Wrotham Parish Council Planning Committee

The Contamination of Ightham Sandpit and the Repercussions for the Local Plan – 9 April 2018

1.0 Introduction

1.1 H+H UK Ltd, (H+H) applied for planning permission to build a concrete block factory with a road on Ightham Sandpit in 2005.

1.2 The land is a restored sand quarry that is within the AONB and the Green Belt. The road is similar to part of the plans by Borough Green Garden City to build a road from Ightham Roundabout (Darkhill) to the A227 where they will construct a new roundabout and then on to the A20 in Wrotham Heath.

1.3 The original proposal was controversial from the beginning because the road terminated on the A227 (Wrotham Road), which effectively diverted all traffic from the A25 up past South Wrotham, caused unacceptable queuing at Wrotham roundabout (Whitehill) and then hugely increased the traffic flow by several thousand vehicles daily along the A20.

1.4 Kent County Council (KCC) Officers recommended refusal of the application but were over ruled by Elected Members. Due to the controversy about AONB development, the Secretary of State (SoS) called it in for investigation at a Planning Inquiry conducted by Inspector Mr Martin Pike. WPC became a Rule 6 party at the Inquiry and thus had access to all documentation.

1.5 KCC Officers had to support the decision of their Members and argued the proposal was lawful and beneficial and as a result issued a Lawful Development Certificate (LDC) that the road had been implemented and the consent was extant.

1.6 As part of the terms of the Inquiry the Applicants were required to establish that the land had been back filled with the conditioned ‘inert’ materials and were compelled to conduct a Stage 1 Intrusive Contamination Investigation of 10 bore holes. When the Southern Testing results were published to the applicant it caused some panic within the H+H Inquiry team, as evidenced by the email in Appendix 1.

1.7 The applicant was asked by the Environment Agency and Southern Water to urgently conduct further intrusive tests but WPC has no further knowledge as to whether those test were concluded and the applicant informed.

1.8 The QC Planning Barrister who was representing WPC had been consistently requesting the evidence from KCC that they had relied on when deciding to issue the LDC that the road through the AONB was lawful. When the evidence was provided WPC issued a Judicial Review of the decision and KCC conceded that it was in fact unlawful and the LDC should not have been issued.

1.9 KCC then offered to H+H that they would reapply for permission to build a road through H+H's land.

1.10 H+H rejected the offer and withdrew their application, the subject of the Inquiry, and as a result Mr Martin Pike terminated the Inquiry and recommended to the SOS that the planning consent for the factory should be revoked. WPC was awarded very substantial costs against KCC and H+H that have benefited the Parish to this day.

1.11 Paul Carter, Leader of KCC, told the people of Borough Green in the Borough Green Village Hall that KCC would reapply for the road consent independently of H+H. KCC Officers spent 2 years trying but the project was quietly shelved when they realised that the costs associated with the building of the road were too high. Presumably the remediation and the Great Crested Newts had made it an unviable proposition.

1.12 It has been WPC's long term view that the reason that H+H refused to continue at that point was that the contamination of the land had only recently become apparent, they had conducted further intrusive contamination tests and the huge costs of remediation were becoming apparent. That was ten years ago and the management of H+H has changed.

1.13 WPC still retains the Inquiry Papers and we are aware that other Local Government Authorities like Tonbridge and Malling Borough Council (TMBC), were not represented and are unlikely to have the same degree of access to this information without substantive investigations.

1.14 The area is once again under scrutiny because TMBC are considering the inclusion of a road through this area of AONB to facilitate housing in Borough Green Garden City as part of their Local Plan proposal.

1.15 The back filling operation in Ightham Sandpit was sub contracted to Trodell Limited and was essentially controlled by one person with no oversight. The lack of management by H+H and the lack of monitoring and enforcement by authorities resulted in opportunism by those controlling the back filling operation. This resulted in the following email exert listed in full in the Appendix A.

> *"The intrusive investigation by Southern Testing has to date identified noxious fill materials comprising hydrocarbon stained and odorous sandy clayey made ground including large quantities of metal, pipework, occasional drums (unknown content) concrete, brick, plastic and polythene. They have advised that material of this nature is usually found to contain elevated concentrations of contaminants…."* ***Ref: Email from Barton Wilmore to H+H's Barrister 5/10/2006***

2.0 Contamination

2.1 The severity of the contamination was discovered in late 2006 but nobody was informed for some time (as the email states) and it was much later in 2007 when the actual costs of remediating the entire back filled sandpit became apparent. This was one of the factors that made H+H keen to withdraw their application when it was discovered the bypass had no extant consent.

2.2 There were only 10 boreholes in an area of 18ha and yet metal drums buried deep in the pit were encountered containing unknown substances. It is therefore considered likely that there are many such drums of unknown chemicals, spread across the site and at various depths in the same way that borehole analysis has found various pollutants spread throughout the site. This is supported by the fact that the Environment Agency wanted a much-expanded investigation of the site before development could be considered. The average depth of the boreholes in the made ground was 11m so over the 18 ha site that amounts to approximately 216 thousand cubic meters of polluted backfill in the ex quarry.

2.3 It is local knowledge, completely supported by the evidence from the Inquiry, that one person controlled backfill with minimum oversight. As a result HGVs brought backfill from highly polluted sites in Kent where the land was being remediated for further development. The HGVs were meant to be taking their load to expensive specialist landfill sites designated for polluted materials but instead they were dumping polluted materials in Ightham Sandpit. This was non-compliant with conditioning but clearly there was no monitoring regime or enforcement. This is from the first Environmental Statement in 2004.

> *13.25 The Envirocheck report identified two landfills onsite. The data, however, refers to the same landfill, Ightham Sand Pit. Discussions with Tonbridge and Malling Borough Council,- Kent County Council and the Environment Agency Waste Management Department indicates that this site has never been used as a landfill as far as their records show. It can only be conjectured that either the landfill licence applied for was never granted (despite the Envirocheck database holding information to the contrary), that a waste licence was not required at the time of infilling, or that any in-filling was undertaken without the approval of the Environment Agency or any historic governing body. No details of the application are held on record by any of the current regulators. Having made enquiries with Mr J Bailey of Trodell Plant Ltd and owner of Crickett's Farm to the south of the site, it appears that there is no available information regarding the type or quantity of material used to infill the pit. Once planning permission is granted, a full intrusive investigation will be undertaken.* ***Ref: Environmental Statement H+H H+H 13th December 2004 Barton Willmore***

2.4 The site has been quiet for 10 years with no sign of activity from the footpaths and only the grazing of sheep. There does not appear to have been ongoing monitoring of boreholes, no active remediation and the area has been quietly forgotten. Certainly H+H will not want the huge expense of remediation and much of the Company Management was replaced after the Planning Inquiry so it's likely that the present management are unaware of the situation.

2.5 It is entirely possible that there are other metal canisters of unknown chemicals buried in Ightham Sandpit, but in the absence of investigation we just don't know. It is generally accepted that land will remediate itself to some extent over time when exposed to oxygen but this is dependant on the chemical makeup of the pollutant and chemicals encased in metal containers are not exposed to oxygen. Eventually the steel will rust and the cycle of contamination will continue.

2.6 The Southern Testing Report is hundreds of pages long so the following are some of the more concerning extracts.

> *"The risk of methane gases affecting human health and buildings and services is therefore considered to be moderate to high".*
>
> *"The measured levels of carbon dioxide in the boreholes were also considered to present a potentially unacceptable risk to human health, buildings and services."*
>
> *The report states that the 'Made Ground', which comes from past waste dumping activity has "Significantly elevated levels" of Extractable Petroleum Hydrocarbons (EPH), " > 1,000mg/kg were identified in approximately one third of the samples tested."*
>
> *"Groundwater contamination… Of greatest concern are the elevated PAHs and Petroleum Hydrocarbons (EPH)" Polycyclic Aromatic Hydrocarbons (PAHs) and EPHs were found in all the boreholes and appeared to be widespread across the site".*
> **Ref: *Ref: Southern Testing Environmental and Geotechnical - Site Investigation & Risk Assessment Report - Ightham Sandpit - 24 November 2006***

2.7 WPC also includes the Proofs of Evidence of Sean Furey MSc. MCIWEM FRGS who is an ex Environment Agency Infrastructure Engineer specialising in Water Supply and Sanitation. He submitted an 'Expert Witness' report for CPRE that succinctly summarised the level of contamination and risks to human health. Refer to Appendix B.

3.0 Implications for the Local Plan

3.1 There will need to be further and extended intrusive investigation into the nature of the risks that the contaminated ground now poses after ten years. There is an additional risk that the evidence trail has gone cold and the sources of this uncontrolled contamination remain unknown. This is important because if there are metal canisters with 'unknown contents', then when they corrode and leak then there are new possibilities for contamination. The backfill comprises of an estimated 216 thousand cubic meters of polluted backfill and this is substantiated by the conclusions of Southern Testing that toxicity was distributed across the whole site, please refer to CPRE's report and contamination maps in Appendix B.

3.2 Joco Pit is an example of what can happen when building is allowed on toxic land and is one not to be repeated.

3.3 Trodell Limited also back filled their own sand quarry adjacent to Ightham Sandpit and it is unknown what is buried there as it has never been investigated.

3.4 The legal situation is extremely unclear with regard current liabilities. The sub-contractor Trodell Limited is no more and it's likely that H+H are unaware of the extent of the contamination, as are the rest of the companies proposing BGGC. Depending on the results of further contamination investigations there could be very significant costs associated with remediation? Under the heading of '*Strategy*' Southern Testing gave the following

advice to their client H+H H+H. ***"It is also recommended that the specific advice of an Environmental Lawyer be sought, as the legal issues relating to the project are likely to be complex." (WPC emphasis)***

3.5 The H+H land is within the AONB and 'The Way Forward' did not propose housing or industrial development, apart from a road. Therefore H+H would not be benefiting from development of their land and have no way to offset the cost of investigation or remediation. H+H might consider that the risk of a significant cost of remediation would offset any profit they may make from other partners in the consortium for the building of a road on their land. There is a risk that they could withdraw from the consortium and then the land would need to be compulsorily purchased. Who would pay for the remediation of the land in that event given there is no evidence as to how the land came to be contaminated?

3.6 There are also other areas of historic quarrying included in the BGGC proposals, which were also backfilled when there was little control of backfill materials. Those areas were backfilled long before Ightham Sandpit; are they likely to be filled with non-putrescent waste?

4.0 Conclusions

4.1 There is considerable uncertainty regarding the current state of the 216 thousand cubic meters of polluted backfill and metal drums of unknown substances in Ightham Sandpit and an expensive investigation will be required to better understand the risks associated with building a road. Also, putrescence causes instability with pockets of gas in the ground, which tends to cause the land to subside over time. Both of theses factors introduces doubt into a situation where an LPA needs certainty for the Inspector to confirm a 'Sound Plan'.

4.2 A complete road from Darkhill to Nepicar is critical to the proposals coming from the landowners of BGGC. Any uncertainty regarding the start of the road causes doubts about the whole proposal.

4.4 The 6 Parish Alliance is actively considering being represented by an environmental barrister at the Local Plan Inquiry to consider the soundness of LPA proposals that involve made ground.

4.5 The quarry owners in the BGGC Consortium assert that they can finish quarrying and back filling in a timely manner to conform to the rigorous timescales required by the LPA to satisfy the Planning Inspector that the plan is sound. We are aware that the LPA has consulted the MPA in this regard.

4.6 The 6-Parish Alliance have consulted a specialist Mineral Planning Consultancy to give an initial opinion on whether this is a valid way for an LPA to proceed. We have been advised that mineral consent timescales are dependant on a number of factors and several are beyond the control of the MPA and the LPA.

a. The primary restriction on quarries is the market because an unpredicted downturn, for example the banking crisis, reduced demand for several years after 2008. In addition we are moving into a much more uncertain world with Brexit.

b. 0ne of the primary restrictions on quarry operations is the number of HGV movements allowed per working day. These decisions are taken so as not to unreasonably disrupt schools or local residents in their enjoyment of their residence and garden. However, they limit the rate that the quarry can be worked, irrespective of the market.

4.7 The alliance is considering commissioning a report from Mineral Planning Consultants in the event that the LPA is proceeding with BGGC. The report will provide evidence to the Inspector on whether proposed mining timescales are realistic and therefore sound, given the recent extensions to quarrying that have been applied for by the mining consortium.

4.8 WPC discusses issues of mutual interest with Green Balance Planning Consultancy who we regularly appoint to advise us on planning matters. Arising from those discussions WPC considers that viability is now an issue for the LPA if it is minded to bring forward aspects of BGGC in the forthcoming consultation. There are considerable unknown costs associated with the proposal that have not been quantified by the consortium proposing the site and we list our concerns as follows.

a. Given the evidence of contamination then an exhaustive and intrusive investigation of Ightham Sandpit will be necessary and the outcome is unpredictable.
b. Given the contaminated history of the site and the presence of unknown substances in sealed containers then we consider it probable that more substantive investigation and remediation will be necessary.
c. Any delay on the crucial part of the road would jeopardise the proposed Local Plan in the event that the LPA places reliance on it.
d. It is unclear whether the land owning consortium, or even H+H is aware of these potential costs that would be necessary to progress their aspirations and have taken account of them?
e. The fact that H+H own the land but gain nothing directly from residential or industrial development as it is in the AONB and that their costs as landowners will escalate will need to be considered.
f. A recent email from Forward Planning indicated that there would be no surprises regarding additional land required for development over and above that specified in the document 'The Way Forward'.
G. This would limit BGGC at present to less that 1,000 dwellings as some of the land specified to the east of H+H's factory is now fully utilised and would require significant backfill.

4.9 WPC is of the opinion that the proposal of BGGC, should it come forward, would be potentially unviable and therefore 'unsound' in planning terms. We will therefore be strongly advocating the 6 Parish Alliance to retain Green Balance Planning Consultancy for specialist advice on Mineral Applications and an Environmental QC to advise on the 'soundness' of proposals involving 'made ground' at the forthcoming Inquiry into the Local Plan.

Appendix A: Email from Barton Wilmore to H+H H+H's Barrister 5/10/2006
Appendix B: Sean Furey MSc MCIWEM FRGS. Expert Witness Report on Ightham Sandpit for the Planning Inquiry

Copy from

BARTON WILLMORE

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STL			
25 OCT 2006			
JMH		ALG	
MWS		CJP	
RCS		ENG	LB
DV		Accounts	
RB		Durkins	
HLS		Lab	
		S Mid	

The Clerk to Mr John Pugh-Smith
Chambers
39 Essex Street
London
WC2R 3AT

Our Ref: 12583/A2/AM

24th October 2006

Dear Sir

TOWN AND COUNTRY PLANNING ACT 1990 – SECTION 77
TOWN AND COUNTRY PLANNING (GENERAL DEVELOPMENT PROCEDURE) ORDER 1995

TOWN AND COUNTRY PLANNING (INQUIRIES PROCEDURE) (ENGLAND) RULES 2000

PLANNING APPLICATION REF: TM/03/2563 – DEVELOPMENT OF NEW FACTORY TO MANUFACTURE AERATED CONCRETE (JAMERA) PRODUCTS WITH OUTSIDE STORAGE, PARKING, NEW ACCESS AND ASSOCIATED FACILITIES AT IGHTHAM SANDPIT, BOROUGH GREEN ROAD, IGHTHAM, SEVENOAKS

We write with reference to the above in advance of our conference call with John Pugh-Smith, on Friday 27th October 2006 at 2.00 p.m. Other participants to the conference call will be Stuart Brittle from H + H Celcon Ltd, and Laura Brearley and Stuart Pratt from Southern Testing Ltd.

The purpose of the conference call is to consider the issue of potential site contamination identified during the ongoing intrusive site investigation being conducted by Southern Testing Ltd and the implications for the call-in inquiry.

Prior to the investigation work the assessment of ground conditions and water resources prepared by Southern Testing Ltd had been confined to desk-top analysis. Consultations with the Environment Agency (EA) and investigations by the applicant had found no records of the type of materials tipped at the site under the site's approved restoration scheme which had required use of inert materials and a site licence.

The site is partly located on a Catchment Source Protection Zone and the aquifer status is considered sensitive. The EA in their consultation response to the scheme considered the potential to cause ground water contamination was high and proposed a condition seeking determination of past and present uses of the site and adjacent area to ascertain the likelihood of contamination existing on site, with appropriate remediation being determined. Mid Kent Water commented that a detailed Environmental Assessment was required and requested to be involved in the consideration of groundwater protection. Kent CC's resolution to approve the scheme was subject to the applicant providing within 3 months further details to address groundwater protection. Counsel's advice confirmed that the intrusive investigation work should be undertaken and an ES Addendum be submitted to ensure robustness of the EIA process in advance of the call-in inquiry.

In-filling at the site had been assumed to have been confined to inert material in accordance with the approved variation of condition (i) of planning permissions ref: TM/85/1436 (part) and TM/87/1851 dated 8 April 2002 which required that all tipped material be confined to inert, non-toxic and non-putrescible material and a site licence be obtained for the restoration work (see permission letter dated 8 April 2002 enclosed). Subsequent unauthorised over-filling of the site, understood to have taken place between 1991-2002, was regularised with a retrospective approval ref: TM/02/583 dated 3rd April 2002 for a revised restoration and aftercare scheme (see copy of permission dated 6 February 2002 enclosed).

The intrusive investigation by Southern Testing Ltd has to date identified noxious fill materials, comprising hydrocarbon stained and odorous sandy clayey made ground including large quantities of metal, pipework, occasional drums (unknown content), concrete, brick, plastic and polythene. They have advised material of this nature is usually found to contain elevated concentrations of contaminants and given the unknown source and age of the materials a concern remains regarding the possibility of asbestos contamination. In response to the advice from Southern Testing Ltd gas monitoring and ground water testing equipment has been fitted to the boreholes because of the potential threat to the groundwater and from landfill gas. However, the contamination test results required to provide an accurate analysis of the contaminative content and guide the appropriate remediation are still awaited (see e-mail dated 19th October 2006 received from Southern Testing Ltd providing a summary of findings to date and fax dated 17th October 2006 providing borehole information).

The construction of the proposed factory requires significant land remodelling across the entire site with the estimated movement of 250,000 cubic metres of material around on site to provide the level base area required for the factory. Southern Testing Ltd have undertaken leachate tests to consider the effects the material may have on a designed landfill should the tipped material require removal off-site. The removal of material off-site would fall outside the scope of the existing planning application. Potential revisions to the landform and the building design would also fall outside the scope of the application.

In view of the sensitive nature of the information no consultation has yet taken place with the EA, Mid Kent Water and KCC regarding the scope of the intrusive investigation work and the remediation scheme.

The issues for discussion and matters on which Counsel's views are sought include:

1. Update on the ongoing investigation work;
2. Potential for the contamination to be localised and require minimal remediation or the contrary;
3. Potential position of the EA, Mid Kent Water and KCC and the implications for H +H Celcon Ltd;
4. Factory design implications;
5. Need for additional planning applications to be made to KCC;
6. Implications for the call-in inquiry work programme including ES addendum and the proposed March 2007 inquiry date;
7. Any other matters arising.

If you have any queries please do not hesitate to contact us.

Yours faithfully

ALASDAIR MACKENZIE
Associate

cc:	Stuart Brittle	:	HHCL (with enclosures)
	Laura Brearley	:	Southern Testing Ltd (with enclosures)
	Keith Funnell	:	KFA (with enclosures)

bcc: EL

Enc.

Campaign to Protect Rural England

CPRE Kent

Mrs Debbie Smith
The Planning Inspectorate
4/04 Kite Wing
Temple Quay House
2 The Square
Temple Quay
Bristol BS1 6PN

01 May 2007

Dear Mrs Smith

Proposal:	**Development of new factory to manufacture aerated concrete (Jamera) products with outside storage and parking and new access and associated facilities**
Location:	Ightham Sandpit, Borough Green Road, Ightham, Sevenoaks, Kent TN15 9JB
Application:	TM/03/2563
Appeal:	App/W2275/V/06/1199658

The following report supplements the comments submitted previously by Mr Ron Saunders, dated 20 April 2007. However, I would like to make a correction in that all correspondence should be addressed to:

CPRE Kent
3 Evegate Park Barn
Station Road
Smeeth, Ashford
Kent TN25 6SX

Please could the attached be copied to the main parties for the application so that this can be considered within the enquiry that is due to start on 15 May 2007.

The following proof of evidence has been produced on behalf of CPRE Kent. It is focused on the land contamination issues identified in the document: *Additional supportive information and second environmental statement addendum* (Barton Wilmore, April 2007).

This document was received on 17 April 2007, which has given very limited time to analyse the information provided and no time for additional research to verify its findings. The site investigation report was completed on 24th November 2006 and to our knowledge has not been released for consultation before. The remediation strategy by EDSR is undated, or

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has had the dates removed, which is not standard practice for consultancy reports. This makes it difficult to judge whether the applicants could have given consultees more time to assess the material presented prior to the public enquiry.

Given the magnitude of the soil and groundwater contamination found, this raises serious concerns about how thoroughly the risks and implications can be resolved through the public enquiry.

Yours sincerely

Sean Furey

Deputy Director

CPRE Kent

Direct dial: 01303 815186

E-mail: sean.furey@cprekent.org.uk

cc.

Mr Ron Saunders, CPRE Kent (Tonbridge & Malling)

Mr John Cannon, CPRE Kent (Tonbridge & Malling)

Campaign to Protect Rural England

1 Witness Credentials

1.1 My name is Sean Graham Furey MSc MCIWEM FRGS. I have a Bachelor of Science degree in Environmental Sciences and a Masters degree is in Infrastructure Engineering (Community Water Supply & Sanitation). I am a Chartered Water & Environment Manager.

1.2 Since February 2007 I have been Deputy Director of CPRE Kent and for the previous seven years I worked with the Kent Area of the Environment Agency as a Water Resources Officer and then a Project Manager for Integrated Water Management.

1.3 The Kent Branch of the Campaign to Protect Rural England exists to promote the beauty, tranquillity and diversity of rural England by encouraging the sustainable use of land and other natural resources in town and country.

2 Summary of position

2.1 **We object** to permission being granted for this proposal on the grounds that:

- There is an unacceptable risk to public water supplies and environmental water quality from the contamination identified on the site;
- There is insufficient data and understanding of the local hydrogeological and hydrological conditions in relation to the known, and unknown, contaminants, on the site and how both will be affected by the construction of the proposed factory.

2.2 If the inspector is minded to grant permission, after the public enquiry, then we strongly recommend that the following conditions are imposed:

- That further monitoring of surface and groundwater quality and flow is undertaken, including the area where the foundations of the factory will go;
- Geological mapping, by the British Geological Survey, to identify potential fissures or other geological structures that may facilitate the flow of groundwater to or from the site;
- That a groundwater model be developed to simulate the potential movement of contaminants from the site, the impact of the proposed development and the effectiveness of the proposed remediation strategy.
- Long term monitoring to verify that there has been no residual impact of groundwater and surface water quality as a result on the contamination nor the proposed factory.
- Investigation of the hydroecology of the upper Bourne to assess whether or not there has been an impact.

2.3 The presence of high level of hydrocarbons in an area that should have only been filled with "*inert, non-toxic, non-putrescible material"* suggests that enforcement action should be taken by the Environment Agency and Kent County Council.

2.4 It needs to be made clear to the applicant that they will need to undertake full site remediation whether or not this planning permission is granted. **Remediation should not, and cannot, be made conditional to planning permission being granted.**

2.5 It should also be determined whether 12 months is adequately long for effective bioremediation of the site.

3 Analysis

3.1 Identified contamination

3.1.1 A thorough and impartial site investigation appears to have been carried out by Southern Testing Ltd. The report identifies problems with soil contamination, groundwater contamination and landfill gases. The source of this contamination appears to be what is described as 'Made Ground', which is material that has been buried at this site at sometime in the past.

3.1.2 The distribution of boreholes and trial pits is uneven and does not include the footprint of the proposed buildings. This is important because there is a risk, however small, that construction of the foundations may create a contaminant pathway through the Gault Clay into the underlying Folkestone Formation.

3.1.3 Table 1, below, summarises those chemical parameters highlighted as potential problems in the Environmental Statement. Of greatest concern is the soil and groundwater contamination by hydrocarbons that could potentially drain from the site into nearby watercourses or aquifers used for public water supply.

Table 1 – Contamination problems identified by the Environmental Statement Addendum

Medium	Chemical Parameter	Problem
Landfill Gas	Methane (CH_4)	Monitoring of the gases in the 11 boreholes showed "elevated methane, carbon dioxide and corresponding depletion of oxygen has been detected in the majority of boreholes across the site". The Site Investigation & Risk Assessment Report reports that methane was found in 6 of the 11 boreholes and the readings were such that: "The risk of methane gases affecting human health and buildings and services is therefore considered to be moderate to high".
	Carbon Dioxide (CO_2)	The measured levels of carbon dioxide in the boreholes were also considered to present a potentially unacceptable risk to human health, buildings and services.
Soil	Hydrocarbons	The report states that the 'Made Ground', which comes from past waste dumping activity has "*Significantly elevated levels*" of Extractable Petroleum Hydrocarbons (EPH), " > *1,000mg/kg were identified in approximately one third of the samples tested."* Polycyclic Aromatic Hydrolocarbons (PAH) and ammoniacal nitrogen were found at high levels. Appendix B '*Exploratory Hole Logs'* identifies the type of material found across the site. The information from the eight trial pits gives an indication of the material and hydrocarbon content found. Similar results were presented for the 11 boreholes.
Groundwater	Hydrocarbons	*"Groundwater contamination… Of greatest concern are the elevated PAHs and Petroleum Hydrocarbons (EPH)"* Polycyclic Aromatic Hydrocarbons (PAHs) and EPHs were found in all the boreholes and appeared to be widespread across the site.

3.2 Further Analysis of Soil Contamination

3.2.1 The data provided in the excavation and drilling logs shows widespread burial of construction across the site (Table 2); brick was found in 20 of the 22 pits and boreholes and concrete in 19.

3.2.2 Evidence of hydrocarbons, through odours and black staining, was found in 15 of the 22 excavations. Figure 3 shows the distribution of those trial pits and boreholes where evidence of hydrocarbons was noted and its shows that they occur throughout the quarry, except to the south west, near the entrance the site.

3.2.3 The evidence of Figure 3 is backed up by the distribution of EPHs and PAHs found in soil samples (Figure 4, Figure 5). Interestingly, the relative distribution of EPH is more biased towards the north of the site, whereas PAH have not overall pattern but with high concentrations in the south (however there is no data for the BH12, which shows other signs of high hydrocarbon levels).

3.2.4 The log for Trial Pit 2 refers to metal drums, which may have been how the hydrocarbons were transported to the site. Blacktop (tarmac) is mentioned in only two sites (Trial Pits 1 and 2), which is in the area that appears to have the highest levels of PAHs.

3.2.5 We can conclude that EPH and PAHs are widespread across the site, but not uniform. The inconsistent data collection hampers further analysis and hence further monitoring, and a more uniform spatial spread of sites is recommended.

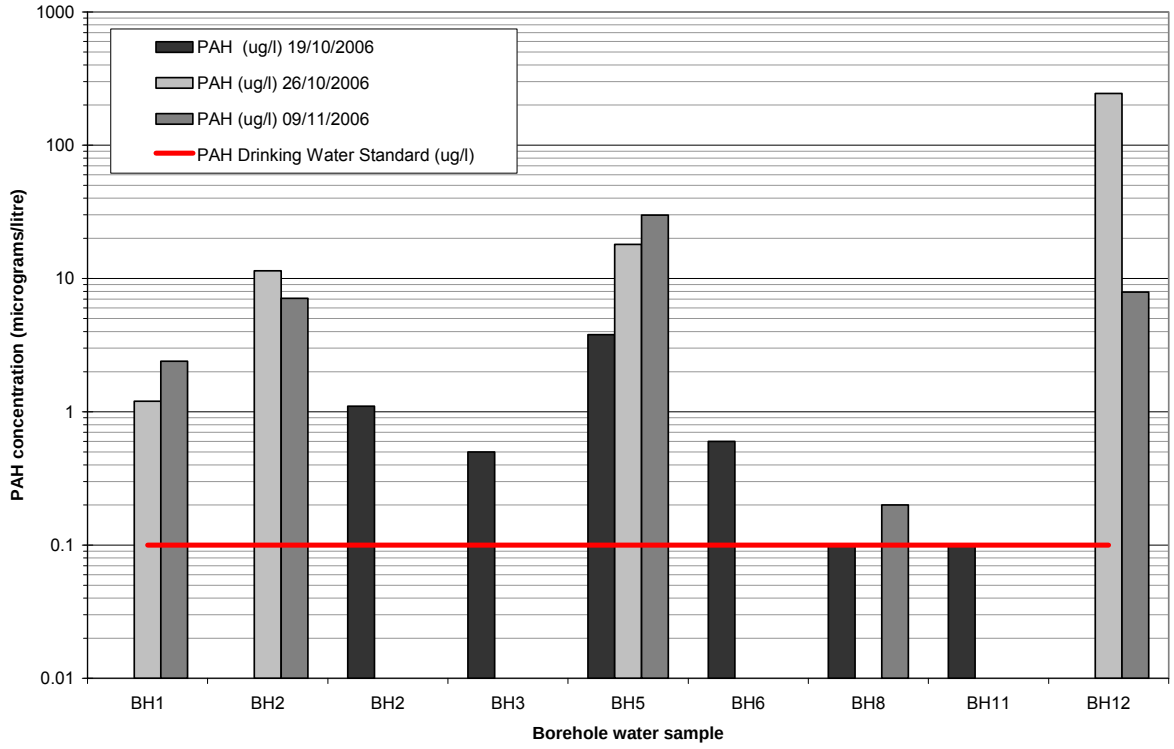
3.3 Further Analysis of Groundwater Contamination

3.3.1 While the data provided in the addendum is thorough the reproduction that we received has the ring-binding holes through the line that reports the EPH data for the 26 October so that only two of the five monitored boreholes are readable.

3.3.2 The European/UK drinking water standard for PAHs is 0.1 µg/l, which is the Limit of Detection (LOD) shown in Table of Results, in the Southern Testing report. The boreholes were monitored on three dates: 19 October, 26 October and 9 November. The pattern of which boreholes were tested is not consistant. However, 15 samples showed concentrations of PAHs at or above 0.1 µg/l, the highest being 245 µg/l (Figure 1).

3.3.3 Figure 6 is an attempt to discern a spatial pattern. The distribution of PAHs in the soil and groundwater do not compare well, but this appears to have more to do with the data availability than any physical discrepancies. This is a pity because it might have been possible to suggest whether PAHs were being transported away from the contaminated soil and hence which direction the contaminants have been moving.

Figure 1 - PAH concentrations found in on-site borehole water



4 Commentary

4.1 Hydrogeological conditions and vulnerabilities

4.1.1 The site is geologically complex because it is on the boundary of the Folkestone Formation (a sandstone that is a minor aquifer) and the overlying Gault Clay (which is largely impermeable). In addition there is also overlying Alluvium, which is usually old river deposits comprising silts, sands and gravels.

4.1.2 The Bartin Wilmore summary states in paragraph 13.7 that "The site is not located on a groundwater Source Protection Zone (SPZ)"

4.1.3 However, in Appendix F, a letter from Barton Willmore (24 October 2006) states: *"The site is partly located on a Catchment Source Protection Zone and the aquifer status is considered sensitive. The EA in their consultation response to the scheme considered the potential to cause groundwater contamination was high..."*

4.1.4 The Site Investigation & Risk Assessment Report states:

4.1.5 "Significant groundwater contamination has been identified as part of this investigation, resulting in risks to groundwater, the underlying aquifer, and surface watercourses."

Over the past five years, South East Water has commissioned detailed hydrogeological investigations of the Folkestone and Hythe Beds in the adjacent Darent catchment, around Sevenoaks and Kemsing. The work demonstrated the complexity and variability of the Lower Greensand series. Consequently, although

4.1.6 Figure 2 shows that the majority of the site is not in a Source Protection Zone, such boundaries should not be treated as an absolute.

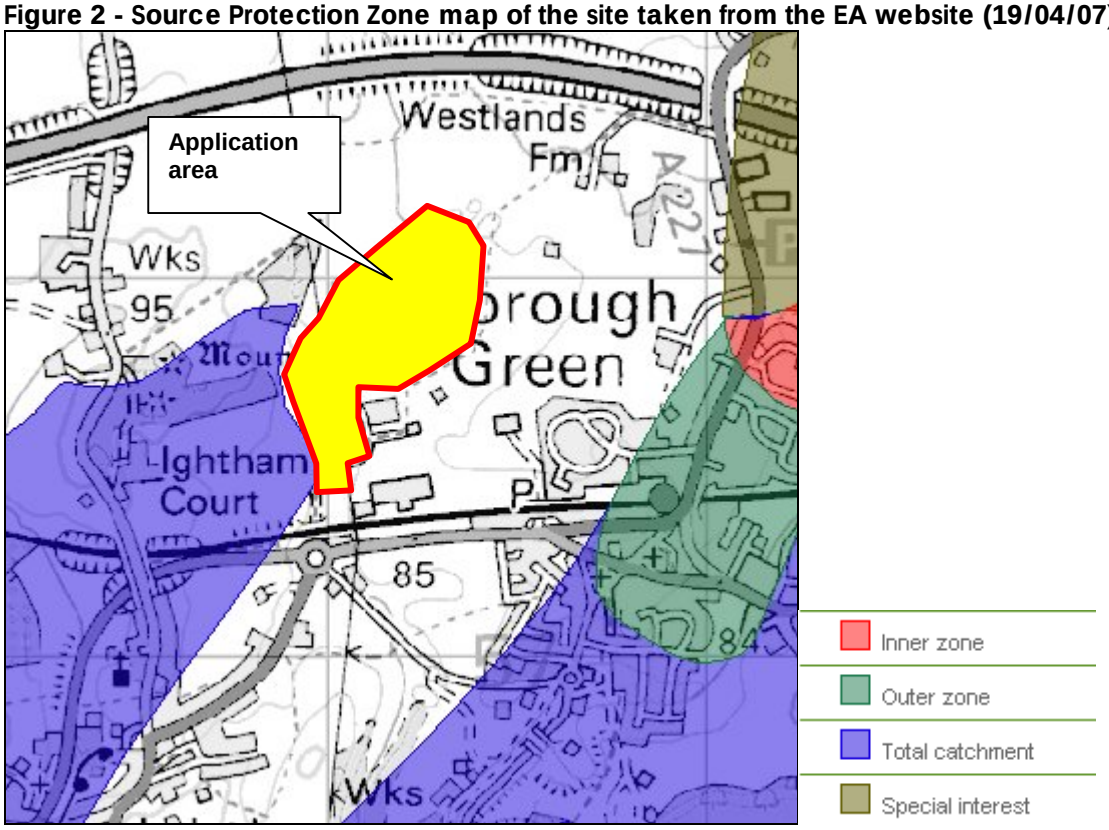
4.1.7 In addition, SPZ boundaries are determined by groundwater models that work at a larger scale and hence have quite coarse resolution and have uncertainties arising from the modelling process, the data available and the disturbance to the ground conditions caused by the quarrying activity. Given the presence of Folkestone Formation on the site and the proximity to SPZs to the east and west, and the level of contamination that has been found, it seems justifiable to take a precautionary approach to decisions on this site.

4.1.8 The report states that groundwater flow is northwards from the site. This would be consistent with the general dip of the Folkestone Formation underneath the Gault Clay, however local topography and drainage is southward into the River Bourne.

4.1.9 The word 'bourne' is often used to describe an ephemeral chalk stream, however the River Bourne is fed by perennial chalk springs at the foot of the North Downs where the chalk meets the Gault Clay. It is not easy to identify how much the Folkestone Formation contributes to this stream.

4.1.10 Therefore, further work is recommended to determine whether groundwater flow from the site does indeed go north into the confined aquifer, or south to feed the River Bourne. This is needed to ensure that remediation strategy, which calls for a permeable reactive barrier, targets the correct areas and flow directions.

Figure 2 - Source Protection Zone map of the site taken from the EA website (19/04/07)



4.2 Pollution Risks

4.2.1 The River Bourne joins the River Medway between Tonbridge and Yalding, consequently the flow helps support public water supply abstractions at Yalding, which feeds Bewl Reservoir, and the Springfield pumping station in Maidstone.

4.2.2 In 2005, Southern Water applied to abstract from the Medway under a Drought Order, this allowed them to abstract when the flow in the river is lower than their usually 'Hands Off Flow' condition and outside the period of their licence allows. At times of low flow in the river, there will be higher concentrations of any chemicals coming from point-source discharges (like wastewater treatment works) and diffuse sources (like leached pollutants from contaminated land) will be increased. Although, the water treatment process will remove the major of harmful substances, pollution from sites like Ightham Sandpit increases the risk to supply quality and, potentially, the treatment cost.

4.2.3 Equally, this site presents a potential risk to the Mid Kent Water public water supply source in Borough Green that could result in greater risk and cost. As well as the aquifer, Southern Testing notes that some of the contaminants could affect plastic water service pipes, which are likely to be common in Borough Green.

4.2.4 Leaching of hydrocarbons, or other harmful substances into the River Bourne may also have a long term ecological impact. Due to time constraints it was not possible

to prepare a case on this aspect. Hence further work should be undertaken to examine the impact caused by this site.

4.3 Planning condition non-compliance

4.3.1 We have serious concerns about how this site has been managed and monitored in the past. The situation is complicated by the combination of the site works itself and any preparatory work and permissions for the proposed Borough Green-Platt bypass, which passes through it.

4.3.2 Planning Consent TM/87/18511 contains a number of relevant conditions that may have been breached:

Condition	Comment
"(xvii) precautions shall be taken, to the satisfaction of the County Planning Authority, to prevent tipping by unauthorised person including the provision where necessary of fencing and gates; any unauthorised material on the site shall be removed within 24 hours of such tipping taking place;".	This condition also exists as condition (xvi) in planning consent TM/85/1436, which applies to this site. If the hydrocarbons were deposited at this site by an unauthorised party then this condition has clearly not been adhered to.
"(xxii) (a) the material to be used as 'approved fill' as shown on drawing No. 15/SP/1 shall be hassock from Stangate Quarry..." and *"(c) the Kent County Council Highways Laboratory shall carry out testing of the placed and compacted fill to determine the acceptability of the material and its compactions..."* and *"(d) "any material which does not meet the requirements of these conditions shall be removed or recompacted, as directly by the Kent County Council Highways Laboratory at the expense of the operator;"*	We can infer that either the contaminated material was deposited at a later time, or that samples from this site were not tested, or they would have undoubtedly encountered the waste material shown in Table 2 and then removed. ("hassock" is a loosely consolidated sandstone from Hythe Beds in the Lower Greensand series).
"(vi) no materials shall be imported for use in general restoration except for solid inert waste which shall be "Waste Category A – inert waste";	The material present on the site is largely inert (bricks, concrete, wood etc) suggesting compliance with this condition. If it was imported at this time and not later then where did the hydrocarbons come from?

4.3.3 Planning consent MK/4/71/532, dated 5 November 1971 was for an extention to the original quarrying. It included two relevant conditions:

Condition	Comment
"(x) no filling materials shall be introduced to the site without the consent of the Local Planning Authority"	From this, we can conclude that either these conditions were not enforced, or there is part of the paper trail that we have not seen that removes these requirements.
"(xi) no refuse, sewage, chemical or industrial waste or petroleum products shall be disposed of on the site during of following the excavations hereby permitted."	

4.3.4 We can conclude that there is significant uncertainty about what is happened at this site, and hence the environmental risk, and the ability of the applicants to comply with planning conditions placed upon them.

5 Conclusions

The site investigation work leads us to the recommendations set out in Section 2 and requires the following actions:

5.1 Remediate the contamination:

5.1.1 The threat to human health and the ecology of the site and the River Bourne, needs to be removed. This needs to happen whether or not planning permission is granted for this application.

5.2 Determine the source and history of the 'Made Ground':

5.2.1 It was not possible to get hold of any waste management licence information for the site in the time available. The Environment Agency website does not show the site as having been a landfill site.

5.2.2 Chalk fragments and flint gravel was found across the site. Neither would come from the Lower Greensand or the Gault Clay of the immediate area. The Flint gravel may be naturally occurring in that area due to erosion and outwash from the North Downs scarp slope that may have contributed to the formation of the Alluvium. However, chalk is much less likely to have been transported naturally as it generally lost from the Downs through dissolution, not mechanical erosion and transport typical of less soluble rocks like flints and silca-dominated sandstones. Therefore, the presence of chalk suggests that the material was transported to the site with the man-made material. This is supported by the logs from Trial Pit 11 and Borehole 9(Natural Ground) which contained flint gravel but no chalk. Hence, the infill material is most likely to have come from an area on, or north of, the North Downs. Thamesport, on the Isle of Grain, has been suggested.

5.2.3 There is an assumption that the hydrocarbons entered the site with this fill, but as the EDSR report highlights, there are other possible sources. If they are not dealt with then the contamination could reoccur even after the site has been cleaned up.

5.2.4 If this material had been tipped without the owner's consent then they were obliged to have removed the material within 24 hours.

5.3 Determine why this site does not appear to have been appropriately managed, monitored and regulated in the past.

5.3.1 Paragraph 2.7 of Appendix 5, the EDSR report, suggests that the pit was licensed to be backfilled with *"inert, non-toxic, non-putrescible material".* This commenced in the late 1980s and was completed in 2001. The presence of significant hydrocarbons across the site shows that this was not kept to nor enforced.

6 Appendices & Figures

6.1 Definitions

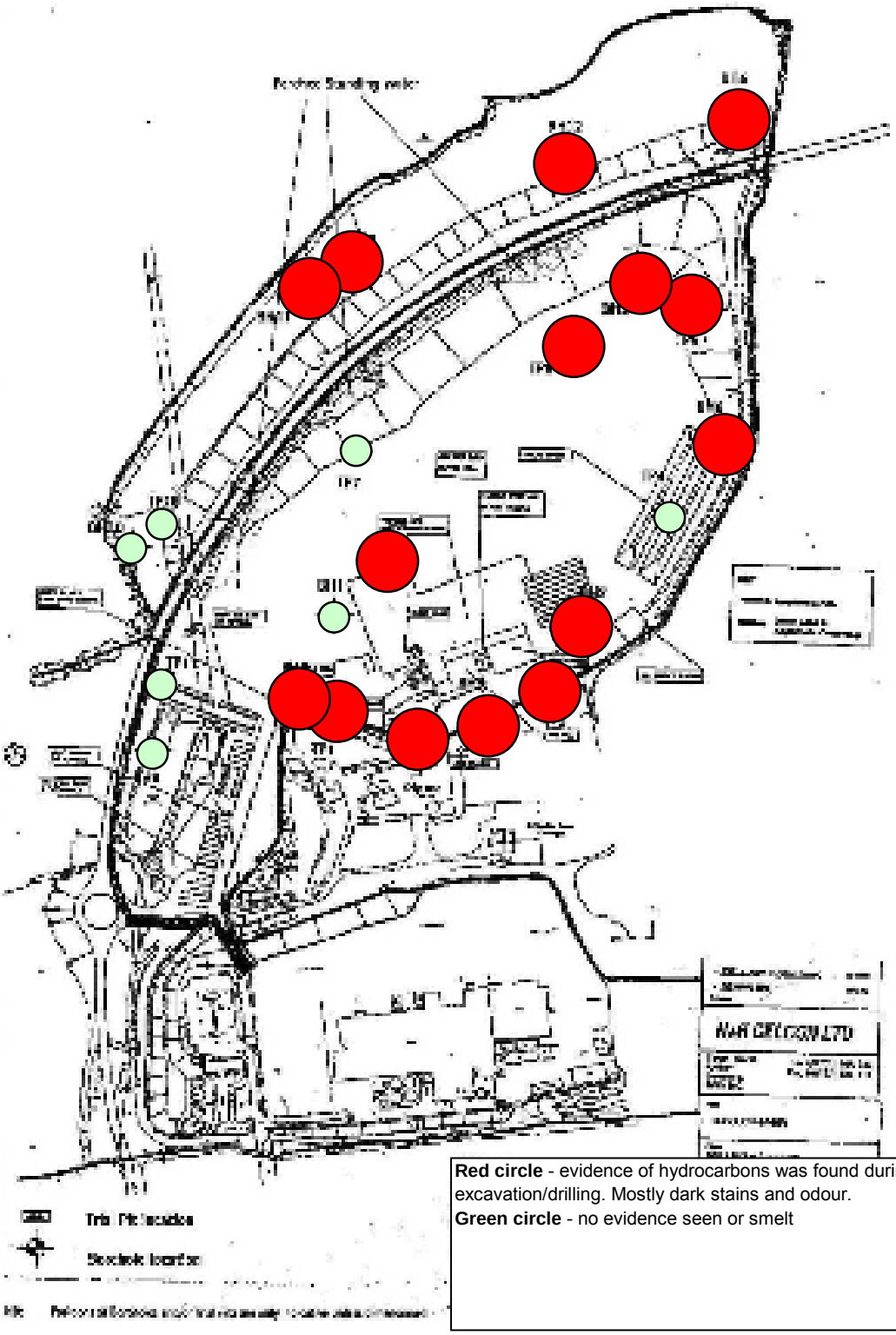
Petroeum Hydrocarbons		Petroleum fuels and oils are complex mixtures of hydrocarbons that vary, not only among the fuel types, but also within each fuel type depending upon manufacturer, geographic location, and seasonal use. The compositions of these products are made up of several hundred hydrocarbon compounds. Of these hundreds of compounds, toxicological information is available on only a very few. This makes determining the health risk posed by petroleum hydrocarbons difficult.
Extractable Petroleum Hydrocarbons	EPH	These aliphatic and aromatic hydrocarbon ranges correspond to a boiling point range between approximately 150 °C and 500 °C and have 12 to 35 carbon atoms per molecule. These include most diesels, lubricating oils, greases, waxes, hydraulic oils.
Polycyclic Aromatic Hydrocarbons	PAH	Polycyclic aromatic hydrocarbons is a group name for several substances present in petroleum based products such as coal tar. The standard is 0.1 µg/l for the sum of all the substances. Some PAHs are known carcinogens. The molecular structure is based on multiple benzene rings (rings of 6 carbon atoms). Benzo(a)pyrene is one of several PAHs. Their source in drinking water is as a result of deterioration of coal tar which many years ago was used to line water pipes. Due to extensive water mains refurbishment and renewal it is now rare to detect this substance in drinking water. The standard is 0.01 µg/l.
Volatile Hydrocarbons	VH	Hydrocarbons that vaporise readily into the atmosphere. They are typically defined as having 5 to 12 carbon atoms per molecule.
Total Petroleum Hydrocarbons	TPH	This is the total amount of hydrocarbons that was found in a given sample, this includes EPHs, PAHs and volatile hydrocarbons.

Table 2 - Summary of man-made materials found in trial pits and boreholes (adapted from Southern Testing test hole logs)

Location	Brick	Concrete/ aircrete	Hydrocarbons/ black staining	Flint	Chalk	Metal	Coal/ Clinker	Plastic	Wood	Tiles	Black top	Ceramic
TP1	✓	✓	✓	✓	✓					✓	✓	✓
TP2	✓	✓	✓		✓	✓						
TP3	✓	✓	✓	✓		✓		✓				
TP4	✓	✓		✓	✓			✓			✓	
TP5	✓	✓	✓			✓		✓				
TP6	✓	✓	✓	✓	✓							
TP7	✓	✓		✓	✓	✓			✓	✓		
TP8	✓	✓	✓	✓		✓	✓					
TP9	✓	✓	✓	✓	✓			✓				
TP10	✓	✓										
TP11				✓								
BH1	✓				✓		✓					
BH2	✓	✓	✓			✓	✓		✓			
BH3	✓	✓	✓	✓	✓				✓			
BH4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH5	✓	✓	✓	✓								
BH6	✓	✓	✓		✓		✓	✓				
BH7	✓	✓	✓		✓	✓						
BH8	✓	✓	✓				✓					
BH9				✓								
BH10	✓	✓		✓			✓					
BH11	✓	✓	✓	✓			✓					
BH12	✓	✓	✓			✓		✓	✓			
Total (*l23*)	**20**	**19**	**15**	**13**	**10**	**8**	**7**	**6**	**4**	**2**	**2**	**1**

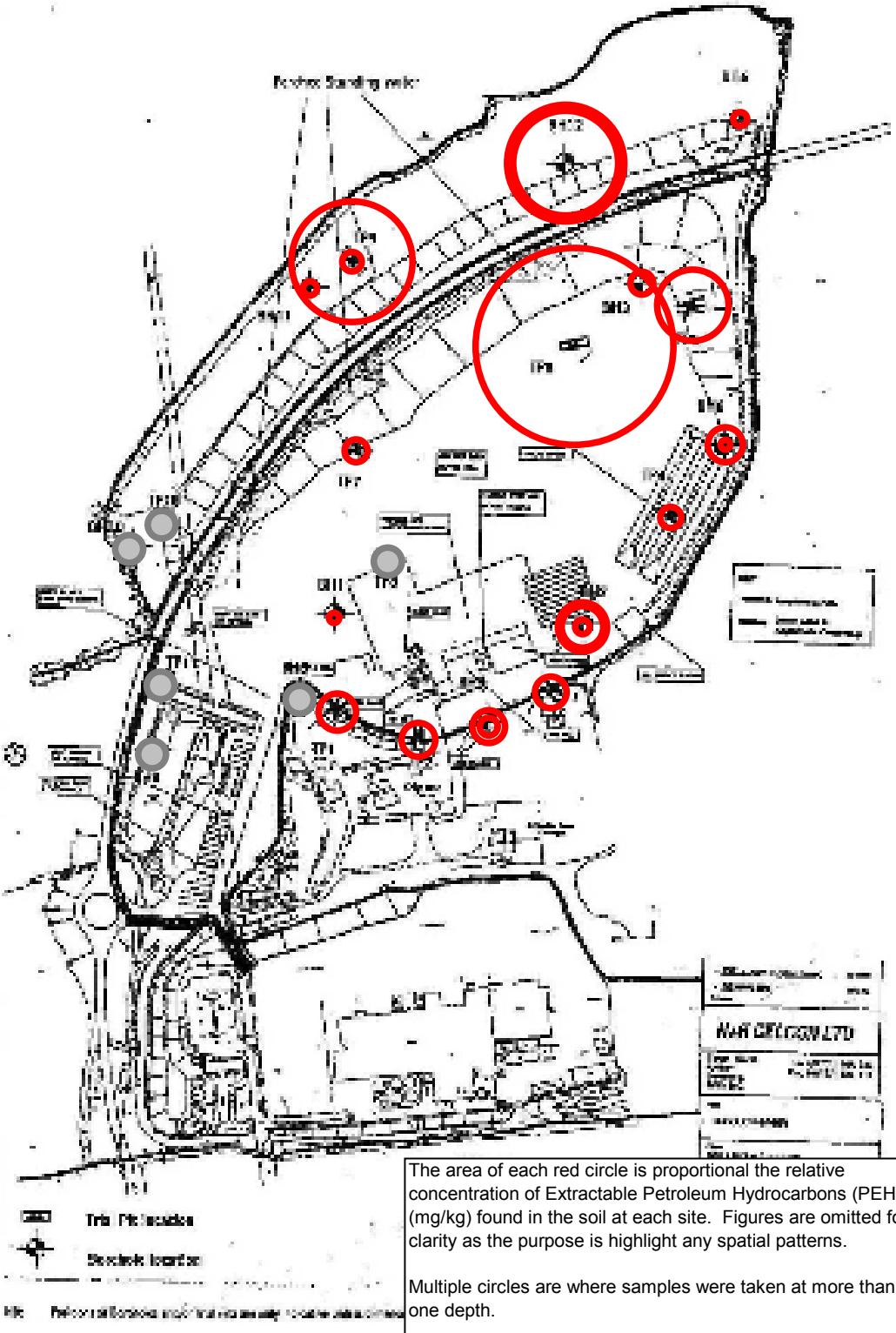
ND – No Data

Figure 3 - Evidence of hydrocarbons in excavation/drilling logs



Red circle - evidence of hydrocarbons was found during excavation/drilling. Mostly dark stains and odour.
Green circle - no evidence seen or smelt

Figure 4 – Extractable Petroleum Hydrocarbons (EPH) concentration measures in soil samples

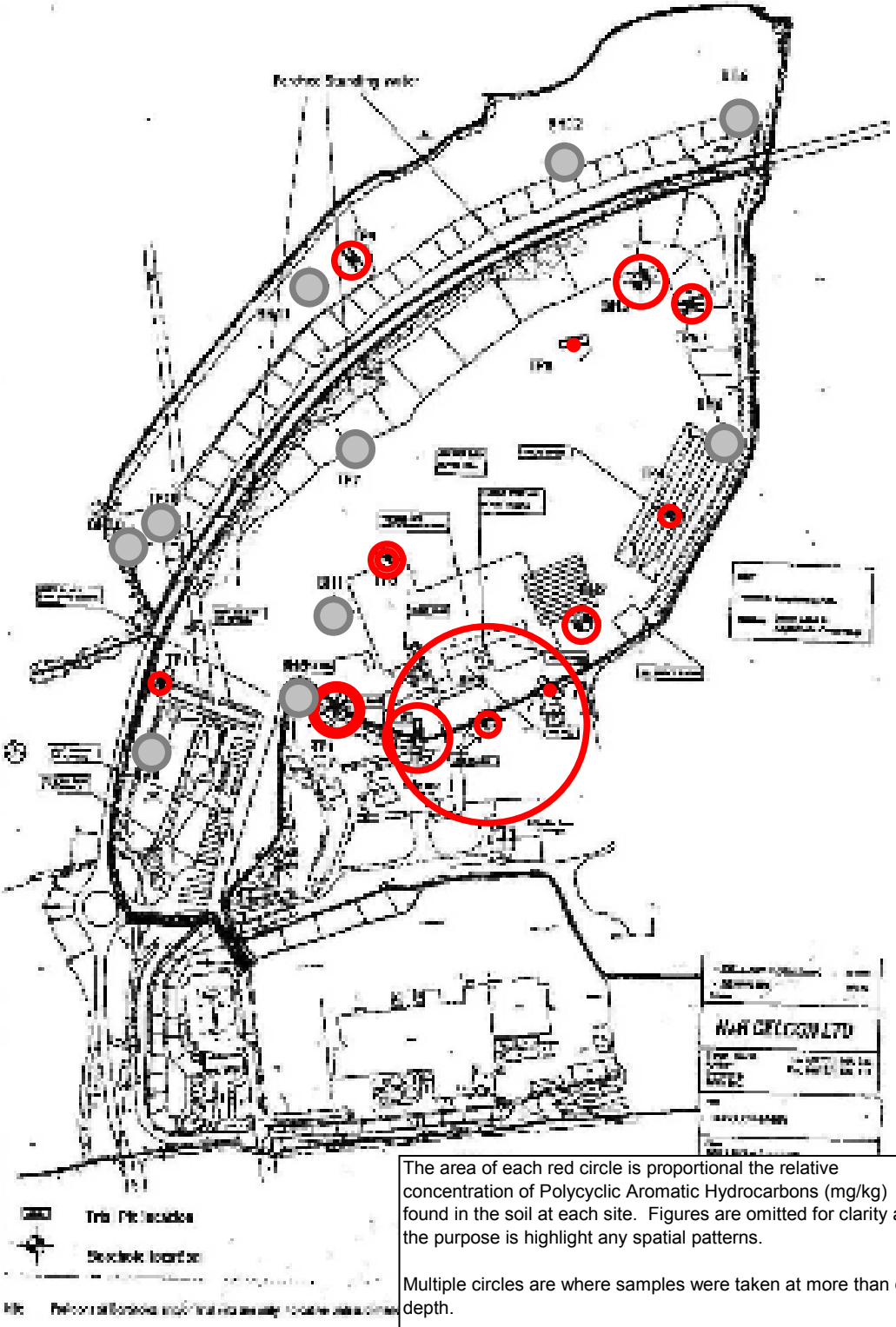


The area of each red circle is proportional the relative concentration of Extractable Petroleum Hydrocarbons (PEH) (mg/kg) found in the soil at each site. Figures are omitted for clarity as the purpose is highlight any spatial patterns.

Multiple circles are where samples were taken at more than one depth.

Grey circles are those with no data

Figure 5 - Distribution of Polcyclic Aromatic Hydrocarbons (PAHs) in soil samples

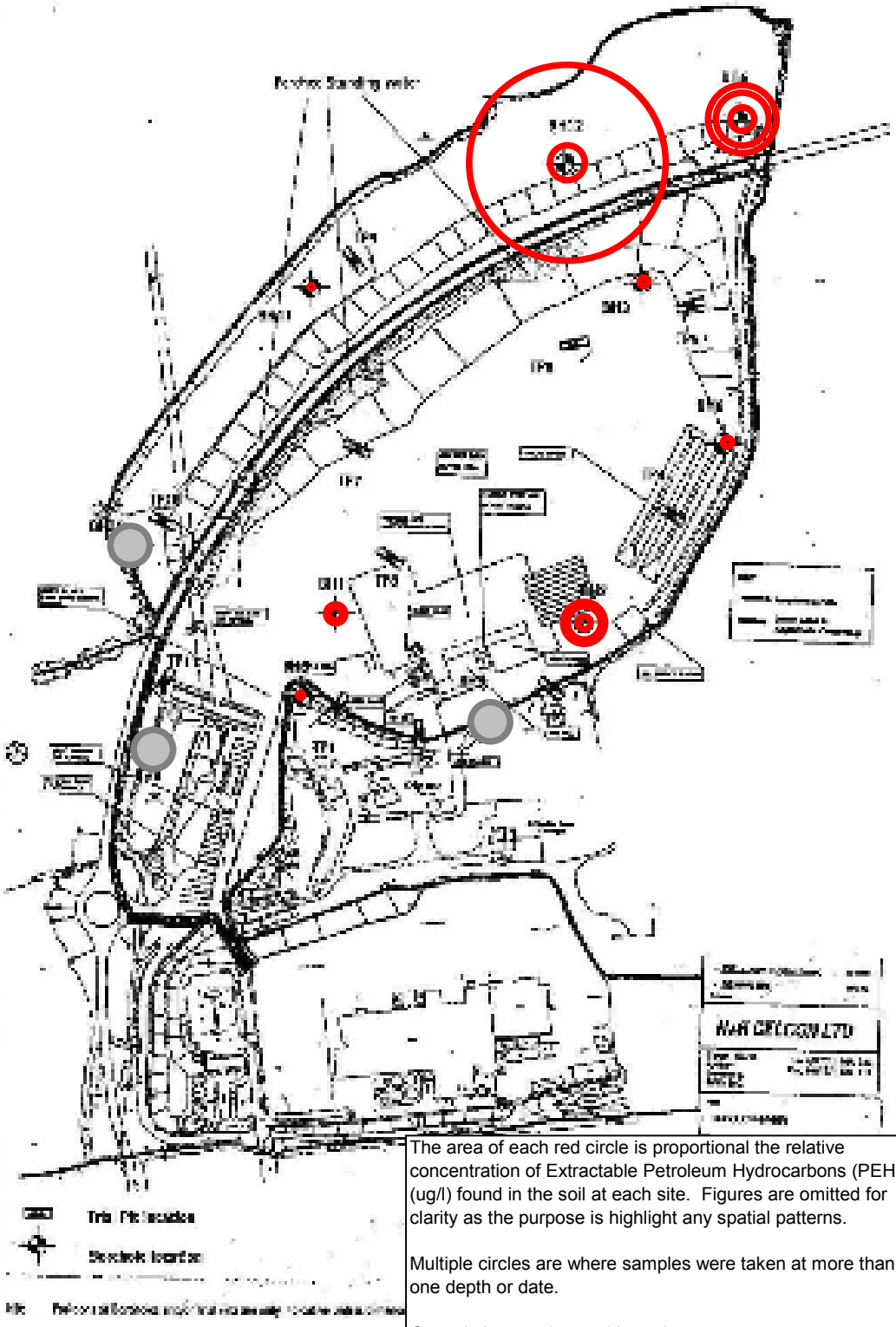


The area of each red circle is proportional the relative concentration of Polycyclic Aromatic Hydrocarbons (mg/kg) found in the soil at each site. Figures are omitted for clarity as the purpose is highlight any spatial patterns.

Multiple circles are where samples were taken at more than one depth.

Grey circles are those with no data

Figure 6 - PAH distribution in groundwater samples



The area of each red circle is proportional the relative concentration of Extractable Petroleum Hydrocarbons (PEH) (ug/l) found in the soil at each site. Figures are omitted for clarity as the purpose is highlight any spatial patterns.

Multiple circles are where samples were taken at more than one depth or date.

Grey circles are those with no data