less than 2% by volume

2 - more than 2% but less than 50% by volume

3 - more than 50% by volume

Samples analysed using polarised light optical microscopy with dispersion staining in accordance with a documented in-house procedure based on HSE Method MDHS 77 - Asbestos in Bulk Materials.

#### ASBESTOS BULK MATERIAL ANALYSIS

Herewith report on analysis of bulk material submitted for examination on 28th November 2001.

Samples taken by Environmental Advice Centre Ltd. personnel and analysed by ECOS Environmental, Bradford.

Dear Mr Davies

Mr G Davies  
Environmental Advice Centre Ltd.  
Unit 1 Long Barn  
Pistyll Farm  
Village Road  
Nercwys  
Flintshire  
CH7 4EW

28th November 2001

Our ref: RW/CB

Telephone: 01274 691122  
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Low Moor Business Park  
Common Road  
Bradford  
BD12 0NB

Note: (i) The identification of non-asbestos fibres is outside the scope of the laboratorys UKAS accreditation.  
(ii) The laboratory cannot be held responsible for the condition or suitability of samples submitted for testing by a third party or for the competency of personnel other than its own staff.  
(iii) Any opinions or interpretation of test results expressed herein are not within the scope of UKAS accreditation.

C. Patrick

*C. Patrick*

Yours sincerely,

|                                 |         |             |                 |                    |                     |
|---------------------------------|---------|-------------|-----------------|--------------------|---------------------|
| SAMPLE REF:                     |         | MS5 (0.20M) |                 | ECOS ref: S0134823 |                     |
| CHRYSOPILE                      | AMOSITE | CROCIDOLITE | OTHER AMPHIBOLE | ASBESTOS FIBRES    | NON-ASBESTOS FIBRES |
| (WHITE)                         | (BROWN) | (BLUE)      | None            | Detected           | None                |
| Detected                        | None    | Detected    | None            | Detected           | Detected            |
| TYPE OF ASBESTOS FIBRE DETECTED |         |             |                 |                    |                     |



### APPENDIX III

### CHEMICAL ANALYSIS RESULTS GROUNDWATER SAMPLES



**Summary Of Results**  
**Environmental Advice Centre Ltd. - J419**

| ANALYTES            | UNITS     | BH1      | BH2      | BH3      | BH4      |   |   |   |   |   |   |   |   |   |
|---------------------|-----------|----------|----------|----------|----------|---|---|---|---|---|---|---|---|---|
|                     |           | S0135024 | S0135025 | S0135026 | S0135027 |   |   |   |   |   |   |   |   |   |
| pH                  | N/A       | 8.0      | 8.1      | 7.4      | 7.5      | # | # | # | # | # | # | # | # | # |
| Sulphate            | mg/l      | 49       | 74       | 124      | 82       | # | # | # | # | # | # | # | # | # |
| Copper              | mg/l      | <0.01    | <0.01    | <0.01    | <0.01    | # | # | # | # | # | # | # | # | # |
| Magnesium           | mg/l      | 10.53    | 9.27     | 16.27    | 14.64    | # | # | # | # | # | # | # | # | # |
| Manganese           | mg/l      | 0.28     | 0.15     | 0.89     | 0.45     | # | # | # | # | # | # | # | # | # |
| Ammoniacal Nitrogen | mg/l as N | 0.3      | 0.3      | 3.1      | 8.1      | # | # | # | # | # | # | # | # | # |
| Calcium             | mg/l      | 106.44   | 111.14   | 136.62   | 128.18   | # | # | # | # | # | # | # | # | # |
| Nitrate             | mg/l      | <1.0     | <1.0     | <1.0     | <1.0     | # | # | # | # | # | # | # | # | # |
| Nitrite             | mg/l      | <1.0     | <1.0     | <1.0     | <1.0     | # | # | # | # | # | # | # | # | # |
| Phosphorus (total)  | mg/l      | <0.10    | <0.10    | <0.10    | <0.10    | # | # | # | # | # | # | # | # | # |
| o-phosphate         | mg/l      | <0.1     | 0.3      | <0.1     | 0.1      | # | # | # | # | # | # | # | # | # |
| Potassium           | mg/l      | 25.71    | 14.86    | 58.27    | 39.89    | # | # | # | # | # | # | # | # | # |
| Acid Herbicides     | ug/l      | 0.17     | #        | 0.59     | #        | # | # | # | # | # | # | # | # | # |
| TPH GC              | mg/l      | <0.01    | <0.01    | <0.01    | <0.01    | # | # | # | # | # | # | # | # | # |
| MCP                 | ug/l      | 0.17     | #        | 0.45     | #        | # | # | # | # | # | # | # | # | # |
| MCPA                | ug/l      | #        | #        | 0.14     | #        | # | # | # | # | # | # | # | # | # |

Water samples analysed as received  
# : Analyte not requested