Proposed Aldi Store

Old Mill Lane, Barnsley

Remediation and Enabling Works Statement

For Aldi Stores Ltd.

Report Ref	Issue	Prepared by	Date	Reviewed by	Date
15004/RS	1	A Bradley	26.04.19	A Cooper	01.05.19

Client

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Proposed Aldi Store, Old Mill Lane, Barnsley
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For Aldi Stores Ltd.

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DRAWINGS

APPENDICES

1 INTRODUCTION

Site Description

1.1 It is proposed to redevelop a remediated former gas works with an Aldi store with associated car parking and landscaping, details of which are provided in **Appendix A**. The site, centred on National Grid Reference 435200, 407310, is located on the east of Old Mill Lane and north of Old Tannery Road in Barnsley, South Yorkshire, approximately 1km north east of the town centre as shown on **G001**.

1.2 The site is currently unoccupied, level and generally covered by informal granular hardstanding with discrete areas of block work walls, concrete slab or tarmac hardstanding. During the walkover, evidence of potential contamination sources was not observed on the surface.

1.3 The boundaries are marked by post and wire fencing on the east, west and south with palisade fencing to the north.

1.4 Land uses in the vicinity of the site are summarised below:

- North: Car park and associated Wickes store beyond.
- South and East: Old Tannery Lane on a raised embankment with unoccupied land and the River Dearne beyond.
- East: Access road with a car park, public footpath and open land beyond.
- West: Old Mill and with an embankment with retail units beyond.

Site Investigation Works

1.5 3e Consulting Engineers Limited carried out a site investigation in 2016 on the remediated site, which comprised trial pits; mini percussion boreholes dynamic sampling and rotary open hole drilling, in order to determine soil profile and to allow ground gas and groundwater monitoring wells to be installed. Disturbed samples and, where possible, undisturbed open drive tube samples were recovered for soil descriptions and laboratory testing.

1.6 Locations for all the works are indicated on the enclosed Exploratory Hole Location Plan, **Drawing G-0-02**.

1.7 The following reports should be read in conjunction with this remediation statement:

- Phase I Geo-Environmental Assessment Report, 3e Consulting Engineers Limited, Reference 15004 Issue 2, dated October 2016.
- Phase II Geo-Environmental Assessment Report, 3e Consulting Engineers Limited, Reference 13738/SI Issue 1, dated October 2016.
- Ground Gas Monitoring Addendum Letter, 3e Consulting Engineers Limited, Reference 15004/LTR/0001/AB, dated 8 December 2016.

1.8 The site forms part of a former gas works which is understood to have been remediated by VHE under the supervision of White Young Green (WYG) in between 2007 and 2008 and a validation report was prepared by WYG (Factual Post Remediation Verification Report, Former Gasworks, Old Mill Lane, Barnsley, dated August 2008, ref E7773-PRF-V1). The report also summaries the previous series of geo-environmental assessments of the site completed by WYG between 1996 and 2007. It is recommended that the reports are read in conjunction with this assessment.

1.9 During the investigation, potential contamination associated with the former gas works was identified in both soils and groundwater in all three deep dynamic sampling boreholes. This was both visual and olfactory evidence of contamination was encountered within the deeper made ground materials (particularly immediately below a puddle clay layer and above the obstruction encountered in the former gas holder) and in residual soils.

2 SUMMARY OF SITE INVESTIGATION

Soil Profile and Visual Evidence of Contamination

2.1 Ground conditions generally comprise made ground including reworked clay, gravel, cobbles and boulders of brick, concrete, black ashy gravel of various lithologies. These were proven to an average depth of 1.70m, however, within the former gas holder these were proven to 6.6m where a concrete obstruction was present. Underlying the made ground were alluvial soils, which comprised very soft to firm sandy clay with bands of sand and gravel to a maximum depth of 3.90m. Firm to stiff and stiff gravelly clay (residual soils) overlying interbedded clay, sand and cobbles of sandstone recovered as a bedded gravel were present to depths between 8.15m and 8.50m bgl. The solid Coal Measures strata comprising interbedded Mudstone, Sandstone and Siltstone with a thin band of coal (BH02 12.40-12.60m) was proven to 30.2m.

2.2 Visual and olfactory evidence of potential gas works contamination was encountered in the base of the natural soils outside of the gas holder and in the base of the gas holder.

Groundwater

2.3 During the progression of the mini percussion and dynamic sampling boreholes, perched groundwater was encountered in the made ground between 1.5m and 1.9m bgl. Deeper groundwater strikes were encountered in natural soils and bedrock between 4.0m and 8.1m.

2.4 The groundwater monitoring visits encountered water between 1.11m in the centre of the site and 2.91m bgl in the east.

Chemical screening

2.5 Selected samples recovered from the site were tested for potential contaminants of concern based on the findings of the conceptual site model. A total of eight samples of made ground and two natural soils were screened for a selection of the following determinands:

- Metals (Arsenic, Cadmium, Chromium III, Lead, Mercury, Nickel, Selenium, Copper, Zinc)
- Boron (water soluble)
- Total Organic Carbon (TOC)
- Water soluble sulphate
- Speciated polyaromatic hydrocarbons (PAH)
- TPH (Aliphatic/Aromatic banding)
- MTBE & BTEX

2.6 In addition, nine samples of made ground were screened for the presence of asbestos and six samples of natural deposits were scheduled for water soluble sulphate and pH determinations to assess the potential for sulphate attack on buried concrete.

2.7 Where Gas Works waste contamination was suspected in deep natural soils, additional testing for total cyanide, total ammonia and phenols were carried out.

Groundwater Analysis

2.8 In order to assess the potential risk to the water environment, groundwater samples were obtained from groundwater monitoring wells. The two samples of groundwater recovered were screened for the following determinands:

- Speciated polyaromatic hydrocarbons (PAH)
- TPH (Aliphatic/Aromatic banding)
- MTBE & BTEX
- Ammonia
- Total Cyanide
- Total Phenols
- pH

3 CONTAMINATION ASSESSMENT

Soils

3.1 The ground investigation undertaken by 3e was for a commercial end use and the results of the laboratory chemical analysis identified a single sample of made ground (TP03 at 0.30m) in the west of the site identified some elevated PAH compounds and a sample of made ground from beneath the proposed store recorded Chrysotile asbestos fibres at 0.003%.

3.2 Groundwater testing has identified that elevated concentrations of PAH, TPH, benzene, ethylbenzene, ammonia and phenol are present in the groundwater against generic assessment criteria, however, these results are similar, albeit slightly higher to those recorded in the post remediation validation monitoring carried out by the remediation consultant.

3.3 Given the results of the laboratory analysis, the risk to the wider environment is considered to be low when compared to the post remediation validation monitoring on the site, which we understand was previously approved by BMBC and the EA, copies of the correspondence for the wider gas works remediation scheme carried out by White Young Green are included as **Appendix B**.

Gas Protection Measures

3.4 Radon protection measures are not required for the proposed development.

3.5 Ground gas monitoring indicated elevated concentrations of carbon dioxide gas to be present, therefore, as precautions are considered necessary in line with CIRIA C665 Characteristic Situation 2.

3.6 In addition, based on the elevated concentrations of naphthalene within the made ground at the base of the gas holder and within natural soils around the gas holder it is recommended that the gas protection measures are increased to a hydrocarbon vapour barrier, particularly as the likely foundations solution (either piles or stone columns) will provide a preferential pathway up to the underside of the floor slab.

Potential risk to human health

3.7 Information obtained during the desk study indicated a medium risk of contamination. Visual and olfactory evidence of potential gas works contamination was encountered in the base of the made ground outside of the gas holder and in the base of the gas holder. Laboratory chemical analysis on the soils has identified them to be suitable to remain on site for the proposed development when compared with the relevant human health GAC.

3.8 Prior to construction, it is recommended an asbestos management plan is prepared and implemented to prevent the exposure of construction staff and public to potential asbestos exposure. Following completion of the development, the pathway to the end user will be broken by use of hard stand and managed landscaping throughout and the risk is negligible.

3.9 UKWIR analysis has not been undertaken as part of this assessment. Given the presence of hydrocarbon contamination (TPH and PAH compounds) in the made ground on the site, it is possible that water supply pipes may need to be upgraded to barrier pipes. It is recommended that the results of this investigation are made available to the utility supplier to determine a suitable pipe material.

Potential Risk to Surface and Groundwater

3.10 Based upon the findings of the 3e investigation, the elevated levels of TPH and PAH contamination recorded within the groundwater samples screened from BH2 and BH3 are considered to be similar to the post remediation validation sampling carried out by the remediation consultant.

3.11 In view of the fact that contaminated groundwater is already present at rockhead levels, piling is considered to have limited additional impact on the mobilisation of contamination into the underlying aquifer and lateral movement to the adjacent watercourse. Given the results of the 3e laboratory analysis, the risk to the wider environment is considered to be low when compared to the post remediation validation monitoring on the site, which we understand was previously approved by BMBC and the EA for the wider remediated gas works.

Remediation Overview

3.12 A remedial capping layer in areas of soft landscaped areas will be sufficient to break the latent pollutant pathway between any remaining made ground and end users, with hardcover providing a pollutant break elsewhere. In view of the presence of marginally elevated PAH compounds and occasional asbestos fibres, a capping layer 300mm thick is recommended, however, this will need to be agreed with the local authority following submission of this Remediation Statement for the development.

3.13 In order to prevent the generation of dust, made ground will need to be suitably dampened to allow appropriate handling as a precaution to prevent generation of dust and covered when stockpiled to prevent drying together with suitable dust monitoring during periods of the intensive activity involving the made ground. In addition, if areas of made ground are trafficked by plant during construction then suitable precautions will be required to prevent dust generation. These recommendations are not exhaustive, but should form part of the site specific asbestos management plan for the site prepared by a specialist.

3.14 Ground gas monitoring indicates carbon dioxide gas to be present, therefore, need for gas precautions are considered necessary. However, in addition, based on the elevated concentrations of naphthalene within the made ground at the base of the gas holder and within natural soils around the gas holder it is recommended that the gas protection measures are increased to a hydrocarbon vapour barrier, particularly as the likely foundations solution (either piles or stone columns) will provide a preferential pathway up to the underside of the floor slab.

4 REMEDIATION METHOD STATEMENT

4.1 The following remediation statement details a method of working and validation that will ensure the site is left in a condition such that no significant risk is presented to human health or controlled waters / adjacent sites.

4.2 Any groundwater encountered during ground works will need to be assessed prior to disposal.

4.3 In summary, the following items are required and discussed in more detail below;

- Placement of 300mm remedial capping in limited areas of new soft landscaping where made ground soils are present.
- Inclusion of gas protection measures suitable for the protection against hydrocarbon vapours and carbon dioxide as part of store construction (to be designed and validated by others).
- Given the presence of hydrocarbon contamination (TPH and PAH) in the made ground on the site, it is possible that water supply pipes may need to be upgraded to barrier pipes. It is recommended that the results of this investigation are made available to the utility supplier to determine a suitable pipe material (to be designed and validated by others).

4.4 If during the groundworks, other areas of gross contamination or soils which differ from those encountered in the site investigations are exposed they will be assessed by a geo-environmental engineer from 3e Consulting Engineers as part of the watching brief, the Local Authority Contaminated Land and Planning Officers notified and appropriate remediation carried out as necessary, following agreement with the Contaminated Land Officer.

Made Ground Re-engineering

4.5 All made ground containing deleterious materials, including topsoil, should be removed from areas where levels are to be raised with engineered fill. If this material cannot be maintained on site it should be removed to a suitably licensed disposal facility.

4.6 In the area of proposed Aldi store the following method shall be used:

- Excavation of obstructions in area of proposed store where possible or expose the deeper obstruction (ie gas holder) and record by survey as part of the as-built drawings for the earthworks and pile/stone column design.
- It is envisaged that excavations will be carried out using conventional excavation plant.
- Care should be taken when excavating or filling in the vicinity of the site boundaries particularly when excavating in loose soils or removing obstructions and should be addressed in a site specific method statement by the contractor.
- In the remainder of the site all obstructions should be removed to a minimum level of 1m below the proposed finished level, including below any proposed drainage structures.
- All site won concrete and brick materials should be crushed to a suitable grading and validated to ensure their suitability for re-use with respect to both contamination and physical properties.

Imported Soils (General Fill)

4.7 Any fill imported to site will need to be validated to ensure it is not pose a risk to the environment (i.e. uncontaminated).

4.8 All engineered fill should be placed in accordance with the 3e Earthworks Specification (enclosed as **Appendix C**) and design drawings.

4.9 All imported general fill materials used to raise levels should be screened for potential contaminants prior to importation to site using the acceptance criteria for capping soils provided in **Table 1** as follows.

Table 1 – Imported General Fill Acceptance Criteria

DETERMINAND	GENERIC ASSESSMENT CRITERIA(1) (GAC) MG/KG
Arsenic	640
Boron	240000
Cadmium	190
Chromium	8600
Lead	2330(2)
Mercury	1100
Selenium	12000
Copper	68000
Nickel	980
Zinc	730000
TPH	
Aromatic TPH C_5-C_7 (benzene)	3200
Aromatic TPH C_7-C_8	7800
Aromatic TPH C_8-C_{10}	2000
Aromatic TPH C_{10}-C_{12}	9700
Aromatic TPH C_{12}-C_{16}	59000
Aromatic TPH C_{16}-C_{21}	1600000
Aromatic TPH C_{21}-C_{35}	1600000
Aromatic TPH C_{35}-C_{44}	26000
Aliphatic TPH C_5-C_6	56000
Aliphatic TPH C_6-C_8	3500
Aliphatic TPH C_8-C_{10}	16000
Aliphatic TPH C_{10}-C_{12}	36000
Aliphatic TPH C_{12}-C_{16}	28000
Aliphatic TPH C_{16}-C_{35}	28000
Aliphatic TPH C_{35}-C_{44}	28000
PAH compounds:	
Acenaphthene	84000
Acenaphthylene	83000
Anthracene	520000
Benzo(a)anthracene	170
Benzo(a)pyrene	35
Benzo(b)fluoranthene	44
Benzo(g,h,i)perylene	3900
Benzo(k)fluoranthene	1200
Chrysene	350
Dibenz(a,h)anthracene	3.5
Fluoranthene	23000
Fluorene	63000
Indeno(1,2,3-cd)pyrene	500
Naphthalene	190
Phenanthrene	22000
Pyrene	54000
Inorganics:	
Water soluble sulphate	0.5g/l(3)
Acidity (pH)	not less than 5
Asbestos	Presence not accepted

Notes:

(1) LQM/CIEH S4UL for commercial/industrial end use unless otherwise stated
(2) DEFRA, SP1010: Category 4 Screening Levels
(3) Upper level for Class 1 concrete (BRE Special Digest:2005)
Assessment criteria based on 1% soil organic matter

4.10 Please note that depending upon the provenance the imported materials only a selection of these determinands may need to be screened, see Section 4.16 and **Table 3** as follows for details.

Imported Topsoil

4.11 Within the areas of proposed 'new' soft landscaping it is proposed to place a minimum of 300mm of imported topsoil or greater where the landscape architect design and specification requires. Any excavated soils can be re-used beneath areas of hardstanding.

4.12 The formation level should be suitably proof rolled prior to the placement of any fill materials. Reference should be made to the specification for topsoil, BS3882:2007 and Landscape Architect specification.

4.13 The suitability of 'topsoil' and 'subsoil' is important to any landscaping project, whether for private dwellings, public parks and other construction projects where soft landscaping is required. 3e are not specialists in classifying 'topsoil' and 'subsoil' in terms of its suitability for reuse as a plant growth medium and the soils termed as either 'topsoil' or 'subsoil' within this report would need to be clarified as part of a soils resource survey by a specialist consultant.

4.14 Any arisings materials generated for offsite disposal should be stockpiled separately and clearly marked from other materials in order to prevent cross contamination.

4.15 All imported capping materials, including topsoil and subsoil, should be screened for potential contaminants prior to importation to site using the acceptance criteria for capping soils provided in **Table 2** as follows.

Table 2 – Imported Topsoil Acceptance Criteria

DETERMINAND	RESIDENTIAL END USE WITHOUT PLANT UP TAKE CRITERIA [1](mg/kg) IN SOIL
Metals:	
Arsenic	40
Cadmium	85
Chromium	910
Lead	310[2]
Mercury	56
Selenium	430
Copper	7100
Nickel	180
Zinc	40000
PAH compounds:	
Acenaphthene	3000
Acenaphthylene	2900
Anthracene	31000
Benzo(a)anthracene	11
Benzo(a)pyrene	3.2
Benzo(b)fluoranthene	3.9
Benzo(g,h,i)perylene	360
Benzo(k)fluoranthene	110
Chrysene	30
Dibenz(a,h)anthracene	0.31
Fluoranthene	1500
Fluorene	2800
Indeno(1,2,3-cd)pyrene	45
Naphthalene	2.3
Phenanthrene	1300
Pyrene	3700
TPH	
Aliphatic EC 5-6	42
Aliphatic EC >6-8	100
Aliphatic EC >8-10	27
Aliphatic EC >10-12	130
Aliphatic EC >12-16	1100
Aliphatic EC >16-35	65000
Aliphatic EC >35-44	65000
Aromatic EC >5-7	370
Aromatic EC >7-8	860
Aromatic EC >8-10	47
Aromatic EC >10-12	250
Aromatic EC >12-16	1800
Aromatic EC >16-21	1900
Aromatic EC >21-35	1900
Aromatic EC >35-44	1900
Inorganics:	
Water soluble sulphate	0.5g/l[3]
Acidity (pH)	not less than 5
Asbestos	Presence not accepted

Notes:

(1) LQM/CIEH S4UL for residential end use without plant up take unless otherwise stated
(2) DEFRA, SP1010: Category 4 Screening Levels
(3) Upper level for Class 1 concrete (BRE Special Digest:2005)
Assessment criteria based on 1% soil organic matter

Validation Testing and Reporting Requirements

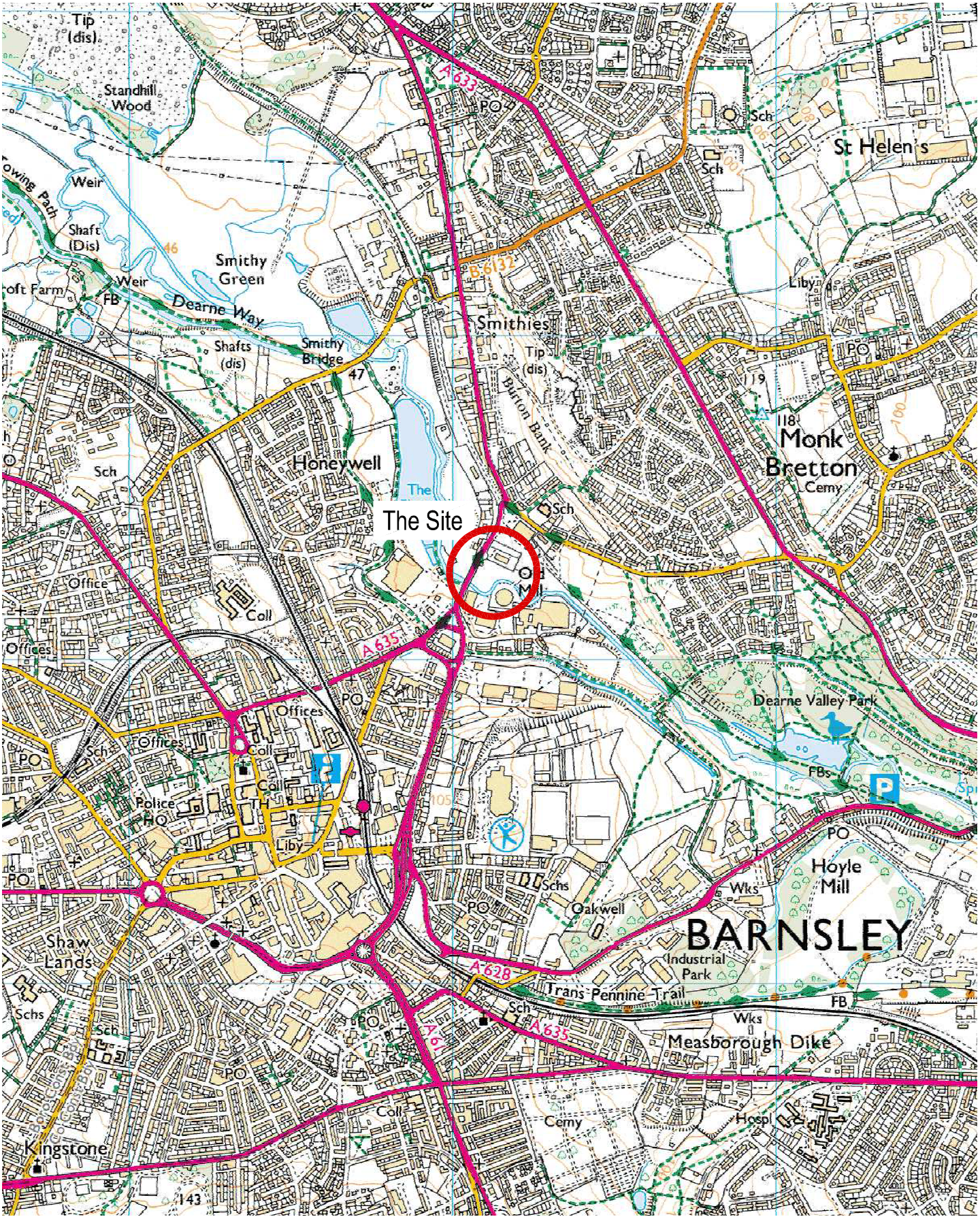
4.16 Prior to importation to site, soils used for general fill and soft landscaping will be tested for the determinands listed in Tables 1 and 2. The frequency of testing shall be as **Table 3**:

Table 3 – Imported Soil Testing Frequency

Type of material	Frequency of testing	Testing schedule
Crushed hardcore, stone, brick used as capping	Minimum 3 or 1 per 500m^3 (whichever is greater)	• Standard metals/metalloids • Speciated PAHs • Asbestos • Leachate analysis
Greenfield/Manufactured Soils	Minimum 3 or 1 per 250m^3 (whichever is greater)	• Standard metals/metalloids • Speciated PAHs • Asbestos
Brownfield/Screened Soils	Minimum 6 or 1 per 100m^3 (whichever is greater)	• Standard metals/metalloids • Speciated PAHs • Asbestos • Banded TPH

4.17 An addendum report to this will be prepared once any topsoil/subsoil has been validated for suitability, which occurs generally in the latter phase of the construction of the new store.

Drawings



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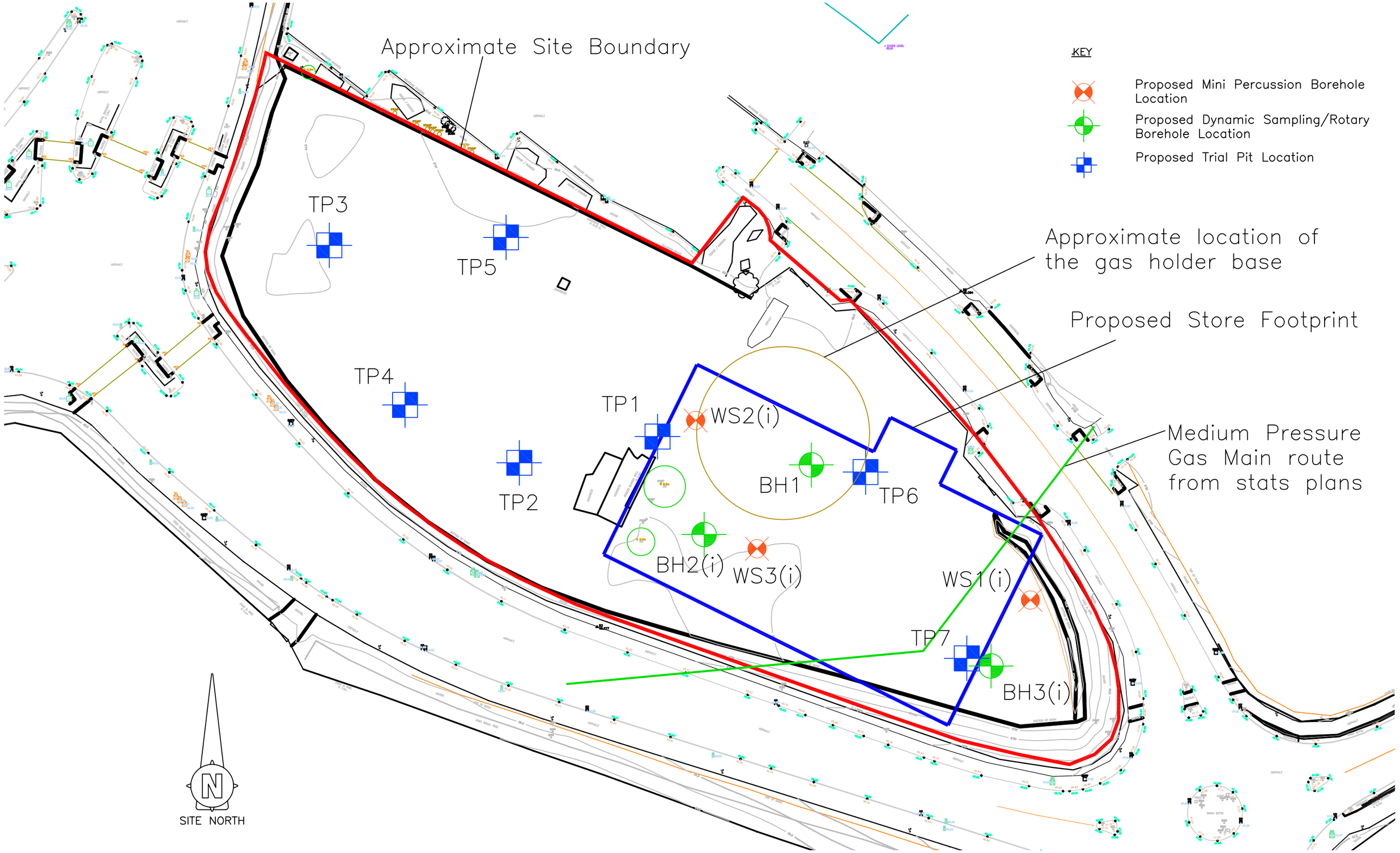
Project	Old Mill Lane, Barnsley For Aldi Stores Ltd.		
Title	Site Location Plan		
Scale 1:25,000	Drawn AHC	Checked AJB	Date Oct '16
Job No. 15004	Drawing No. G001		Rev 0



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Project	Old Mill Lane, Barnsley For Aldi Stores Ltd.		
Title	Exploratory Hole Location Plan		
Scale: 1:500 @ A3	Drawn: AJB	Checked: AHC	Date: Oct '16
Job No.: 15004	Drawing No.: G-0-02		Rev: 0

Appendix A

Proposed Site Layout

Key

+000.00 Existing Levels

+000.00 Proposed Levels

EXISTING WICKES STORE

EXISTING WICKES CAR PARK

OLD MILL LANE

Assumed Site Boundary
FOODSTORE SITE
approx **1.62** ACRES
(0.65 HA)

Existing Site Access to be modified Subject to Approval

Proposed
ALDI Foodstore
1746 sq.m GIA
1804 sq.m GEA
(1254 sq.m sales area)

93 no. Parking spaces
(2.5m x 5m Bays)

Aldi Signage

Existing Embankment

Service Point

Store Entrance

5 no. Cycle Hoops

Pedestrian Crossing with drop kerbs and tactile paving

Existing Pedestrian Crossing

New Pedestrian access Subject to levels

Proposed Retaining Wall +1.2m

Proposed low level wall with railings to site boundary

All levels are subject to engineers details

1:60 Gradient

FFL +45.45

NOTE:
ASSUMED BOUNDARY INFORMATION IS BASED ON EXISTING FENCE LINE AND SUBJECT TO LEGAL CONFIRMATION .

Rev	Date	Description	Rev By	Chk'd By
B	12.01.2017	External entrance lobby omitted	LH	NJC
A	03.01.2017	Landscaping updated to planners comments	LH	NJC

Project Title	Proposed Foodstore Development Old Mill Lane Barnsley
Client	Aldi Stores Ltd
Status	PLANNING
Scale	1:250
Drawing Size	A1
Date	03/2016
Drawn By	LH
Checked	NJC

Drawing Title	Proposed Site Layout
Job-Dwg No	1210-100
Rev	B

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Carvers Warehouse, 77 Dale Street, Manchester, M1 2HG t. 0161 2388555

The Old Rectory, 79 High Street, Newport Pagnell, MK16 8AB t. 01908 211577

101 London Road, Reading, RG1 5BY t. 0118 9507700

10 Gees Court, St Christophers Place, London, W1U 1JJ t. 0207 4091215

THE HARRIS PARTNERSHIP
ARCHITECTS
www.harrispartnership.com

CAD file reference J:\Aldi\ALDI YORKSHIRE REGION\Planning\1210 SDAR - Old Mill Lane, Barnsley

Appendix B

Regulatory Authority
Correspondence

BARNSLEY
Metropolitan Borough Council

Regulatory Services
Assistant Director: Ken Eastwood, BSc (Hons), MCIEH
PO Box 602, Barnsley S70 9FB

Patricia Gill
WYG Environment,
Arndale Court,
Otley Road, Headingley,
Leeds
LS6 2UJ

My Ref: JSC147430
Your Ref: ref: E7773-PRF-V1
Enquiries to: regulatoryservices@barnsley.gov.uk
Dial Direct: (01226) 772456
Fax: (01226) 775699
Date: 21 December 2010

Dear Patricia

Re: Verification Report, Former Gasworks, Old Mill Lane, Barnsley
Planning Application 2006/1911

Thank you for your submission of the Verification Report (ref E7773-PRF-V1) for the above site. I have now reviewed the report and made the following comments.

I can confirm my acceptance of the verification report, as it has confirmed the agreed remediation works have been completed and the risks to human health have been addressed.

With regards the condition on the planning application, I have confirmed with the planning officer of my approval to the verification report and informed them that sufficient information has been provided to discharge any outstanding conditions.

Should you wish to discuss this correspondence further, please don't hesitate to contact me.

Yours sincerely

John Scott
Contaminated Land Officer

creating a better place

Environment Agency

03 December 2010

Patricia Gill
WYG
Arndale Court
Headingley
Leeds
LS6 2UJ

Dear Patricia Gill:

Subject: Mill Lane

Further to our conversation today and your letter dated 23 November 2010 I agree that it is reasonable for National Grid / WYG to amend the remediation strategy so that active remediation of the groundwater shall not be required if post remediation monitoring shows:

"generally stable or decreasing levels of the Contaminants of Concern (CoCs) within the groundwater in the Alluvium / River Terrace Gravels."

While there is no consistent evidence of decreasing levels there is evidence to suggest that the CoCs are broadly stable. Also I consider the monitoring available suggests the river is not being significantly polluted by the gas works contamination at this site. Therefore, I agree that monitoring as part of this remediation strategy can cease and that, at present, it is unlikely that active remediation will be required in future.

The remediation strategy does not take detailed account of future development proposals at this site. In particular, it does not assess the risk posed from residual contaminants should the ground be significantly disturbed. Therefore, my comments above do not relate to such a scenario.

Please call if you wish to discuss.

Yours faithfully

E Wrathmell

Edward Wrathmell
Hydrogeologist

Environment Agency, Phoenix House, Global Avenue, Leeds, LS11 8PG

Appendix C

Earthworks Specification

July 2005

Project Specification

Earthworks

3e Consulting Engineers Ltd, 4 Calder Close,
Calder Park, Wakefield, WF4 3BA
Tel: 01924 240 420 Fax: 01924 240 421

CONTENTS **PAGE**

1 GENERAL

1.1 The Engineer referred to in this specification shall mean the Consulting Structural Engineer.

1.2 The expressions approved and approval shall mean the written approval of the Engineer.

1.3 All British standards, specifications and British Standard Codes of Practice or any other standards referred to in this specification shall be the latest standards including all amendments published before the last day of returning tenders, unless otherwise stated.

1.4 The works described in this specification shall be carried out to the entire satisfaction of the Engineer. Clause 1.3 refers to the minimum standard of acceptance that may be supplemented, modified or amplified by this specification.

1.5 In the case of any variance the following order of precedence shall apply:

- 3e Specification Special Requirements - clause 13
- 3e Specification
- Reference clause 1.3

2 STANDARD OF ACCEPTANCE

2.1 The work shall be carried out in accordance with the Engineer's drawings, British Standard BS 6031, BS 8000 and the Highways Agency - Specification for Highway Works (hereinafter referred to as the HA Specification for Highway Works).

3 SITE INFORMATION

Site investigation information already obtained

3.1 Accompanying this specification is the information already obtained from the site in the form of borehole logs, trial pits, etc, as is appropriate to the site.

Further information

3.2 The Contractor shall visit the site, inspect the subsoil information and ascertain for himself the nature of the ground, obtain all necessary information in respect of overhead and underground services, obstructions, site access, position of adjacent properties and any other features that may affect the cost or programme of the work. No claim shall be considered arising from lack of knowledge in this respect.

3.3 It is the responsibility of the Contractor to satisfy himself as to the suitability of his equipment and methods in the soil conditions existing on the site.

3.4 Should the Contractor feel that he requires additional information in order to finalise his design, he is at liberty to carry out further site investigation work at his own expense. The Engineer shall however be notified of this requirement so that any necessary permissions may be obtained and the Engineer shall also be given the opportunity of attending the site during this additional investigation.

Ground water level

3.5 The Contractor shall make all necessary enquiries concerning ground water level and allow for variations from this level when working on any part of the site.

Site features

3.6 Before starting work the Contractor shall verify with the Engineer and/or architect which existing fences, gates, walls, roads, paved areas and other site features are to be removed. Materials arising shall to be removed from site subject to approval by the Engineer and/or architect.

Trees and undergrowth

3.7 Before starting work the Contractor shall verify with the Engineer and/or architect those trees, shrubs and hedges that are to be removed.

3.8 As required, the Contractor shall clear site of all trees, bushes, scrub and undergrowth. The Contractor shall grub up main roots and fill voids with suitable material. The Contractor shall dispose of all timber.

Cultivated turf

3.9 Before starting work the Contractor shall verify with the Engineer and/or Architect those areas of turf are to be retained. At the contract's discretion, cost and/or profit, other turf shall be either lifted, sold, left or to be incorporated with the proposed development.

Schedule of Dilapidations

3.10 Prior to commencement on site the Contractor shall prepare and agree a Schedule of Dilapidations supported by photographs of all existing buildings, roads, footpaths, walls, fences, etc., adjacent to the site with the Engineer, the architect and statutory authorities. The Contractor shall include for all costs in respect of this schedule and allow for providing two additional copies of all written information together with the photographs for the exclusive use of the employer.

Existing levels

3.11 The Contractor shall satisfy himself that the existing levels of the ground shown on the drawings are correct and bring to the notice of the Engineer any discrepancies before any excavation is commenced. The drawings shall be deemed to be correct if no such notice is given to the Engineer.

4 DEFINITION OF MATERIALS

4.1 Suitable materials shall comprise all that which is acceptable for the contract and more particularly described in clause 4.9.

Unsuitable materials

- Material from swamps, marshes, etc.
- All organic or part organic material.
- Material susceptible to spontaneous combustion.
- Frozen materials. Such material may be re-defined as suitable when thawing has occurred at the discretion of the Engineer.
- Clay if the liquid limit exceeds 80% and/or the plasticity index exceeds 55%.
- Materials having a moisture content greater than the maximum permitted for such materials as defined by the Engineer. The Engineer may redefine such materials when sufficient drying has occurred.

Suitable materials

4.2 Cohesive soil including clays and marls with up to 20 percent gravel or rock and having a moisture content of not less than the value of the plastic limit minus 4, also chalk having a saturation moisture content of 20 percent or greater.

4.3 Well graded granular and dry cohesive soils including clays and marls containing more than 20 percent gravel or rock and/or a moisture content of

less than the value of the plastic limit minus 4, sands and gravels, chalk having a saturation moisture content in the range of 15 to 20 percent.

4.4 No fill materials containing soluble sulphates in excess of 1.2 g/l when tested to BS 1377 shall be used within 3.0m of any concrete without specific approval of the Engineer.

Topsoil

4.5 Topsoil shall be the top layer of soil that can support vegetation and shall include turf.

Rock

4.6 Rock shall mean those hard geological strata or deposits requiring the use of blasting, wedges, pneumatic tools or approved mechanical rippers for it's excavation.

5 METHOD OF WORKING

5.1 The Contractor shall employ only that plant which is suitable for the soils to be handled. He shall not use plant that damages or reduces the natural strength of the soil either in its insitu state or during handling, placing and compacting.

5.2 Where excavation reveals a combination of suitable and unsuitable materials the Contractor shall, unless otherwise agreed by the Engineer, carry out the excavation in such a manner that the suitable materials are excavated separately for use in the works without contamination by the unsuitable materials.

5.3 The Contractor shall not use explosives without the written permission of the Engineer.

5.4 Excavation from a cutting shall not proceed unless sufficient plant is available in the fill area to comply with compaction requirements.

5.5 The gradient of slopes formed by cutting and filling areas shall be defined in the contract and shall be well graded, trimmed and free of loose material.

5.6 The Contractor shall be deemed to have included for temporarily supporting as necessary any services, drains or ducts encountered.

5.7 Before starting work the Contractor shall submit details of proposed methods for carrying out general excavation/levelling for approval.

5.8 The Contractor shall be deemed to have allowed for the deterioration of material as a result of inclement weather and the replacement with suitable material as appropriate.

6 EXCAVATION

Materials arising

6.1 All materials arising from the excavations on site shall remain the property of the employer. When any such materials are approved by the Engineer to be used in the works in substitution for any materials that the Contractor would otherwise have provided, the materials shall be paid for by the Contractor at a price to be agreed.

Topsoil

6.2 Before commencing general excavation or filling the Contractor shall excavate topsoil from required area as indicated in the contract and keep separate from excavated subsoil. Not less than two weeks before excavating topsoil, the Contractor shall treat it with an approved herbicide to the manufacturer's recommendations.

Benching

6.3 Surfaces of excavations with a gradient greater than 1 in 5 that are to receive filling shall have horizontal benches cut to match the depths of compacted layers of filling.

Adjacent excavations

6.4 Where an excavation encroaches below a line drawn at an angle of 30^0 from the horizontal from the nearest formation level of another higher excavation, the lower excavation, all work within it and backfilling thereto, shall be completed before the higher excavation is made.

Tolerances

Permissible deviations from formation levels:

- beneath mass concrete foundations +/-25mm
- beneath ground bearing slabs +10/-25mm
- beneath R.C. foundations +/-15mm
- embankments and cuttings +/-50mm

Earthwork support

6.5 The Contractor shall be entirely responsible for the sufficiency of all temporary earthwork support to excavations. Should a fall occur in any excavation, or excessive material be excavated, the Contractor shall carry out at his own expense any reinstatement or repairs which may become necessary as the result of such fall and excess. Any void caused by a fall shall be filled and compacted by the Contractor at his own expense, to the requirement of the Engineer.

Recorded and unrecorded features

6.6 The Contractor shall break out old foundations, beds, drains, etc., where indicated and to the extent stated on the drawings. The Contractor shall seal off drain ends, remove contaminated earth and disinfect as required by the local authority and the Contractor shall backfill as specified on the drawings.

6.7 Where old foundations, beds, basements, filling, tanks, service pipes, drains, etc., not shown on the drawings are encountered, the Contractor shall obtain instructions from the Engineer before proceeding.

Watercourses

6.8 The Contractor shall temporarily divert as necessary all field drains and other waterways not shown on the drawings and encountered during the excavations, and if possible, reinstate on completion or if it is not possible to reinstate, obtain instructions from the Engineer.

6.9 Existing watercourses that have been diverted and are to be filled shall be cleared of all vegetable growth and soft deposits before filling.

Excess excavation

6.10 The Contractor shall backfill any excavations taken wider than required with approved excavated material.

6.11 The Contractor shall backfill any excavations for strip foundations taken deeper than required with concrete, as directed by the Engineer.

7 DISPOSAL OF MATERIALS

7.1 All materials arising from the excavations and not used on the works shall be disposed of as directed by the Engineer.

Topsoil

7.2 Sufficient excavated preserved topsoil to carry out subsequent topsoiling operations shall be stockpiled in temporary spoil heaps.

7.3 The spoil heaps shall not be more than 3m high and shall be treated with an approved herbicide and covered with black polythene sheeting.

7.4 The Contractor shall make his own arrangements for the stockpiling of topsoil and suitable material for re-use on the contract unless otherwise provided for in the contract. Suitable material shall be compacted in stockpiles in accordance with clause 10.8

7.5 The Contractor shall remove surplus topsoil from site, subject to approval by the Engineer.

Surplus materials

7.6 The Contractor shall comply with the requirements of the Environment Protection Act 1990 with particular reference to the duty of care for the disposal of waste.

7.7 The Contractor shall be responsible for all testing and validation required by the Environment Agency and shall allow for all costs in connection with the same.

7.8 The Contractor shall provide the employer with copies of all necessary licences, approvals, delivery notes and receipts relating to the discharge of the duty of care for the disposal of waste.

7.9 The Contractor shall remove all suitable materials surplus to the contract requirements and unsuitable materials to an appropriately licensed landfill unless other provisions are specifically made in the contract, subject to approval by the Engineer.

Water

7.10 The permanent drainage system shall not to be used for disposal of water from excavations without approval by the Engineer and the local authority.

7.11 The Contractor shall keep all excavations free from water.

7.12 The Contractor shall not disturb material in or around excavations by pumping operations.

7.13 The Contractor shall obtain approval of the location of any sumps and fill with approved materials when no longer required.

8 FORMATIONS

Proof rolling

8.1 All reduced level surfaces shall be rolled to give the compactive effort of 4 no. passes of 'Bomag' BW6 vibratory roller, or similar approved.

Inspections

8.2 The Engineer shall inspect the formation to all works before new work is laid on them. The Contractor shall give the Engineer not less than 24 hours notice of when formations shall be ready for inspection.

8.3 The last 150mm of excavations shall be removed just before inspection. Excavations shall be trimmed to the required profiles and levels, and all loose material shall be removed.

8.4 Unless otherwise instructed formations shall be sealed within 4 hours of inspection with concrete or other specified fill.

8.5 The Contractor shall obtain instructions if a natural bearing formation of undisturbed subsoil is not obtained at the depth shown on the drawings or if the formation contains soft or hard spots or highly variable material.

9 FILLING

General

9.1 For approval to be given for the filling the Contractor shall be required to demonstrate that the material is suitable and that the placing of the material conforms to the compaction requirements of the HA Specification for Highway Works.

9.2 The filling shall consist of materials that are selected to be free from deleterious materials. The material shall NOT contain the following:

- Colliery shales
- Ironstone shales
- Materials containing sulphates
- Materials susceptible to frost damage, weathering or mechanical damage
- Material in fill areas which has deteriorated due to the ingress of surface water or the trafficking of the Contractor's plant shall be removed and replaced at the Contractor's expense.
- Fill areas shall be built up evenly over the full area, unless the contract requires otherwise, and sufficient camber shall be maintained at all times to enable surface water to drain from them. The containment or disposal of surface water, during the construction period shall be the Contractor's responsibility.
- The Contractor shall ensure that excavations and areas to be filled are free from organic material, loose soil, rubbish and standing water.
- Plant employed for transporting, laying and compacting shall be suited to the type of material being handled.
- The Contractor shall lay differing materials separately so that only one type of material occurs in each layer.

Benching in fill

9.3 Where during the progress of the work the difference in level between adjacent areas of filling exceeds 600mm, the Contractor shall cut into the edge of the higher filling to form benches having a minimum width of 600mm and a height equivalent to the depth of a layer of compacted filling. New filling shall be spread and compacted to ensure maximum continuity with the previous filling.

Cold weather working

9.4 The following conditions apply:

- Frozen material or materials containing ice shall not be used.
- Fill material shall not be placed on a frozen surface.

Imported material

9.5 Sources, types of suitable material and the moisture content at which they may be placed and compacted shall be those approved by the Engineer and agreed at tender stage.

9.6 The Contractor shall have delivered to site sample loads of any imported material proposed for use for the approval of the Engineer before any filling material is placed in position. A minimum of 48 hours notice shall be provided for inspection with a further 24 hours for approval. Grading analyses, aggregate crushing value or 10% fines test and Atterberg limits plus natural moisture content details, as appropriate, shall accompany all samples.

9.7 Materials shall be properly protected from snow, frost and inclement weather and any materials damaged shall be removed from the site immediately and replaced with sound materials.

Topsoil

9.8 Where required by the contract, areas to be landscaped shall be covered with topsoil to the depth specified in the contract documents.

9.9 The topsoil shall be reduced to a fine tilth with no stone or other debris with any dimension greater than two thirds of the thickness of the topsoil layer and not upstanding more than 50mm above the upper surface of the topsoil.

10 COMPACTION

10.1 All materials used in fill areas shall be compacted as soon as practicable after placing.

10.2 All suitable materials deposited in fill areas shall be compacted with suitable plant; an appropriate number of passes and shall not exceed the maximum depth of compacted layer for the type of material in use.

10.3 The works are to be in accordance with the HA Specification for Highway Works. A compilation of Table 6/1 and Table 6/4 from this document is reproduced as Table 1 in this specification for the Contractor's guidance. Compliance with this guidance shall not relieve the Contractor of his obligation to attain the required degree of compaction. The Contractor shall be responsible for selecting suitable plant and methods of working to ensure that the fill materials are compacted to achieve 95% of the maximum dry density and less than 5% air voids as defined by laboratory testing specified by the Engineer.

10.4 The Contractor shall obtain the Engineer's approval for the type of excavation and compaction plant he proposes to use. Approval by the Engineer shall not relieve the Contractor of his obligation under this specification.

10.5 The final formation shall be graded and rolled to the specified levels and tolerances.

10.6 Under no circumstances shall earthmoving plant be accepted as compaction equipment under this clause.

11 SUPERVISION

11.1 The Contractor shall ensure that a competent supervisor is on the site during all working hours.

11.2 The Contractor shall allow the Engineer access to the works at any reasonable time and shall afford the Engineer reasonable facilities to enable him to check the adequacy of the works.

11.3 In the event of ground or other conditions changing such that the Contractor feels that a change in his plant or his method of working is required for compliance with clauses 5 and 10 he shall give the Engineer thirty six hours notice for approval of the proposed plant and working method.

12 TESTING

12.1 Each layer of fill material shall be tested using a suitably calibrated nuclear density gauge or other approved test method at the rate of one test per 400m^2 with a minimum of two per layer.

12.2 The Contractor shall test any of the materials used in the works, when so required by the Engineer, and shall at his own expense supply test samples, packed in suitable containers and forward them to a firm or testing laboratory nominated or approved by the Engineer for such tests as the Engineer shall require.

TABLE 1

(D = Maximum depth of compacted layer in mm)
(N = Minimum number of passes)

Type of Roller	**Cohesive Soils**		**Well Graded Granular Soils and Dry Cohesive Soils**		**Uniformly Graded Materials**	
	D	N	D	N	D	N
Smooth Wheeled Rollers (Mass per metre of roll)						
2100 kg to 2700 kg	125	8	125	10	125	10
2700 kg to 5400 kg	125	6	125	8	125	8
over 5400 kg	150	4	150	8	-	-
Grid Rollers (Mass per metre of roll)						
2700 kg to 5400 kg	150	10	-	-	150	10
5400 kg to 8000 kg	150	8	125	12	-	-
over 8000 kg	150	4	150	12	-	-
Tamping Rollers (Mass per metre of roll)						
over 4000 kg	225	4	150	12	250	4
Vibrating Rollers (Mass per metre of roll)						
1800 kg to 2300 kg	150	4	150	4	225	12
2300 kg to 2900 kg	175	4	175	4	250	10
2900 kg to 3600 kg	200	4	200	4	275	8
3600 kg to 4300 kg	225	4	225	4	300	8
4300 kg to 5000 kg	250	4	250	4	300	6
over 5000 kg	300	4	275	4	300	4

All works to be in accordance with Specification for Highway Works to achieve 95% of optimum density and less than 5% air voids.