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**REMEDIATION STRATEGY
for land at
GOLDTHORPE COLIERY,
GOLDTHORPE**

**prepared for
BEN BAILEY HOMES LIMITED**

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APPENDICES

Appendix A - Drawings

Drawing No.	Title
9060/1	Site Location
9060/2	Key Features
9060/4	Ben Bailey Proposed Layout Drawing ("00 Master" – Received 16/02/05)

Appendix B - Commission

Appendix C - Encia General Specification For Engineered Fills

Appendix D - Encia Suggested Protocol for Importation & Use of Soil Cover (Capping)

**REMEDIATION STRATEGY
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1 INTRODUCTION

1.1 The Commission and Brief

- 1.1.1 Encia Consulting Limited (Encia), were commissioned by Ben Bailey Homes to prepare a remedial strategy for land at Goldthorpe Colliery, Goldthorpe.
- 1.1.2 Correspondence regarding Encia's appointment is included in Appendix B.

1.2 The Proposed Development

- 1.2.1 Ben Baileys proposed layout plan (Drawing 9060/4, included in Appendix A), indicates the site is to be redeveloped with 323 two and three storey residential units and includes gardens and adoptable roads and services infrastructure.

1.3 Report Format and Limitations

- 1.3.1 This Remedial Strategy document outlines the remedial and ground preparatory works necessary to render the site fit for residential development. This document is intended for submission to Barnsley Metropolitan Borough Council to satisfy planning conditions and to NHBC for review/comment.
- 1.3.2 This report should be read in conjunction with previous site investigation reports which include detailed descriptions of ground conditions, mining issues and contamination not provided here.
- 1.3.3 A full summary of previous investigations is contained in the following report:
- Geoenvironmental Appraisal. Report refs 2500/1 and 2500/2, dated June 2002.
- 1.3.4 Earlier phases of ground investigation have been undertaken by RPS Group and IMC. Full details can be found in the following third party reports:
- Goldthorpe Colliery, Level II Appraisal. *RPS Group Plc for British Coal Property*. October 1996.
 - Goldthorpe Colliery, Level III Site Investigation. *RPS Group Plc for British Coal Property*. October 1996.
 - Interim Report on the Proposed Reclamation of Goldthorpe Mine Site to "Soft-End" Use (Moynihan). *IMC Environmental Consultants for British Coal Property*. December 1996.
- 1.3.5 A Method Statement (in accordance with a Pre-Tender Health and Safety Plan) will also be required from the Contractor appointed to undertake the remedial and preparatory works.

2 BACKGROUND

2.1 Site Description

- 2.1.1 The site location is shown on Drawing Number 9060/1 presented in Appendix A to this report. Site details are summarised in the table below.

Detail	Remarks
Location	11 km west of Barnsley town centre
NGR	SE 472 043
Areas	Total: 27ha Area 1: Former main colliery site, with outline planning for residential development - 11.5ha Area 2: Includes the former main colliery spoil tip (Spoil Tip No.1) - 15.5ha

2.1.2 Approximately 60% of the former main colliery site is currently covered by hardstand, predominantly concrete. These areas of hardstanding correspond to demolished building floor slabs and car parking areas. To the south-east corner lies a lobe of the main colliery tip that has been restored. Located in the north-west is a generally level, black, unvegetated area, formerly used for coal stocking. This ground falls gently to the east and is heavily cut by runoff channels.

2.1.3 Along the north-east boundary of main colliery site runs a noise alleviation bund standing approximately 6m in height and 200m in length.

2.1.4 A culverted section of the West Moor Dyke watercourse, flows some 100m beyond the sites eastern boundary.

Mine Entries

2.1.5 The Coal Authority report for the site shows the presence of two mine entries within the site. The exact location and treatment of these two shafts is well documented. However, presence of /details of any rockhead-cap are unknown.

2.1.6 It is possible, although unlikely that further, unrecorded mine shafts and adits exist within the site.

2.2 Contamination

2.2.1 Historical plans show that the site was formerly a colliery. Furthermore, made ground was encountered in all exploratory locations during the ground investigation.

Inorganic Contamination

2.2.2 Chemical analyses show that occasional determinands (most notably phytotoxic arsenic, boron and selenium) exceed current guidance values in occasional samples of colliery spoil. However, with the exception of arsenic none of the determinands exceeded current guidance values for public open space.

2.2.3 The concentrations of all leachable determinands were below the maximum permissible concentrations as defined in the Water Supply (Water Quality) Regulations 1989.

Organic Contamination

2.2.4 Pockets of 'tarry' material were noted within the made ground of TP116. A slight tar/oil odour was also identified in TP109.

2.2.5 Only one sample (TP116) gave a concentration of TPH in marginally in excess of 500mg/kg (a value used by Encia and based on professional judgement).

Calorific Value

- 2.2.6 The calorific values of twenty-nine samples from across the site that contained colliery spoil were determined in order to assess potential combustibility. Calorific values for the samples of colliery spoil classed as 'coal' ranged from 2.03MJ/kg to 24.8MJ/kg (average 14.97MJ/kg). Values of mixed colliery spoil ranged from 0.99MJ/kg to 21.1MJ/kg (average 8.72MJ/kg).

3 REMEDIATION STRATEGY (General)

3.1 Aims

- 3.1.1 Aims of the site remedial works detailed in this Strategy document are to:
- Provide a final ground surface free from chemical contamination and suitable for the proposed after use of the site
 - Provide a geotechnically stable development platform to facilitate the subsequent construction of roads and installation of drainage (to adoptable standards) and the construction of residential dwellings.
 - Provide acceptable levels and gradients for adoptable roads, drainage systems and floor slab levels.
 - To protect controlled water receptors from localised mobile contamination.
 - Satisfy requirements of the Local Planning Authority and the National Housing Building Council.

3.2 Overview

- 3.2.1 Ground investigation of this site has identified development constraints associated with ground contamination. Furthermore, the contamination identified is considered to locally pose a risk to construction workers and end users of the site. Consequently, some remediation will be required prior to redevelopment to ensure that the site is made "suitable for use" and poses no significant threat to the local environment.
- 3.2.2 Remediation of this site has been divided into two Phases:
- **Phase I** – Earthworks.
 - **Phase II** – Monitoring and Validation of the Works.
- 3.2.3 The anticipated remediation strategy is summarised below, and further detail is provided in the subsequent sections.

Phase I

- Breaking out of all slabs/hardstanding
- Grubbing out of sub-surface structures where necessary.
- Processing of demolition arisings
- Treatment/removal of hydrocarbon contaminated soils where necessary to protect end users.
- Location of mine entries
- Regrading of the site to form suitable development platforms & highway construction
- Provide clean cover in gardens/landscaped areas underlain by colliery spoil.

Phase II

- Supervision of the works by a suitably qualified consultant to include detailed records, results of validation testing etc.
- Validation of the remediated site in the form of a detailed Completion Statement confirming that the works set out in this document and agreed were completed and that the site is suitable for its intended use.

3.2.4 Reference should also be made to Drawing No 9060/2 that shows the trial pit locations where treatment/removal of organic contamination is required.

3.3 Site Set-up and Welfare

3.3.1 The site works shall be supervised throughout by an Engineer. Supervision may be part-time for certain activities, but must be full-time during the removal or treatment of any grossly contaminated soil/fill and any placement of fill to an engineering specification.

3.3.2 Prior to the commencement of any works the contractor, in agreement with the Engineer, shall establish the boundaries of the site and the working areas and provide photographic evidence of pre-existing boundary conditions.

3.3.3 The Contractor shall ensure that personnel, plant, materials and other equipment related to the contract are confined within the boundaries of the site.

3.3.4 A full services search is to be conducted prior to commencement of any site works. Any live services lying within the site boundary are to be marked and protected or appropriate arrangements made to truncate them.

3.3.5 Site cabins and welfare facilities are to be established at a location to be agreed with the Engineer.

3.4 Contractors Responsibilities

3.4.1 Prior to commencement of any works on site the Contractor will provide a comprehensive Method Statement to include details of how the works will be undertaken and how potential problems associated with dust, noise and other nuisances will be mitigated.

3.4.2 The Contractor will comply with the following regulations, guidance and legislation relating to the works:

- Health and Safety Executive "Protection of Workers and the General Public during the Redevelopment of Contaminated Land", HS(G)66, HMSO 1991.
- The Construction, Design and Management Regulations 1994.
- The Control of Substances Hazardous to Health Regulations 1994.

4 REMEDIATION STRATEGY (PHASE I - SITE CLEARANCE & EARTHWORKS)**4.1 Removal of Surface Hardstand**

4.1.1 Hardstanding in the form of building floor slabs and exterior handstand covers a significant proportion of the site (see drawing 6090/2). Existing slabs will be broken-up and processed as detailed in Section 4.3.

4.2 Below Ground Obstructions

- 4.2.1 Extensive buried structures are not expected at the site. Foundations associated with former buildings are likely to be in the form of shallow strips. More substantial pad foundations may remain from former conveyor columns.
- 4.2.2 The Engineer shall inspect any buried slabs and relict foundations. The position of these structures shall be recorded by survey and the Engineer shall confirm the requirement to remove the structure. Where the structure is to be removed the Engineer will determine its suitability for use in crushing and wherever possible ensure that they are completely removed.
- 4.2.3 Where below ground demolition requires deep excavation to remove buried slabs or deep foundations etc, the position of the excavation void is to be accurately recorded on the site survey such that subsequent upfilling and construction of foundations can be carried out appropriately.
- 4.2.4 Suitable materials derived from these works shall be stored in a location on site, to be agreed with the Engineer, prior to processing and re-use.

4.3 Processing of Arisings

- 4.3.1 Crushed product is to be screened to remove any unsuitable elements (e.g. large fragments of steel) and stockpiled for reuse during subsequent construction works. The Engineer shall inspect the crushed product, instruct the removal of any unsuitable material.
- 4.3.2 Generation of a selected granular fill, Class 6 material as defined in the Highways Agency Specification (Series 600), should be possible. Generation of a quality granular fill, Type 1 or 2 material (Highways Agency Specification - Series 800) may be possible.
- 4.3.3 The Engineer shall schedule appropriate confirmatory geotechnical and/or chemical testing to determine classification and suitability for re-use. In addition, particle size distribution will be determined by a geotechnical laboratory.

4.4 Excavation and removal/treatment of localised organic contamination

- 4.4.1 Localised removal or treatment of hydrocarbon contamination (TPH) is required in the vicinity of TP116, see Drawing 9060/2, to render the site suitable for development and remove the threat of pollution to the local environment. A minimum TPH clean-up concentration of 500mg/kg is required.
- 4.4.2 Following excavation of the contaminated ground, the Engineer will inspect and sample the resultant excavations. Any excavations extending to the site boundary are to be sealed to an appropriate specification to prevent movement of contaminated material back into the site following remediation.
- 4.4.3 In addition to the on-site testing, a minimum of 6 samples should be taken from excavation side-walls and base.
- 4.4.4 The Engineer may instruct continued removal of soil/fill if the samples yield concentrations above the suggested remedial targets.
- 4.4.5 Groundwater encountered during excavation of grossly contaminated soil/fill should be collected in a sump. Treated water could be tankered off-site or discharged to sewer (subject to Yorkshire Water consent).

- 4.4.6 Groundwater shall be controlled in accordance with CIRIA report 113 "Control of Groundwater for Temporary Works". The Contractor shall arrange for appropriate survey work, as directed by the Engineer, to plot the extent and depth of all excavations associated with the excavation of grossly contaminated soil/fill. The results of this survey work (disc & hard copy) should be submitted to the Engineer for inclusion in the Validation Report.
- 4.4.7 Any material exported from site to landfill should be hauled by a registered waste carrier in accordance with the requirements of the Duty of Care Regulations, 1991 and where appropriate the Special Waste Regulations, 1996.
- 4.4.8 A transfer note should be completed, signed and retained by the parties involved. The transfer note should include the volume of waste, the nature of the material and a statement of its chemical composition.
- 4.4.9 Wagons that are to be used for the haulage of the contaminated material from the site should be sheeted to prevent the release of dust emissions.
- 4.4.10 The Contractor should make enquiries of the landfill operator regarding possible loading rate constraints associated with the proposed waste material.

4.5 Mine Entries

- 4.5.1 The two shafts on site are currently capped with an approximately 250mm thick reinforced concrete slab with an inspection chamber at ground level. However, presence of /details of any rockhead-cap are unknown. A rockhead cap should only be required if shafts are located below proposed buildings or access roads.
- 4.5.2 The mine entries are to be surveyed on site and plotted accurately on the proposed layout drawing to confirm the requirement for a rockhead cap. If necessary, the mine entries to be inspected to confirm the presence (or otherwise) of a rockhead cap. Detailed shaft cap design is beyond the scope of this report but should also include gas venting measures.
- 4.5.3 Liaison with the adopting highways authority/NHBC/CA would be required should the location of the mine entries conflict with proposed structures or highways.
- 4.5.4 Further, unrecorded mine entries could exist in this area. If any are discovered then further advice should be sought from Encia.

4.6 Site Regrade Method of Upfilling

- 4.6.1 The noise abatement bund located along the northern boundary of the site (see drawing 9060/2) is to be removed and placed on the Colliery Spoil Tip to the east of the site.

Method of Upfilling

- 4.6.2 The method of upfilling is to have due regard to the foundation / subgrade requirements for overlying development. Encia's General Specification for Engineered Fills is included at Appendix C.
- 4.6.3 Excavations (to remove relict structures, contamination etc) should be backfilled with suitable materials as agreed with the Engineer, and subjected to nominal compaction, except where the excavation conflicts with the footprint of a proposed highway.

Highways

- 4.6.4 Highway footprints should be treated to a specification approved by the engineer and the LPA (Highways) prior to the commencement of the works.
- 4.6.5 A method statement detailing the works should be submitted by the contractor.

4.7 Placement of Clean Soil Cover

- 4.7.1 Made ground materials across the site comprise predominately colliery spoil that has proved potentially combustible.
- 4.7.2 Where this made ground remains beneath garden and landscaped areas, a minimum 1000mm thick surface cover of "clean" soil is to be placed.
- 4.7.3 However, no cover is required where made ground is removed entirely, exposing natural soils.
- 4.7.4 Crushed product could be used to form the lowermost layers of cover, subject to test results, and providing that crushed product is at least 500mm below finished levels in garden\landscaped areas.
- 4.7.5 There may remain a need for soil import. This work may be undertaken as part of the contract for the preparatory & remedial works, in which case imported soils should be stockpiled in a location agreed with the Engineer. Alternatively, the developer may choose to import soil at a later stage in the development.
- 4.7.6 The thickness and quality of any material imported for use as cover should be validated in accordance with Encia's Protocol for Soil Importation, copied to Appendix D.

4.8 Surveying

- 4.8.1 The Contractor shall arrange for the following survey work as directed by the Engineer:
- establishment of profile boards.
 - Setting-out of plots (generally only required where there might be potential conflict with localised areas of deeper fill or where plots are close to the proposed margins of engineered fill)
 - setting-out of estate roads.
 - depth and extent of excavations associated with removal of grossly contaminated soil\fill.
 - depth and extent of localised areas of overdig (such as those required to remove deep relict structures etc.)
 - the ground surface prior to placement of fill to raise site levels/provide clean cover in garden/landscaped areas
 - the finished surface
- 4.8.2 The Contractor should supply the results of this survey work (disc & hard copy) to the Engineer for inclusion in Encia's Validation Report.

5 REMEDIATION STRATEGY (PHASE II - VALIDATION)

5.1 Supervision

- 5.1.1 The Engineer will supervise, control and advise on all relevant matters.

5.1.2 The responsibilities of the Engineer shall include, but not be limited to, the following:

- i. Ensuring that all site personnel are suitably qualified and given an appropriate induction on their first day;
- ii. Supervision and Quality Control of remedial and ground preparatory works;
- iii. Advice on the correct handling of materials and conditions encountered;
- iv. Guidance on the appropriate protective clothing and safety equipment that is to be made available and used;
- v. Ensuring that personal hygiene arrangements are adequate;
- vi. The undertaking of confirmatory soil/fill sampling as may be required for laboratory analysis and advising the Site Manager of the results in order to allow the satisfactory progress of the works;
- vii. Liaison with statutory bodies as required.

5.2 Validation

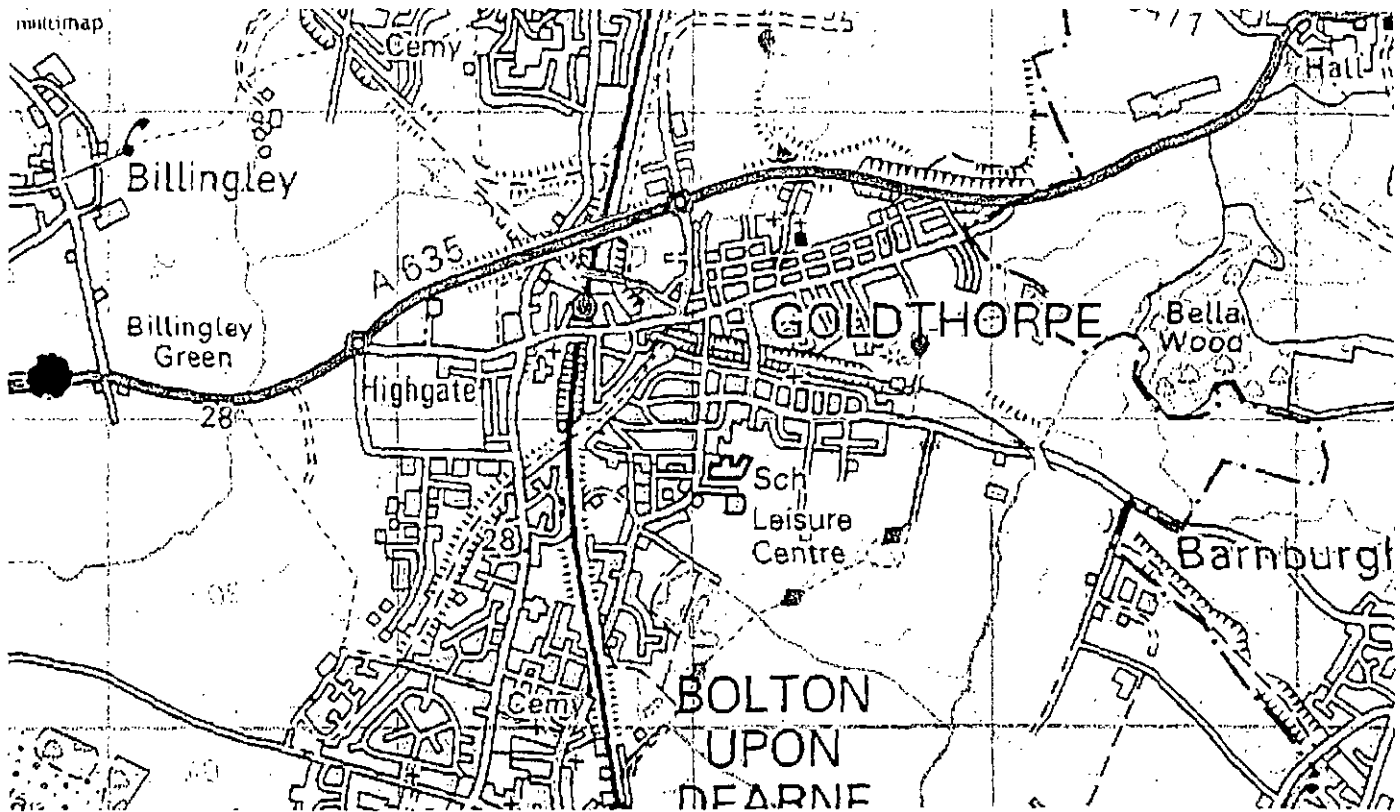
5.2.1 The Engineer will ensure that the requirements of this Remedial Strategy are complied with. On satisfactory completion of all the works the Engineer will provide a validation report. This report will comprise relevant site records and stand as certification that the remedial and ground preparatory works have been carried out in accordance with this Remedial Strategy.

5.2.2 The Engineer will maintain records of his visits to site, to include:

- i. A summary of the activities witnessed\supervised;
- ii. Date and weather conditions;
- iii. Plant, personnel and visitors present
- iv. Aspects relating to Health and Safety, Environmental Control or non-compliance with the Remedial Strategy or the Contractor's Method Statement;
- v. Details of ground conditions exposed by excavation;
- vi. Site surveys as necessary to record the locations of excavation and filling activities
- viii. Test results.

3.4.1 On satisfactory completion of the works, the Engineer will compile a Validation Report, to stand as certification that the remedial works have been carried out in accordance with this Remedial Strategy.

**APPENDIX A
DRAWINGS**



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CLIENT
BEN BAILEY HOMES LIMITED

JOB TITLE
GOLDTHORPE COLLIERY, GOLDTHORPE

DRAWING TITLE
SITE LOCATION

DRAWN BY OGO	SIGNATURE	DATE FEB 05	STATUS Final	
APPROVED RLM	SIGNATURE	DATE FEB 05	SCALE 1: 25,000	DRG NO. 9060/1