SITE PREPARATION AND EARTHWORKS STRATEGY

Barnsley West

Reference	**4848-JPG-XX-XX-SP-G-0606-S4-P01**
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APPENDICES

Appendix A Figures and Drawings

Figure 1 - Site Location Plan
Figure 2 – Aerial Photo

Bond Bryan. Barnsley West Masterplan. Proposed Site Plan. Drawing No: BWM-BBA-ZZ-XX-DR-A-1004-S2-P05, dated May 2021 for Strata Sterling Barnsley West Limited.

JPG (Leeds) Limited. Barnsley West. Site Wide Cut/Fill Analysis. Drawing No: 4848-JPG-XX-00-DR-C-1208-S4-P07, dated April 2021.

JPG (Leeds) Limited. Barnsley West. Proposed Levels with Developable Plateaus. Drawing No: 4848-JPG-XX-00-DR-C-1207-S4-P07, dated April 2021.

JPG (Leeds) Limited. Barnsley West. Topsoil Strategy. Drawing No: 4848-JPG-XX-00-DR-C-1214-S4-P02, dated April 2021.

JPG (Leeds) Limited. Barnsley West. Earthworks Requirements – Site Location Plan. Drawing No: 4848-JPG-SW-00-DR-G-1324-S4-P02, dated April 2021.

JPG (Leeds) Limited. Barnsley West. Earthworks Requirements – Pogmoor. Drawing No: 4848-JPG-SW-00-DR-G-1325-S4-P02, dated April 2021.

JPG (Leeds) Limited. Barnsley West. Earthworks Requirements – Hunters Cottage OCCS. Drawing No: 4848-JPG-SW-00-DR-G-1326-S4-P02, dated April 2021.

JPG (Leeds) Limited. Barnsley West. Earthworks Requirements – Hunters Cottage Externsion OCCS. Drawing No: 4848-JPG-SW-00-DR-G-1327-S4-P02, dated April 2021.

JPG (Leeds) Limited. Barnsley West. Earthworks Requirements – Craven I & II OCCS. Drawing No: 4848-JPG-SW-00-DR-G-1328-S4-P02, dated April 2021.

JPG (Leeds) Ltd. Barnsley West. Conceptual Ground Model - Coal Mining Risk Level Assessment. Dwg. 4848-JPG-SW-XX-DR-G-1307-S2-P03. Dated February 2021

JPG (Leeds) Limited. Barnsley West. Earthworks Requirement - Mine Entry Treatment. Drawing No: 4848-JPG-SW-00-DR-G-1320-S4-P02, dated February 2021.

JPG (Leeds) Limited. Barnsley West. Conjectured Incidental Coal Seam Extraction. Drawing No: 4848-JPG-SW-00-DR-G-1318-S4-P03, dated April 2021.

CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

Strata Sterling Barnsley West Limited
Quay Point
Lakeside
DONCASTER
DN4 5PL

This report has been prepared for the use and reliance of the above-named party. This report shall not be relied upon or transferred to any other parties without the express written authorisation of JPG (Leeds) Limited. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

DOCUMENT HISTORY

Rev	Date	Revision Details	Status	Author	Approved
P01	28.05.2021	First Issue - For Planning	Information	JAM	JBW

1.0 INTRODUCTION

1.1 Instruction

JPG (Leeds) Limited (JPG) has been instructed by Strata Sterling Barnsley West Limited to provide an earthworks strategy for the proposed commercial and residential development of Barnsley West.

1.2 Objectives

The main objective of the earthworks strategy is to provide sufficient guidance and information to confirm that the earthworks can be carried out in order to provide suitable development platforms for the proposed mixed-use development, which includes commercial and residential zones. This includes the provision of an appropriate testing regime to confirm that this objective has been achieved.

1.3 Location

The site is located approximately 3km to the west of Barnsley town centre. The approximate centre of the site is located at NGR 431800 407100.

A site location plan is provided as Figure 1 in Appendix A.

1.4 Site Description

The site is irregular in shape and covers an overall area of approximately 116ha, measuring approximately 1.85km along its northwest – south east axis and 1.20km along its east – west axis.

The site predominantly consists of undulating arable and grazing farmland, which is separated into fields by hedgerows, fences and small watercourses. Hermit Lane, aligned approximately east to west, bisects the site.

1.5 Development Proposals

It is proposed to develop the site for a mixed end use, comprising residential with school in the northern two thirds of the site, industrial/commercial land use including a pub/hotel in the southern third and residential in the east (land adjacent to Pogmoor). The development also includes balancing ponds (SUDS) in the east and associated highways and infrastructure.

A drawing of the proposed development has been provided, which is referenced below, and a copy is containing in Appendix A.

- Bond Bryan. Barnsley West Masterplan. Proposed Site Plan. Drawing No: BWM-BBA-ZZ-XX-DR-A-1004-S2-P05, dated May 2021 for Strata Sterling Barnsley West Limited.

1.6 Previous Reports

A desk study report for the site has been prepared by JPG, which is referenced below:

- JPG (Leeds) Limited. Geoenvironmental Desk Study Report. Barnsley West. Report Ref. JBW/DS/4848.v3. Dated July 2019 for Strata Sterling Barnsley West Ltd.

The desk study report includes a summary of potential geotechnical and environmental issues and should be read in conjunction with this report.

As part of the JPG Desk Study report, a review of the following Eastwood & Partners Consulting Engineers report was carried out. This report is referenced below:

- Eastwood and Partners Consulting Engineers. Geotechnical and Geo-Environmental Site Appraisal Commentary. Barnsley West. Report Ref. 36284. Dated 4 October 2013 for Strata.

A preliminary geoenvironmental ground investigation report and three coal mining risk assessment reports have been prepared by JPG, which are referenced below.

- JPG (Leeds) Limited. Coal Mining Risk Assessment and Coal Recovery Report. Residential Development (Remainder of Site), Barnsley West. Report Ref. 4848-JPG-Z1-XX-RP-G-1101-S2-P02. Dated August 2019 for Strata Sterling Barnsley West Ltd.
- JPG (Leeds) Limited. Coal Mining Risk Assessment and Coal Recovery Report. Employment Land, Barnsley West. Report Ref. 4848-JPG-Z2-XX-RP-G-1102-S2-P02. Dated August 2019 for Strata Sterling Barnsley West Ltd.
- JPG (Leeds) Limited. Coal Mining Risk Assessment and Coal Recovery Report. Proposed Residential Development (Pogmoor), Barnsley West. Report Ref. 4848-JPG-Z3-XX-RP-G-1103-S1-P02. Dated August 2019 for Strata Sterling Barnsley West Ltd.
- JPG (Leeds) Limited. Preliminary Geoenvironmental Ground Investigation. Barnsley West. Report Ref. 4848-JPG-SW-XX-RP-G-0603-S2-P02. Dated July 2019 for Strata Sterling Barnsley West Ltd.

Geoenvironmental reports for two proposed roundabouts have been prepared by JPG; these reports are referenced below.

- JPG (Leeds) Limited. Geoenvironmental Desk Study Report. Higham Common Road Roundabout, Barnsley West. Report Ref: 4848-JPG-ZZ-XX-RP-G-0602-S2-P01. Dated December 2019 for Strata Sterling Barnsley West Limited.
- JPG (Leeds) Limited. Geoenvironmental Ground Investigation Report. Higham Common Road Roundabout, Barnsley West. Report Ref: 4848-JPG-HC-XX-RP-G-0603-S2-P02. Revision dated March 2021 for Strata Sterling Barnsley West Limited.

- JPG (Leeds) Limited. Coal Mining Risk Assessment and Coal Recovery Report. Higham Common Road Roundabout, Barnsley West. Report Ref: 4848-JPG-XX-XX-RP-G-0607-S2-P02. Revision dated March 2021 for Strata Sterling Barnsley West Limited.
- JPG (Leeds) Limited. Geoenvironmental Desk Study Report. Barugh Green Road Roundabout, Barnsley West. Report Ref: 4848-JPG-ZZ-XX-RP-G-0602-S2-P01. Dated December 2019 for Strata Sterling Barnsley West Limited.
- JPG (Leeds) Limited. Geoenvironmental Ground Investigation Report. Barugh Green Road Roundabout, Barnsley West. Report Ref: 4848-JPG-HC-XX-RP-G-0603-S2-P02. Revision dated March 2021 for Strata Sterling Barnsley West Limited.
- JPG (Leeds) Limited. Coal Mining Risk Assessment and Coal Recovery Report. Barugh Green Road Roundabout, Barnsley West. Report Ref: 4848-JPG-XX-XX-RP-G-0607-S2-P02. Revision dated March 2021 for Strata Sterling Barnsley West Limited.

2.0 SUMMARY OF EXISTING GROUND CONDITIONS

A thin layer of sandy gravelly silty clayey topsoil was encountered to depths of between 0.10m to 0.50m bgl across the majority of the site.

Outwith the historical opencast coal sites, the topsoil is generally underlain by made ground comprising orangish brown, occasionally greyish brown, gravelly sandy clay; the gravel being predominantly mudstone, siltstone, sandstone, brick and coal. The made ground is present to depths of between 0.50m bgl and 2.80m bgl.

Within the historical opencast sites, the topsoil is underlain by a possible capping layer (Craven I) to thicknesses of between 0.45m and 0.85m and then colliery spoil made ground. The colliery spoil is generally described as slightly sandy gravelly clay and clayey sandy gravel, with varying proportions of cobbles and boulders. The colliery spoil is considered representative of re-placed opencast overburden material which was removed as part of the coal mining activity.

There are four opencast coal sites within the Barnsley West development area, the based of the opencast coal sites were proven at depths of between 11.20m bgl and 13.00m bgl (Hunters Cottage), between 11.40m bgl and 11.50m bgl (Farmhouse Lane), between 8.20m bgl and 13.00m bgl (Craven I) and between 38.00m bgl and 38.50m bgl (Craven II).

Natural strata generally comprised firm to very stiff residual soil overlying interbedded mudstone, sandstone and coal seams of the Pennine Middle Coal Measures formation.

As part of the preliminary ground investigation 28 boreholes were carried out to investigate the presence of unrecorded underground coal workings. No unrecorded underground coal workings were encountered. Intact coal seams were proven across the site, outwith and beneath the historical opencast coal sites.

The locations of the mine shafts should be confirmed by rotary probing and will require treatment or removal before development.

Groundwater levels within the opencast backfill appear to have stabilised following the cessation of the opencast coal extraction. It should be noted that natural groundwater springs are located on the land south of Hermit Lane. The groundwater regime, including the springs, outwith the historical opencast sites should be further assessed prior to the site preparation and earthworks.

Chemical testing carried out as part of the JPG investigation did not record any concentrations of contaminants above screening values for a residential with home-grown produce end use. However, the made ground in the south west of the site was found locally to contain potentially combustible material, with a calorific value of greater than 2MJ/kg.

Based on the preliminary ground gas assessment, in accordance with BS8485:2015, the site is classified as Characteristic Situation (CS) 2 due to concentrations of carbon dioxide of greater than 5% v/v.

3.0 SITE PREPARATORY WORKS

3.1 Proposed Enabling Works

In order to redevelop the site, it will be necessary to carry out earthworks to create development platforms.

Earthworks cut/fill and proposed levels drawings have been produced for the site. These drawings are referenced below, and copies are provided in Appendix A.

- JPG (Leeds) Limited. Barnsley West. Site Wide Cut/Fill Analysis. Drawing No: 4848-JPG-XX-00-DR-C-1208-S4-P07, dated April 2021.
- JPG (Leeds) Limited. Barnsley West. Proposed Levels with Developable Plateaus. Drawing No: 4848-JPG-XX-00-DR-C-1207-S4-P07, dated April 2021.

Furthermore, JPG have produced a topsoil strategy plan. The topsoil strategy plan shows the locations of the temporary topsoil/subsoil mounds, including the volumes of topsoil in landscaped areas, the volume of topsoil in stockpiles and the volume of surplus topsoil. This drawing is referenced below, and a copy is provided in Appendix A.

- JPG (Leeds) Limited. Barnsley West. Topsoil Strategy. Drawing No: 4848-JPG-XX-00-DR-C-1214-S4-P02, dated April 2021.

As part of the enabling works, it is proposed to construct eight development plateaus across the entire site. A total of seven balancing ponds are proposed in east of the site; three to the north east, two to the immediate west of the land adjacent to Pogmoor and two in the south east of the site.

It is proposed to excavate materials from the western edge of the site, as well as areas in the south, the centre east (north of Hermit Lane) and in the east, adjacent to Pogmoor. The material is to be re-engineered across the north east, centre and the land immediately south of Hermit Lane.

The construction of the development plateaus and balancing ponds in the residential area to the north of Hermit Lane will result in embankment slopes extending along the north-eastern boundary and along the boundaries of the wooded area which bisects the northern half of the site. The heights of these newly formed slopes will range between 1m and 10m. The gradient of the proposed slopes is no greater than 1v:3h.

The development plateaus and balancing ponds in the residential areas and commercial areas to the south and east of Hermit Lane will result in cuttings and embankment slopes which extend along the southern and south-eastern boundaries of the site as well as through the central-southern part of the site and skirting either side of the existing eastern watercourse. The heights of these newly formed cuttings and embankments will range between 4m and 34m. The gradients of the proposed slopes vary between 1v:2.5h and 1v:3h.

A slope stability assessment has been carried out for numerous slope sections across the site; this is referenced below.

- JPG (Leeds) Limited. Preliminary Site Wide Slope Stability Assessment. Barnsley West. Report Ref: 4848-JPG-SW-XX-RP-G-0608-S2-P01. Dated May 2021 for Strata Sterling Barnsley West Limited.

The report provides an assessment of the stability of the slopes based on empirical data. It also provides recommendations for further site investigation works which will be required in order to confirm ground conditions at the location of the proposed slopes and additional geotechnical testing to characterise the materials proposed to be used in the construction of the attenuation basin/plateau. On completion of the investigation and testing, the stability of the proposed slopes can be further assessed.

In addition to the further slope stability site investigation and immediately prior to the earthworks or as part of the enabling/preparatory works (depending on the residual risk to the earthworks), it is recommended that further coal mining investigation is carried out, targeting the mine shafts and providing greater confidence of the absence of unrecorded underground coal workings. Any mine shafts or underground workings encountered will be subject to appropriate mitigation measures.

3.2 Ground Treatment – Preloading and Surcharging

Preloading will be applied during the period taken to construct engineered fill to the development plateau level. Then further surcharging (application of additional load to induce further settlement before construction) will be applied to areas of uncontrolled opencast backfill.

Surcharging works can only take place once the infill operations have achieved the required development plateau level. Where the site is to be cut to the desired plateau level, the existing overburden materials will have already contributed to the surcharging of the underlying development platform. There should be careful consideration to minimise multiple handling of the material. For example, if an area is to be cut by 3.00m, but the designed surcharge height is 4.00m, then placement of an additional 1.00m of surcharge material over the original site levels should be considered.

Additionally, a predefined depth of uncontrolled opencast backfill will also be excavated, processed, and re-engineered to plateau level to achieve a uniform layer of compacted material beneath the development plateau.

Due to the variability of the opencast backfill material, an instrumented trial embankment area should be constructed with prefabricated vertical drain (PVD) installations beneath, and monitoring undertaken either prior to or early in the earthworks contract. This is required to provide confirmation of the effectiveness of the proposed surcharging, including the heights and durations.

The requirements for earthworks and ground treatment are provided on the drawings referenced below and contained in Appendix A.

- JPG (Leeds) Limited. Barnsley West. Earthworks Requirements – Site Location Plan. Drawing No: 4848-JPG-SW-00-DR-G-1324-S4-P02, dated April 2021.
- JPG (Leeds) Limited. Barnsley West. Earthworks Requirements – Pogmoor. Drawing No: 4848-JPG-SW-00-DR-G-1325-S4-P02, dated April 2021.
- JPG (Leeds) Limited. Barnsley West. Earthworks Requirements – Hunters Cottage OCCS. Drawing No: 4848-JPG-SW-00-DR-G-1326-S4-P02, dated April 2021.
- JPG (Leeds) Limited. Barnsley West. Earthworks Requirements – Hunters Cottage Externsion OCCS. Drawing No: 4848-JPG-SW-00-DR-G-1327-S4-P02, dated April 2021.
- JPG (Leeds) Limited. Barnsley West. Earthworks Requirements – Craven I & II OCCS. Drawing No: 4848-JPG-SW-00-DR-G-1328-S4-P02, dated April 2021.

3.2.1 Materials for use in Earthworks

Based on the known ground conditions to date, it is likely that the materials used in the earthworks, including the surcharging, can include site won topsoil, the opencast backfill, made ground (including demolition material), natural clay and natural bedrock. Based on the preliminary assessment, the site won materials that will form the engineered fill and stockpiles (along with the topsoil) are summarised in Table 3.2.1 below.

Table 3.2.1 – Summary of Anticipated Material Types

Material Type	Principle Constituents	Material Classification	Processing/Engineering Notes
Opencast Backfill	Predominantly cohesive with portions of gravel, cobbles and boulders.	Generally Class 2A and 2C with some oversize.	Any oversized materials will require segregation for crushing. Cohesive and granular materials to be split and stockpiled separately.
Other Made Ground	Predominantly cohesive with portions of gravel, cobbles and boulders with a small percentage of brick.	Generally Class 2A and 2C with some oversize.	Oversized materials will require segregation for crushing.
	Demolition material from the existing farms.	Generally Class 6F	Demolition material will require segregation for crushing and testing for suitability within earthworks.
Natural Clay	Slightly sandy slightly gravelly silty clay with bedrock lithorelicts.	Generally Class 2A to 2C.	-
Natural Bedrock	Extremely weak rock (mudstone)	Expected to break down to Class 2C	Compaction trials required to develop a method which satisfactorily breaks down weak rock materials. Further compaction testing will confirm whether the weak rock, once broken down, will have a suitable moisture content.
	Hard mudstone, siltstone, sandstone	Anticipated to be used as Class 6N once processed.	Hard rock encountered will require segregation and crushing.
	Coal	Unacceptable – Class U2	Coal to be segregated for disposal off site. No coal is to remain within 1.00m of the finished development plateau level. Coal can be removed to below 1.00m of finished levels in landscaping/gardens.

If different materials are to be used for the earthworks, including the surcharging, they should be segregated. This includes the segregation of topsoil in order to preserve the topsoil for re-use in future gardens and soft landscaping. Where topsoil is to be used within the same surcharge mound as other materials, the topsoil will need to remain accessible.

Classification of site won materials shall be confirmed prior to commencing the earthworks in order to inform the detailed design, in accordance with Figure 6/1 of Series 600 of the Specification for Highway Works. Frequency of testing is to be confirmed by the Engineer. Further works are recommended in Section 7.0 of this report.

3.3 Importation of Material

The importation of bulk fill materials is considered unlikely for this development, except for materials for construction use only, i.e. build-up for highway pavement construction.

Any materials brought on to site will to be carried out under the guidelines included in Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG) document Verification Requirements for Cover Systems, Version 3.4 dated November 2017 and a materials management plan (MMP) to be prepared by the earthworks contractor.

4.0 GENERAL

The Engineer referred to in this strategy shall mean the Consulting Geoenvironmental Engineer.

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

All British standards, specifications and British Standard Codes of Practice or any other standards referred to in this strategy shall be the latest standards unless otherwise stated.

The works described in this strategy shall be carried out to the entire satisfaction of the Engineer.

5.0 EARTHWORKS STRATEGY

5.1 Standard Acceptance

The earthworks shall be carried out in accordance with the Engineer's drawings and the Manual of Contract Documents for Highways Works, Volume 1 Specification for Highway Works, Series 600 Earthworks (hereafter referred to as the HA Specification for Highway Works).

Except where otherwise specified, work shall be in accordance with the British Standards and other references referred to in the HA Specification for Highway Works. The latest editions shall be used, including all current amendments and additions.

5.2 Definition of Materials

5.2.1 Suitable Materials

Suitable materials shall comprise all that which is acceptable for the contract.

5.2.2 Unsuitable Materials

A summary of unsuitable materials is provided below:

- Material from swamps, marshes, backfilled ponds, etc., all organic or part organic material.
- Material susceptible to spontaneous combustion i.e. coal. Materials that are susceptible to spontaneous combustion shall be removed under a Coal Authority 'Incidental Coal Agreement' or retained on site but not within 1m of finished level or within or adjacent to service corridors.
- 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.

5.2.3 Topsoil

Topsoil shall be the top layer of soil that can support vegetation and shall include turf, this has been identified to a depths of between approximately 0.10m and 0.50m bgl.

Topsoil will be removed to stockpile during the earthworks or used as surcharge material. 300mm of topsoil shall be left on the finished development plateaus or in stockpiles to be used during the construction phase of the development, as shown on the Topsoil Strategy Plan. Materials to be retained on site and used as topsoil shall comply with the YALPAG guidance. A topsoil strategy plan is referenced below, and a copy is provided in Appendix A.

- JPG (Leeds) Limited. Barnsley West. Topsoil Strategy. Drawing No: 4848-JPG-XX-00-DR-C-1214-S4-P02, dated April 2021.

5.2.3 Subsoil

Only soils with calorific values of below 2MJ/kg are to remain within 1m of finished ground levels, i.e. soils containing a lot of coal fragments shall be placed at greater depth. In addition, any subsoils placed within 600mm of finished ground levels shall comply with the YALPAG guidance. The frequency of chemical and calorific value testing of soils is to be confirmed by the Engineer.

5.2.4 Method of Working

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 in-situ state or during handling, placing, and compacting.

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.

The Contractor shall not use explosives.

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

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.

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

Before starting work the Contractor shall submit a detailed methodology including how the works will be undertaken, phasing of the works and disposal and/or temporary storage of spoil and other arisings from the works.

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.

Throughout the works the Contractor shall maintain the whole area of his operations in a clean, tidy, and safe condition by arranging his materials in an orderly manner. All rubbish, waste, material, debris etc. shall be systematically cleared from the working areas as it accumulates.

5.2.5 Recorded and Unrecorded Features

Recorded highwalls, mine entries and associated mitigation requirements are detailed in the relevant coal mining risk assessments and on the coal mining risk level assessment drawing and the mine entry treatment drawing, referenced below and contained in Appendix A.

- JPG (Leeds) Ltd. Barnsley West. Conceptual Ground Model - Coal Mining Risk Level Assessment. Dwg. 4848-JPG-SW-XX-DR-G-1307-S2-P03. Dated February 2021.

- JPG (Leeds) Limited. Barnsley West. Earthworks Requirement - Mine Entry Treatment. Drawing No: 4848-JPG-SW-00-DR-G-1320-S4-P02, dated February 2021.

As part of the site investigation works, it was not possible to investigate certain areas of the site, i.e. beneath or immediately adjacent to the footprint of the occupied farmstead and outbuildings.

Section 7.0 of this document outlines the recommendations for additional works which should be completed prior to the earthworks, during the earthworks and post earthworks.

5.3 Compaction and Testing

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

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.

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 strategy and any future specifications.

The works are to be carried out in accordance with the HA Specification for Highway Works and reference should be made to the appropriate tables for guidance on classification and likely compaction required for fill materials. Classification and compaction verification testing shall be undertaken in accordance with Figure 6/1, Figure 6/4 and Table 1/5 taken from the HA Specification for Highway Works. The frequency of testing is contract specific and shall be confirmed by the Engineer.

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 greater than 95% of the maximum dry density and less than 5% air voids as defined by laboratory testing specified by the Engineer.

The results of the laboratory compaction testing which was undertaken during the preliminary ground investigation indicates that suitable compaction could be achieved with the cohesive and granular colliery spoil, made ground and the natural strata.

However, occasionally the cohesive colliery spoil is too wet to achieve suitable compaction and occasionally the granular colliery spoil is too dry to achieve suitable compaction. Therefore, there may be a requirement to add water to the granular colliery spoil or to dry out the cohesive colliery spoil in order to achieve suitable compaction.

Any oversized material within the colliery spoil (i.e. boulders) and demolition material from the existing farmsteads and hard standing, can be processed, i.e. crushed, screened and submitted for testing prior to reuse in the earthworks.

Additional geotechnical testing is recommended for the proposed fill material which is to be used in the slopes. The findings of the additional testing will inform the suitability of the material types for incorporation into the slope.

Validation testing will be required for all materials placed and compacted. All materials, site-won and imported, should be classified and validated in accordance with the testing requirements set out in Table 1/5 in the HA Specification for Highway Works.

Plate load tests will be required to be carried out at formation level of the proposed highways on a 25m by 25m grid or 25m centres and at formation level of each plateau on a 50m by 50m grid in order to determine the CBR value of the material.

Any materials which do not achieve a CBR value of at least 3% will require additional compaction. If after further compaction a CBR value of 3% cannot be achieved, then the material will require removal and replacement with suitable materials in order to achieve the required CBR value.

Any variation to the testing method and frequency prescribed above will require prior approval by the Engineer.

All test locations shall be accurately surveyed for co-ordinates and level.

The Contractor shall test all 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.

Test results are to be issued to the Engineer for review within 24 hours. The Engineer is to be alerted of non-compliances, i.e. materials not achieving 95% maximum dry density and <5% air voids, within 24 hours. The reporting by the contractor should consist of a spreadsheet with the test results referenced to the control samples.

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

The final formation shall be graded and rolled sealed with 6No. passes of a Bomag BW6 towed vibrating smooth roller or similar to the Engineer's approval, to the specified levels and tolerances.

6.0 COAL MINING

Following the preliminary ground investigation, the three coal mining risk assessments and coal recovery reports were updated to conclude that to-date there is no proven evidence that the site has been affected by underground mining at shallow depths outwith the opencast coal sites or beneath the base of the opencast coal sites. However, there remains a likelihood of underground coal mining at shallow depths in the areas of moderate to high residual risks where insufficient rock cover is present (i.e. to the east of the Farm House Lane OCCS, adjacent to Pogmoor).

Other areas across the site which have been assessed as low to moderate residual risk may also be affected by underground coal mining where insufficient rock cover is present. The low to moderate residual risks relate to the Dunsil seam, Gawber seam, Thin seam, Swallow Wood seam, Top Haigh Moor seam and Low Haigh Moor seam.

There is also a residual risk from recorded and unrecorded mine entries across the site, especially in the proposed residential area adjacent to Pogmoor and in Hunters Cottage Extension OCCS and Craven II OCCS. The recorded mine entry (dewatering pipe) in Craven II is reported to be capped. However, the cap will need to be located and investigated (it is unlikely to have been founded on bedrock strata and therefore inadequate).

To confirm the findings of the preliminary coal mining assessments, it is recommended that further intrusive coal mining investigations in the form of rotary boreholes and trial trenches are carried out. Areas which require further intrusive works are presented on the Coal Mining Risk Level Assessment drawing referenced below and contained in Appendix A.

- JPG (Leeds) Ltd. Barnsley West. Conceptual Ground Model - Coal Mining Risk Level Assessment. Dwg. 4848-JPG-SW-XX-DR-G-1307-S2-P03. Dated February 2021.

6.1 Coal Mining Mitigation Measures

If any shallow underground coal workings are confirmed following the additional intrusive works, and the workings are within influencing depth of the surface, they will require treatment through drill and grout techniques.

If drill and grout remediation is used for the mitigation of shallow coal workings, a drill and grout specification will be required which will be prepared by the Engineer when required. A Permit to Treat the coal workings will also be required from the Coal Authority.

Any mine entries that are encountered during the additional intrusive works or during the enabling works/earthworks, the Contractor will be required to mitigate the risk posed by the mine entry in accordance with a Mine Shaft Stabilisation Specification, which is to be prepared by the Engineer when required, and the mitigation measures outlined in the coal mining risk assessments, as detailed in Table 6.1.1 below and the Mine Entry Treatment drawing, referenced below and contained in Appendix A.

- JPG (Leeds) Limited. Barnsley West. Earthworks Requirement - Mine Entry Treatment. Drawing No: 4848-JPG-SW-00-DR-G-1320-S4-P02, dated February 2021.

Table 6.1.1 – Summary of Recorded Mine Entries and Proposed Mitigation Measures

CA Mineshaft Reference	NGR Reference	Proposed Mitigation Measures
431406-002	431771, 406978	Five mine entries located in Hunters Cottage Extension OCCS. Mine entries have likely been removed during opencast operations. If mine entries are present, these will likely be removed as part of the earthworks. In the event of the mine entries being proven to extend below the base of the opencast, grout stabilisation and capping may be required.
431406-003	431771, 406971	
431406-004	431746, 406949	
431406-005	431840, 406925	
431406-006	431838, 406909	
432406-002	432364, 406628	Mine entry is located outside the site boundary. No mitigation measures required.
432406-011	432302, 406721	Mine entry to be removed during earthworks.
432406-012	432423, 406995	Mine entry is located outside the site boundary. No mitigation measures required.
432406-013	432452, 406972	Mine entry likely to be off site. Departure zone of the mine entry needs to be investigated via excavation during earthworks. If the mine entry is proven to be present on site, grout stabilisation and capping required.
432406-014	432413, 406745	Mine entry is located within Farm House Lane OCCS, therefore it has likely been removed during opencast operations. Entry to be investigated via rotary drilling or excavation during the earthworks, depending on the depth to the mine entry. If the mine entry is proven to be present on site, grout stabilisation and capping required.
432406-015	432298, 406795	Mine entries to be removed during earthworks.
432406-016	432305, 406777	
432406-017	432280, 406747	
432406-018	432324, 406686	
432406-019	432349, 406680	
432406-020	432507, 406628	Mine entries are located outside the site boundary. No mitigation measures required.
432406-021	432509, 406615	
432406-031	432519, 406627	
432407-008	432004, 407548	Mine entry likely to be off site, but the departure zone will need to be investigated via excavation during the earthworks. If the mine entry is proven to be on site, then an assessment of the existing cap is required. Mitigation measures may include the following: • Exposing and cutting the pipe below earthworks formation level and filling with granular material. • Grout stabilisation. • Recapping at rockhead.
432407-019	432435, 407008	Mine entry is located outside the site boundary. No mitigation measures required.

Further information regarding the mitigation measures in relation to shallow coal workings and mine entries are presented in the three coal mining risk assessments referenced in Section 1.6 of this report.

The further investigation works and associated mitigation measures shall be carried out in accordance with CIRIA C758 *Abandoned Mine Workings Manual*.

All boreholes and wells that intersect coal seams are to be fully grouted with bentonite, so that they do not form preferential pathways for hazardous ground gas.

6.2 Coal Seam Removal

A Coal Authority 'Incidental Coal Agreement' must be obtained in respect of the removal of shallow coal, including any shallow worked coal seams (i.e. the Barnsley coal seam to the west of Farm House Lane OCCS), as part of the earthworks. This shall be obtained by the Contractor in advance of the commencement of earthworks operations on the site.

The shallow coal expected to be exposed as part of the earthworks is shown on the JPG drawing referenced below and contained in Appendix A.

- JPG (Leeds) Limited. Barnsley West. Conjectured Incidental Coal Seam Extraction. Drawing No: 4848-JPG-SW-00-DR-G-1318-S4-P03, dated April 2021.

7.0 RECOMMENDATIONS FOR FURTHER WORK

It is recommended that additional ground investigation works is carried both immediately prior, during and post earthworks.

The separate ground investigations are summarised below.

7.1 Immediately Prior to Earthworks

Based on the findings of the coal mining risk assessments, there is a residual risk to the development and the earthworks from potential shallow underground coal workings and mine entries.

Based on the assessments, it is considered that areas which are moderate to high risk (i.e. Farm House OCCS adjacent to Pogmoor) are likely to require remedial action and areas which are low to moderate risk will require further assessment but unlikely to require remedial action.

Where underground coal workings are confirmed, mitigation measures comprising drill and grout techniques will be required where the workings are too deep to be fully excavated along with the coal seam. Further details regarding the mitigation measures for the mine workings are presented in the coal mining risk assessments referenced in Section 1.6 of this report.

7.2 During Earthworks

During the earthworks, it is recommended that soil classification and compliance testing is carried out to confirm the suitability of the materials for re-use in the earthworks.

It is recommended that during the earthworks, the presence of the recorded mine entries will need to be confirmed, particularly in the area of Hunters Cottage Extension OCCS, Farm House Lane OCCS and the dewatering pipe in Craven II OCCS.

Further investigations into the presence of mine entries will comprise trial trenches and rotary boreholes. The mitigation measures for the mine entries will likely comprise full removal of the mine entry (i.e. the adits to the west of Farm House Lane OCCS) or stabilisation (drill and grout) and capping at rockhead. Further details regarding the mitigation measures for the mine entries are presented in the coal mining risk assessments referenced in Section 1.6 of this report.

It is recommended that slope specific ground investigation is carried out, along with in-situ/laboratory testing, in order to refine the ground model (i.e. groundwater levels and strata boundaries) and confirm the geotechnical parameters, including effective stress parameters for the materials to be used in embankment construction, which have been selected for use in the slope stability analysis. This pertains to those slopes where the Factor of Safety is below that required or very close to it.

It is recommended that the slope specific investigation includes the use of cable percussion/rotary boreholes, the excavation of trial pits, geotechnical laboratory testing and groundwater monitoring.

Additionally, natural groundwater springs are located in the south of the site. It is recommended that a ground investigation which includes the excavation of the springs to assess the groundwater regime is carried out.

Mitigation measures for the groundwater springs may include a series of horizontal or vertical drains beneath the earthwork plateaus and the embankments/cuttings. The drains will subsequently allow the groundwater to be directed to the existing surface watercourses.

7.3 Post Earthworks Validation

It is recommended that plot specific post earthworks ground investigations are carried out to validate the construction of the development plateaus and confirm the geotechnical parameters and contamination status of the shallow soils. Additionally, any post earthworks ground investigation will include the assessment of the post earthworks ground gas regime and confirmation of the ground gas protection requirements for new buildings.

It is recommended that the post earthworks ground investigation will include window sample boreholes and static cone penetration tests (CPTs), to be carried out in accordance with the following British Standards:

- BS5930:2015+A1:2020. Code of Practice for Ground Investigations.
- BS8485:2015+A1:2019. Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.
- BS10175:2011+A2:2017. Investigation of Potentially Contaminated Sites – Code of Practice.
- BS1377. Methods of test of soils for civil engineering purposes.

8.0 CONTRACTOR'S RESPONSIBILITIES

8.1 Introduction

The following regulations, guidance and legislation relating to the works shall be complied with at all times:

- Health and Safety Executive "Protection of Workers and the General Public during Redevelopment of Contaminated Land", HS(G)66, HMSO 1991.
- The most current Construction, Design and Management Regulations and the Pre-tender and Construction Phase Health and Safety Plans.
- The Control of Substances Hazardous to Health Regulations 2002; and
- The Control of Asbestos at Work Regulations, 2012.

8.2 Surveying

The contractor shall be responsible for the following survey work:

- Establishment of profile boards.
- Surveying the base and extent of all excavations following proof rolling and prior to placement of any fill to be engineered.
- Areas of localised overdig, i.e. areas required to remove any former structures etc.
- Any obstructions encountered in the works that are not possible to remove, i.e. piles.
- The finished surface (remediation level and interim capping layer) prior to handover to the client.
- Interim surveys to be undertaken during the infilling works to provide information on issues such as progress, earthworks quantities, base/top of made ground etc.; and
- The location and elevation of test and sample locations.

8.3 Testing

The contractor shall be responsible for undertaking all geotechnical testing and chemical analysis necessary to satisfy the Engineer that the works have been carried out in accordance with, and comply with the specification.

All soils and chemical analysis shall be carried out by a UKAS and MCERTS accredited laboratory to the approval of the Engineer.

8.4 General

The contractor shall also be responsible for the following:

- Provision of method statements and reports.
- Production of a Construction Environmental Management Plan (CEMP).
- Environmental Permits (waste and remediation) are in place prior to works commencing.
- The provision of health and welfare facilities.
- Obtaining the relevant permits/consents/licenses i.e. discharge consents.
- Environmental monitoring; and
- Mitigation measures.

9.0 SUPERVISION

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

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.

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, he shall give the Engineer 36 hours' notice for approval of the proposed plant and working method.

It is the Contractor's responsibility to arrange, carry out and report/review all earthworks testing and fill importation testing in accordance with the appropriate specification and provide results in an orderly and timely manner to the Engineer for review.

10.0 VALIDATION AND REPORTING

The Contractor will maintain records of the works to include the following:

- Daily record sheets to include a summary of the day's activities.
- Weather conditions.
- Plant, personnel, and visitors present.
- Aspects relating to Health and Safety, environmental control or non-compliance with the Specifications or the Contractors Method Statement.
- The Contractor shall provide regular up to date records of all testing results within an agreed online data system. These records should be updated at a minimum of once a week. The Contractor is required to review the results and highlight any issues immediately, along with details on how any issues will be rectified; and,
- As built surveys, including base of excavation and final level survey, base and top of made ground.

The Engineer shall ensure that the requirements of this strategy are complied with. On satisfactory completion of all of the works, the Engineer will provide an initial report, comprising relevant site records that will act as confirmation that the earthworks have been carried out in accordance with this specification.

The report shall include the following:

- A description of the works undertaken.
- Records of the works.
- Progress photographs.
- Waste transfer notes.
- Chemical and geotechnical validation test results.
- As built surveys, including base of excavation and final level survey, base and top of made ground as supplied by the Contractor.
- A statement that the works have been undertaken in accordance with the agreed specification.

Appendix A Figures and Drawings

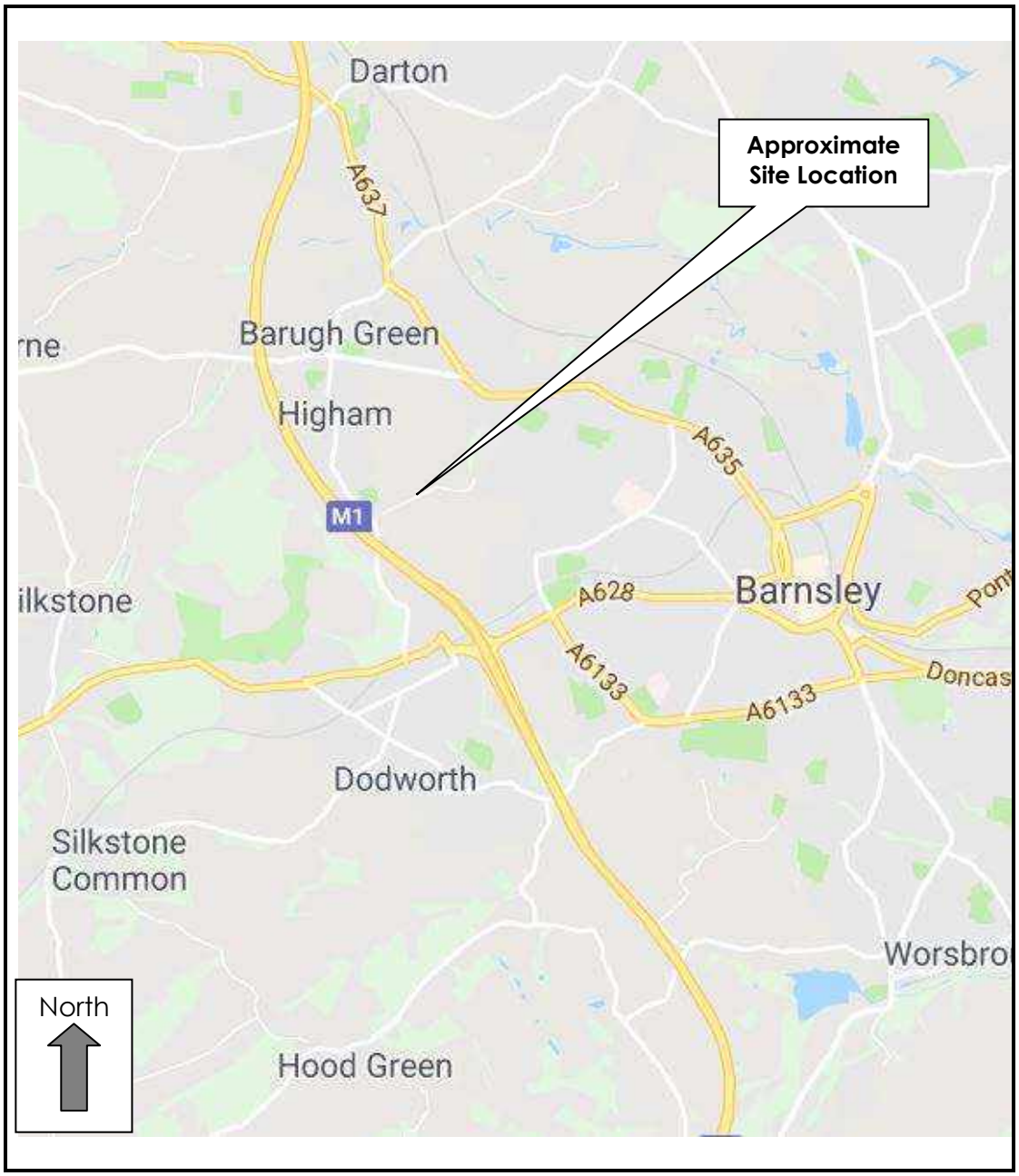

Figure 1 – Site Location Plan	
Site	**Barnsley West**
Client	**Strata Sterling Barnsley West Ltd**
Job Number	**4848**
Scale	**NTS**

Figure 2 – Aerial Photograph	
Site	**Barnsley West**
Client	**Strata Sterling Barnsley West Ltd**
Job Number	**4848**
Scale	**NTS**

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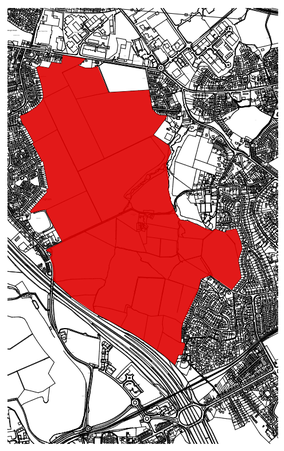
Immediately report any discrepancies on this document to the Originator. This document shall be read in conjunction with associated models, specifications and related consultants' documents.

Native model: 19028-BBA-ZZ-ZZ-M3-A-0002_Site Model_Reshared_A

North

Key Plan



Site Area: 116.50 ha

Key

- Local Plan Boundary
- Private Garden
- Public Landscape
- Highway - Roads & Side Walk
- Homezone
- Formal Play
- Informal Play
- Existing Pedestrian Access
- Proposed Pedestrian Access
- **1** Commercial
- **2** School
- **3** Employment Zone

0 20 40 60 80 100 120m
1:2500

Note:
The drawing is based upon survey information provided by others, no guarantee of its accuracy can be given

rev	description	drawn	checked	date
P05	Consultation issue.	AS	TR	12/05/21
P04	Consultation issue.	YF	TR	11/05/21
P03	Revised layout to suit proposed levels	AG	TR	11/09/19
P02	Consultation issue	AG	TR	12/08/19
P01	First issue	AM	TR	02/08/19

B

B O N D B R Y A N

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w www.bondbryan.co.uk

Strata Sterling Barnsley West Ltd

Barnsley West Masterplan

Proposed Site Plan

Originator project ref	Purpose of Issue
19028	**CONSULTATION**
Scale(s)	Status
1:2500	**S2 SUITABLE FOR INFORMATION**
Paper size	Revision
A1	**P05 PRELIMINARY**

project	originator	volume	level	type	role	number	status	revision
BWM	BBA	ZZ	XX	DR	A	1004	S2	P05

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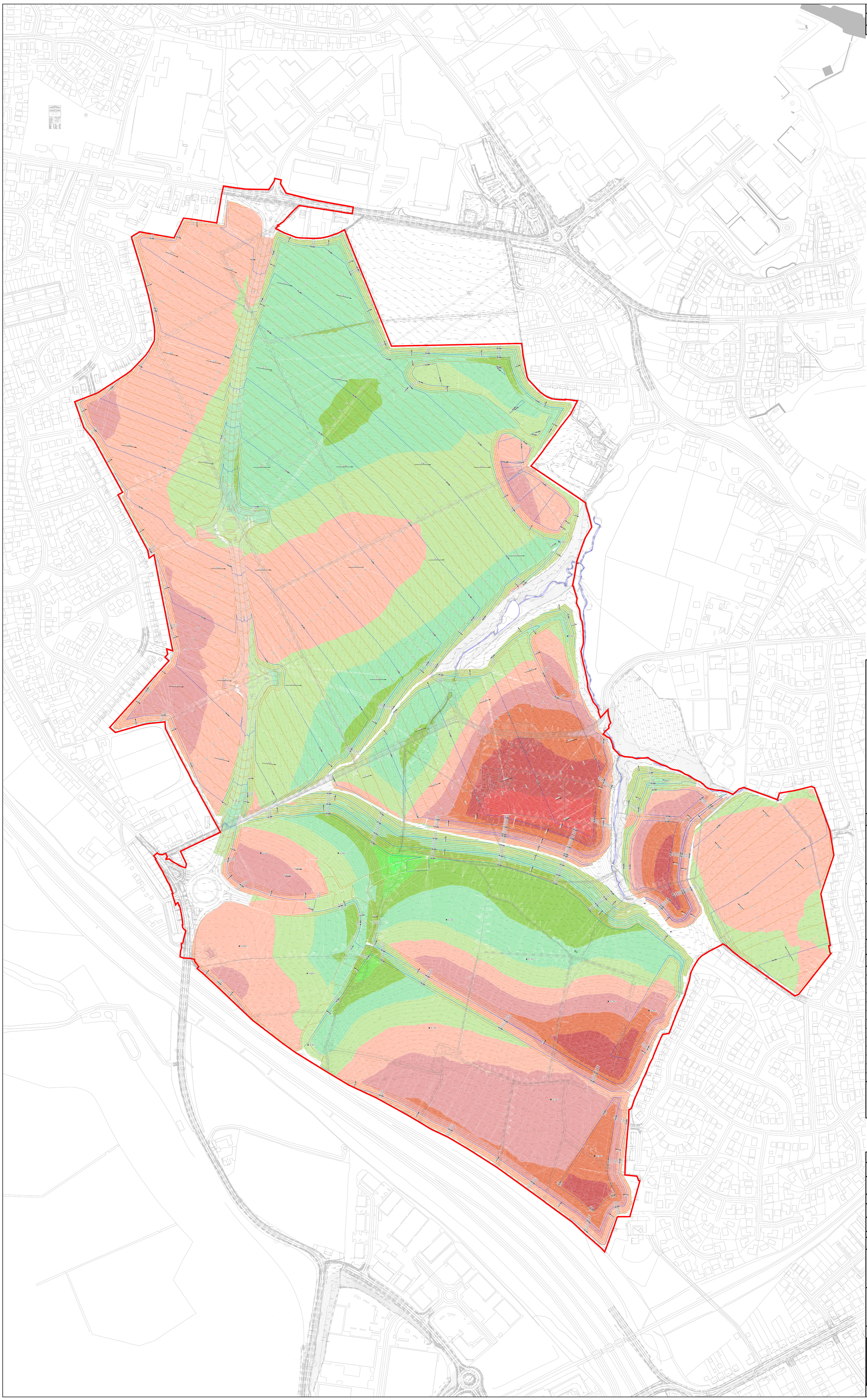

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EARTHWORKS NOTES

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5. ISOPACHYTE COLOUR BANDINGS DENOTE APPROXIMATE CUT AND FILL VOLUMES BETWEEN THE EXISTING SITE STRIP AND PROPOSED FORMATION LEVELS. REFER TO EARTHWORKS ANALYSIS TABLE.
6. AREAS NOT SHADED WITH ISOPACHYTE COLOUR BANDINGS HAVE NOT BEEN INCLUDED IN THE CUT/FILL ANALYSIS.
7. APPROXIMATE EARTHWORK VOLUMES HAVE BEEN DETERMINED BASED ON THE FOLLOWING CAVEATS:

- BULKING FACTOR HAS BEEN ACCOUNTED FOR.
- ARISINGS FROM ATTENUATION BASIN FORMATION HAS BEEN ACCOUNTED FOR.
- ARISINGS FROM DRAINAGE AND FOUNDATION EXCAVATIONS HAVE NOT BEEN ACCOUNTED FOR.
- DEMOLISHED MATERIAL FROM EXISTING BUILDINGS/STRUCTURES HAVE NOT BEEN ACCOUNTED FOR.

EARTHWORKS ANALYSIS

EXISTING SITE STRIP

ANALYSIS HAS ALLOWED FOR A 200mm DEEP SITE STRIP OF EXISTING TOPSOIL.
TOTAL AREA = 1088604.442m²
TOTAL VOLUME = 217720.888m³
SITE STRIP MATERIAL DEEMED TO BE UNSUITABLE FOR RE-USE AS ENGINEERING FILL.
TOPOGRAPHICAL SURVEY INFORMATION USED IN THE EARTHWORKS ANALYSIS TAKEN FROM: HAYCOCK & TODD LAND SURVEY CONSULTANTS, TOPOGRAPHICAL SURVEY, DRAWING NO. S8315.

ANALYSIS BETWEEN EXISTING SITE STRIP & PROPOSED PLATEAU LEVELS

2D AREA	1088604.442m²
CUT	1747876.481m³
BULKING FACTOR (5%)	87393.824m³
FILL	1838645.243m³
NET (SHORTFALL)	3374.938m³
MAXIMUM CUT DEPTH	-14.850m
MAXMIUM FILL DEPTH	14.580m

SURFACE LEVEL DATA

MIN. LEVEL	MAX. LEVEL	COLOUR
-18.000m	-15.000m	
-15.000m	-12.000m	
-12.000m	-9.000m	
-9.000m	-6.000m	
-6.000m	-3.000m	
-3.000m	0.000m	
0.000m	3.000m	
3.000m	6.000m	
6.000m	9.000m	
9.000m	12.000m	
12.000m	15.000m	
15.000m	18.000m	

LEGEND

0.000 DENOTES PROPOSED MAJOR CONTOURS
0.000 DENOTES PROPOSED MINOR CONTOURS
1:40 DENOTES PROPOSED GRADIENTS

REV	DESCRIPTION	DATE	CHK	BY
P07	UPDATED LEVELS TO ACCOMMODATE FOOTPATHS.	15/04/21	CPH	OLT
P06	UPDATED COMMERCIAL LAYOUT. UPDATED LINK ROAD LAYOUT AND LEVELS.	04/02/21	CPH	OLT
P05	UPDATED TO INCLUDE DETAILED HIGHWAYS, EMBANKMENT AND DRAINAGE DESIGN.	25/11/20	CPH	OLT
P04	UPDATED RED-LINE BOUNDARY.	17/11/20	CPH	OLT
P03	ALTERATION TO SITE BOUNDARY. ALTERATION TO LINK ROAD ALIGNMENT.	24/02/20	CPH	OLT
P02	AMENDMENTS TO LAYOUT IN LINE WITH ARCHITECTS COMMENTS.	17/10/19	CPH	OLT
P01	FIRST ISSUE.	23/08/19	CPH	OLT

Project
BARNSLEY WEST

Drawing Title
SITE WIDE CUT/FILL ANALYSIS

PLANNING

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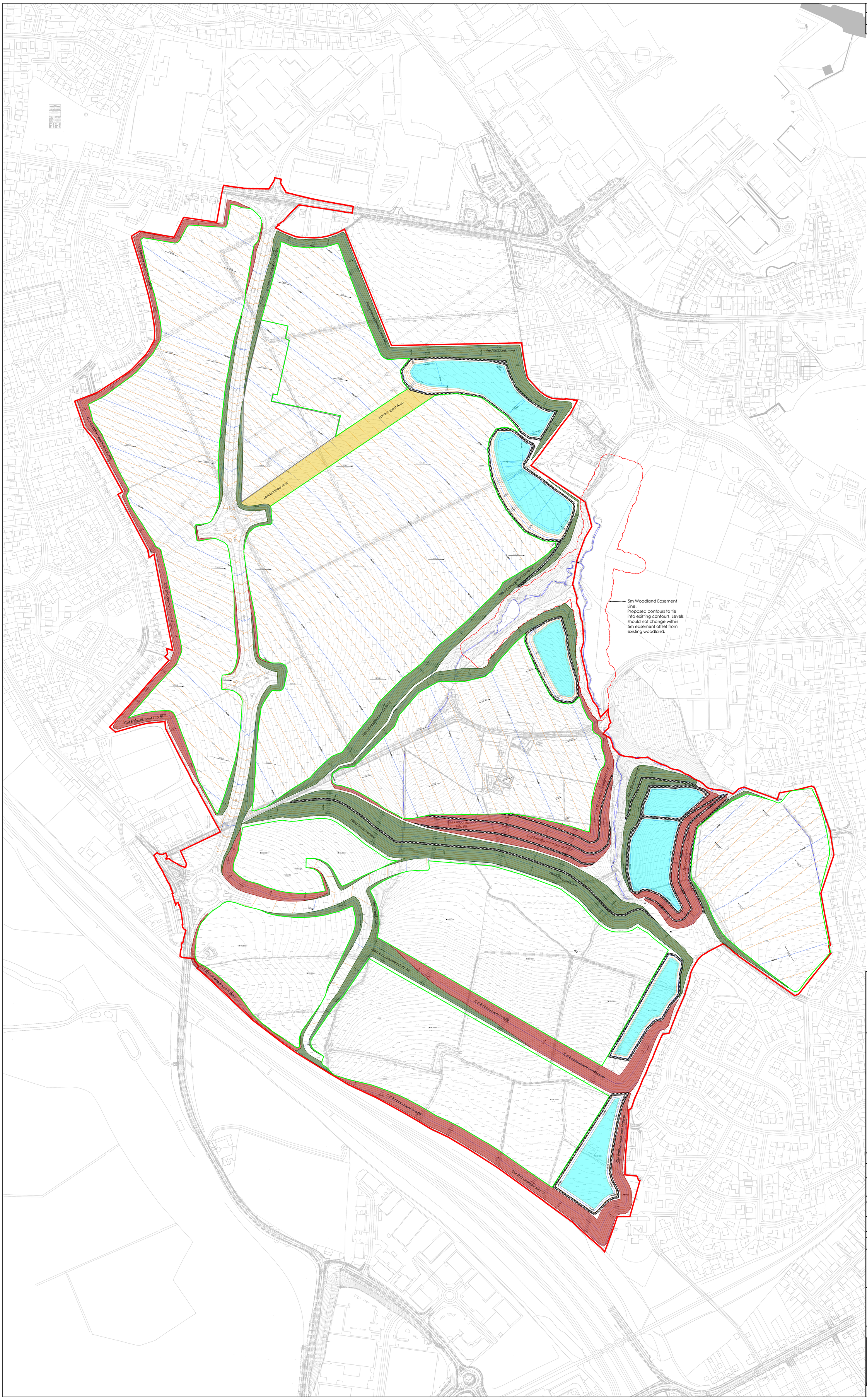

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LEGEND

- 0.000 — DENOTES PROPOSED MAJOR CONTOURS
- 0.000 — DENOTES PROPOSED MINOR CONTOURS
- 1:40 — DENOTES PROPOSED GRADIENTS
- DENOTES DEVELOPABLE PLATEAU
- DENOTES ATTENUATION BASINS
- DENOTES LANDSCAPING AREA
- DENOTES FILLED EMBANKMENT
- DENOTES CUT EMBANKMENT

REV	DESCRIPTION	DATE	CHK	BY
P07	UPDATED LEVELS TO ACCOMMODATE FOOTPATHS.	15.04.21	CPH	OLT
P06	UPDATED COMMERCIAL LAYOUT. UPDATED LINK ROAD LAYOUT AND LEVELS.	04/02/21	CPH	OLT
P05	UPDATED TO INCLUDE DETAILED HIGHWAYS, EMBANKMENT AND DRAINAGE DESIGN.	24/11/20	CPH	OLT
P04	ADDITIONAL NOTES ADDED.	16/04/20	OLT	OLT
P03	AMENDMENTS TO SITE BOUNDARY. ALTERATION TO LINK ROAD ALIGNMENT.	24/02/20	CPH	OLT
P02	AMENDMENTS TO LAYOUT IN LINE WITH ARCHITECTS COMMENTS.	17/10/19	CPH	OLT
P01	FIRST ISSUE.	23/08/19	CPH	OLT

Project
BARNSLEY WEST

Drawing Title
PROPOSED LEVELS WITH DEVELOPABLE PLATEAUS

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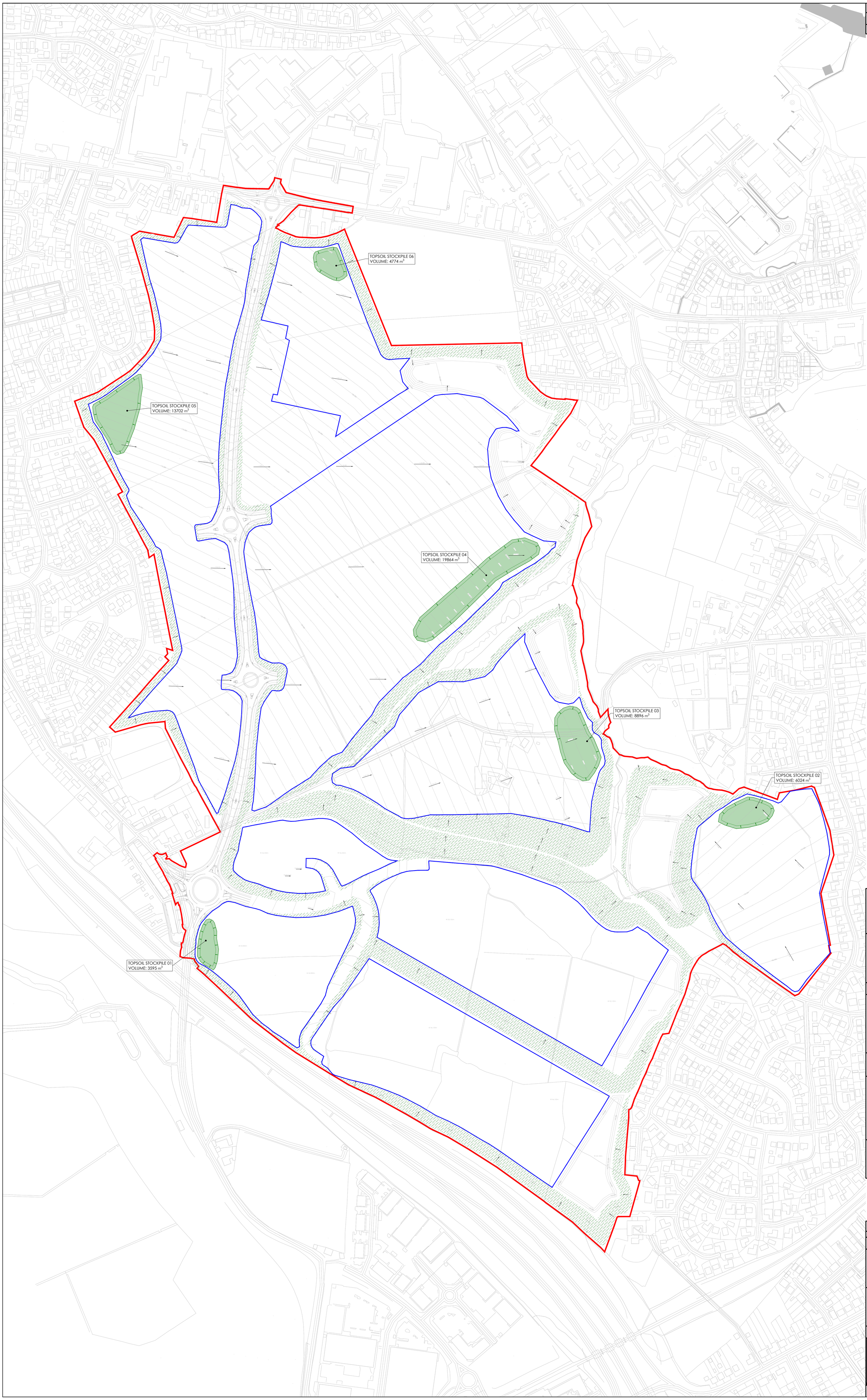

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LEGEND

DENOTES TOPSOIL IN LANDSCAPED AREAS

DENOTES TOPSOIL IN STOCKPILE

TOPSOIL ANALYSIS

EXISTING SITE STRIP

EARTHWORKS CUT/FILL ANALYSIS HAS ALLOWED FOR A 200mm DEEP SITE STRIP ACROSS THE FULL SITE.
TOTAL AREA = 1088604.442m²
TOTAL VOLUME = 217720.888m³
SITE STRIP MATERIAL DEEMED TO BE TOPSOIL AND THEREFORE UNSUITABLE FOR RE-USE AS ENGINEERING FILL.
TOPOGRAPHICAL SURVEY INFORMATION USED IN THE EARTHWORKS ANALYSIS TAKEN FROM: HAYCOCK & TODD LAND SURVEY CONSULTANTS, TOPOGRAPHIC SURVEY, DRAWING No. S8315

TOPSOIL IN LANDSCAPE AREAS

IN AREAS OF DEFINED LANDSCAPING (INC. ATTENUATION BASINS) A 300mm THICK TOPSOIL LAYER SHALL BE PLACED.
TOTAL VOLUME = 71362.170m³

TOPSOIL IN STOCKPILES

TOPSOIL FOR USE IN THE FUTURE DEVELOPMENT SHALL BE SUITABLY STOCKPILED. STOCKPILE LAYOUT IS INDICATIVE AND IS SUBJECT TO CHANGE ACCORDING TO THE DEVELOPMENT PROGRAMME.
VOLUME ESTIMATES OF THE FUTURE TOPSOIL REQUIREMENT HAVE BEEN ESTABLISHED BY APPLYING AN ASSUMED TOPSOIL COVERAGE (%) OF THE AVAILABLE DEVELOPABLE PLATEAU WITH A 300mm THICK TOPSOIL LAYER:
RESIDENTIAL DEVELOPMENT: 35%
COMMERCIAL DEVELOPMENT: 5%
TOTAL VOLUME = 56855.000m³

SURPLUS TOPSOIL

REMAINING TOPSOIL WHICH HAS NOT BEEN DESIGNATED FOR LANDSCAPED AREAS OR FUTURE DEVELOPMENT.
TOTAL VOLUME = 89503.718

SURPLUS TOPSOIL SHALL BE UTILISED AS PART OF THE GROUND TREATMENT SURCHARGE REQUIREMENT.

0m 50m 100m
SCALE 1:2000

REV	DESCRIPTION	DATE	CHK	BY
P02	UPDATED LAYOUT TO ACCOMMODATE FOOTPATHS.	15/04/21	CPH	OLT
P01	FIRST ISSUE.	23/02/21	CPH	OLT

Project
BARNSLEY WEST

Drawing Title
TOPSOIL STRATEGY

PLANNING

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   PARTICULARLY JPG DRAWINGS:
   - 4848-JPG-SW-00-DR-G-1325 - EARTHWORKS REQUIREMENT - POGMOOR
   - 4848-JPG-SW-00-DR-G-1326 - EARTHWORKS REQUIREMENT - HUNTERS COTTAGE OCCS
   - 4848-JPG-SW-00-DR-G-1327 - EARTHWORKS REQUIREMENT - HUNTERS COTTAGE EXTENSION OCCS
   - 4848-JPG-SW-00-DR-G-1328 - EARTHWORKS REQUIREMENT - CRAVEN I & II OCCS
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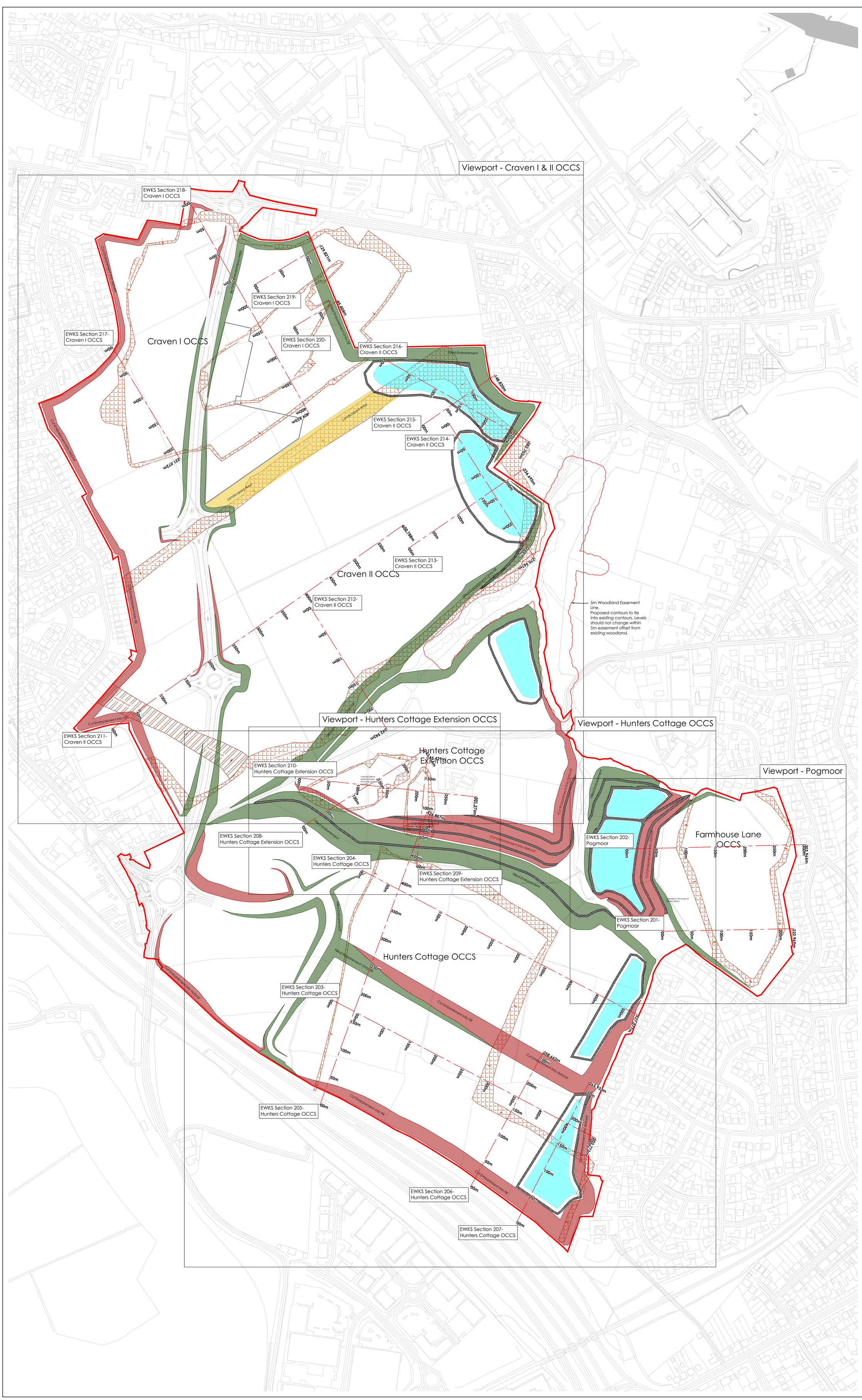
4. CONJECTURED EXTENTS OF HIGHWALLS HAVE BEEN DETERMINED USING LIMITED SITE INVESTIGATION AND HISTORICAL COAL SEAM EXTRACTION PLANS.
5. FURTHER SITE INVESTIGATION IS REQUIRED PRIOR RO UNDERTAKING OF EARTHWORKS.

LEGEND

- DENOTES CONJECTURED HIGHWALL LOCATION (ARROW INDICATING DIP DIRECTION)
- DENOTES CONJECTURED BURIED HIGHWALL LOCATION (ARROW INDICATING DIP DIRECTION)
- DENOTES ATTENUATION BASINS
- DENOTES LEVEL LANDSCAPING AREA
- DENOTES FILLED EMBANKMENT
- DENOTES CUT EMBANKMENT



0m 50m 100m
SCALE 1:2000

REV	DESCRIPTION	DATE	CHK	BY
P02	UPDATED LEVELS TO ACCOMMODATE FOOTPATHS.	15.04.21	CPH	OLT
P01	FIRST ISSUE.	25.02.21	OLT	OLT

Project
BARNSLEY WEST

Drawing Title
EARTHWORKS REQUIREMENTS - SITE LOCATION PLAN

PLANNING

JPG
www.jpg.group
Leeds - 0113 263 1155 | London - 0207 947 4148

4848-JPG-SW-00-DR-G-1324 | S4 | P02

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LEGEND

PLAN VIEW

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SECTION VIEW

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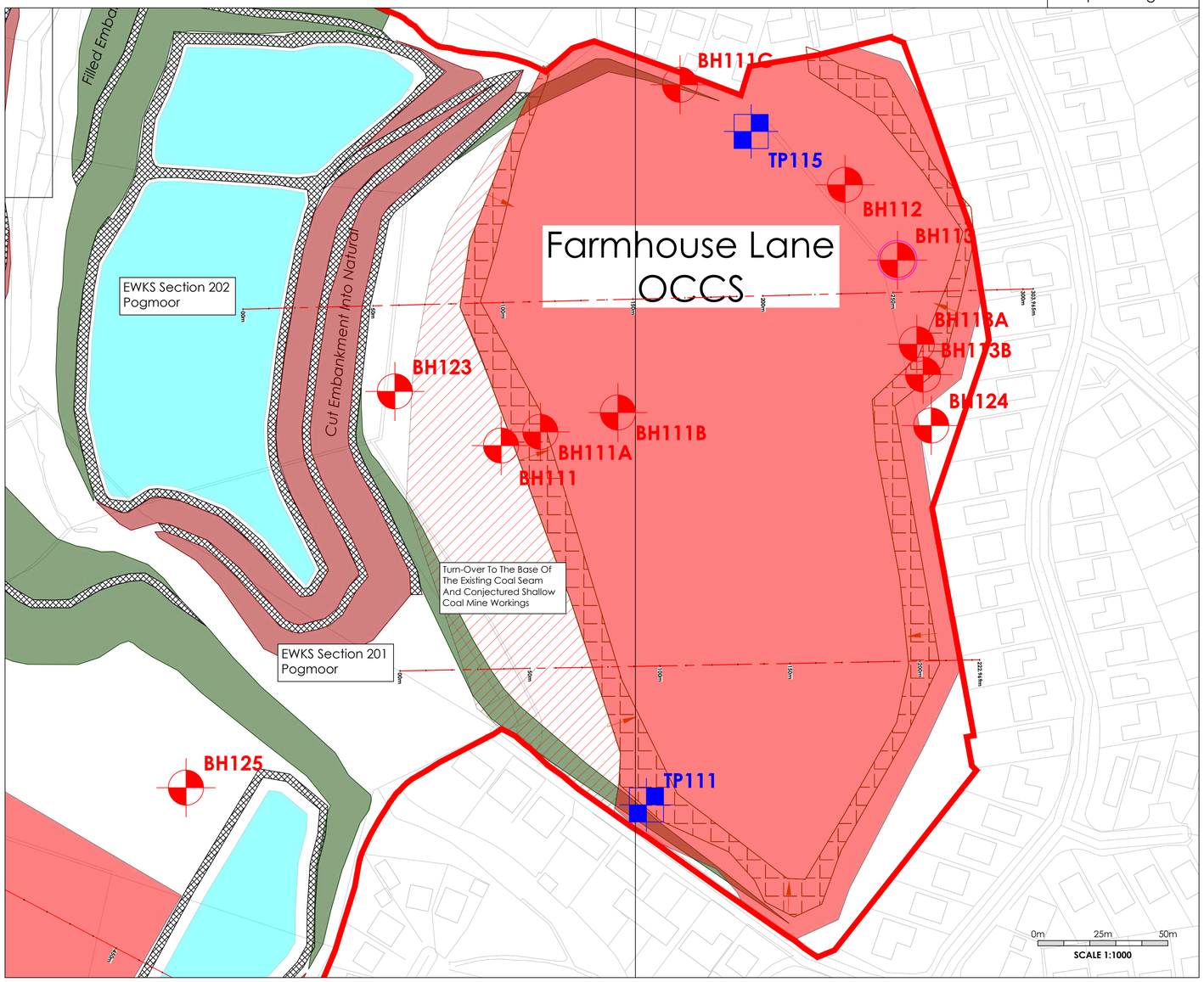
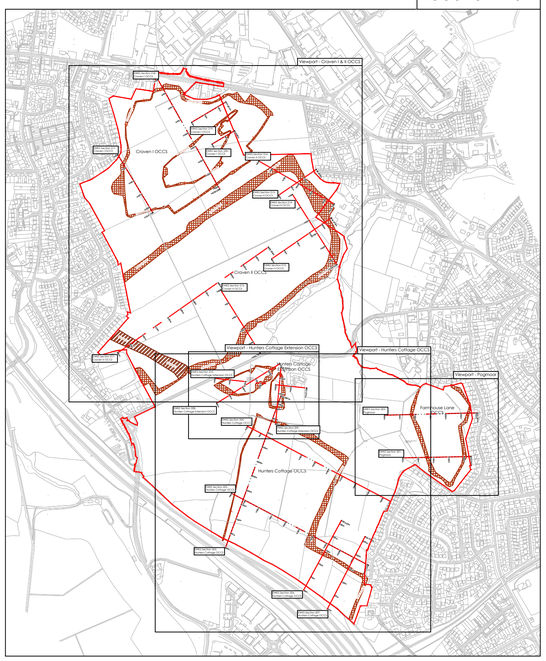
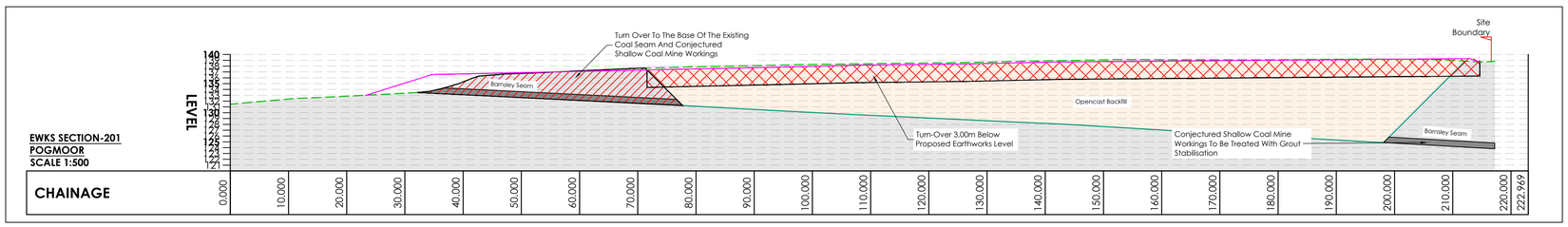
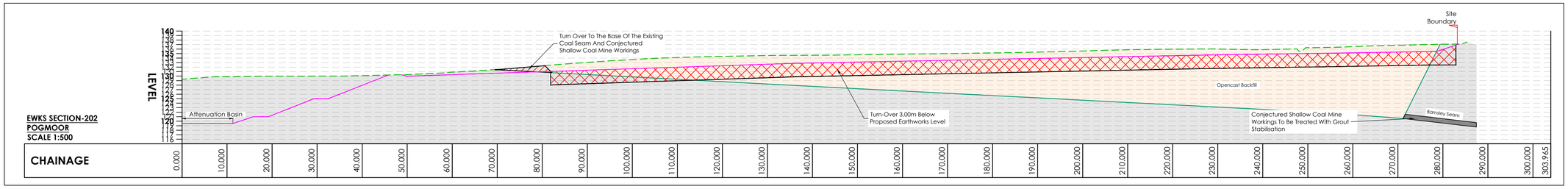
Viewport - Pogmoor



Location Plan







REV	DESCRIPTION	DATE	CHK	BY
P02	UPDATED LEVELS TO ACCOMMODATE FOOTPATHS.	15.04.21	CPH	OLT
P01	FIRST ISSUE.	25.02.21	CPH	OLT

Project
BARNSLEY WEST

Drawing Title
EARTHWORKS REQUIREMENT - POGMOOR

PLANNING

JPG
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4848-JPG-SW-00-DR-G-1325 | S4 | P02

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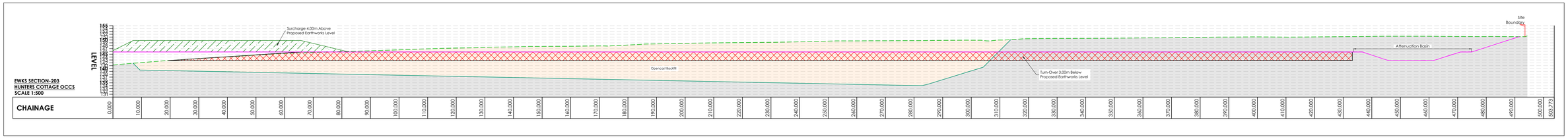
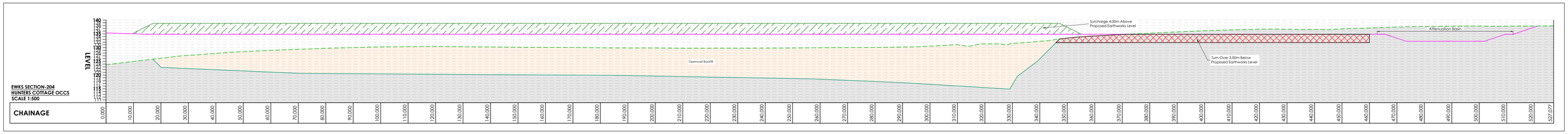
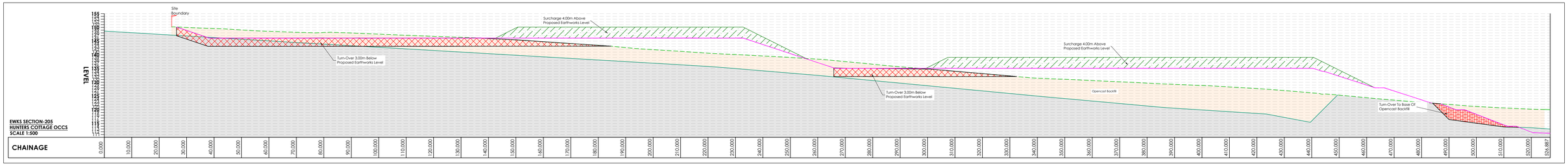
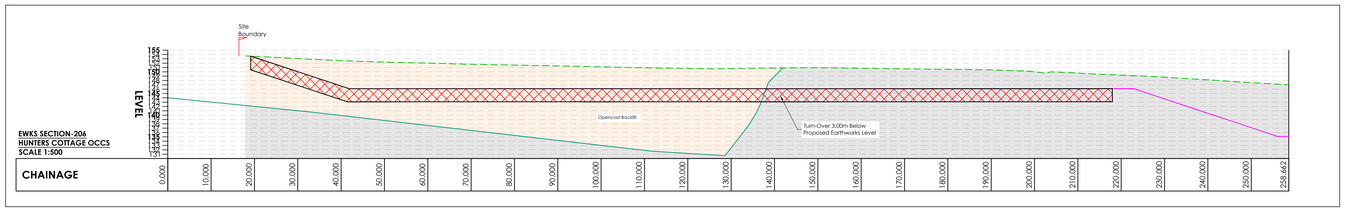
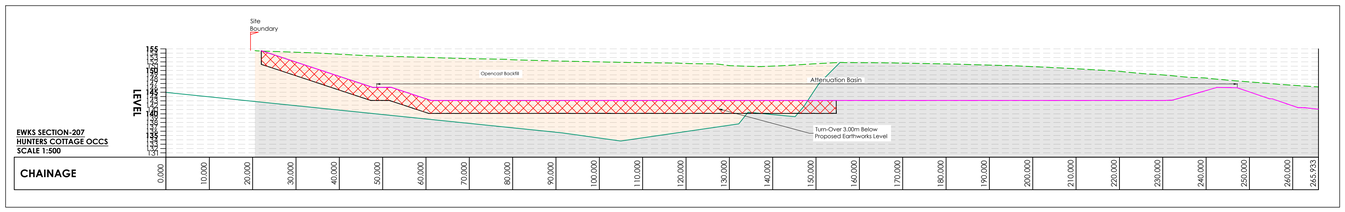
NOTES











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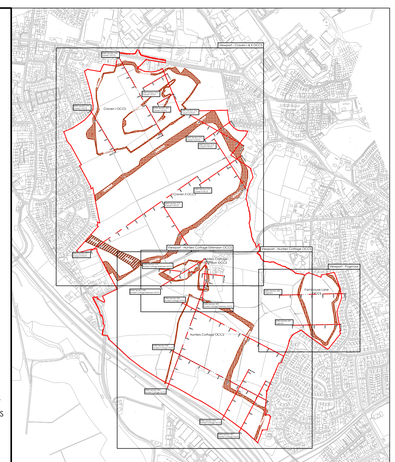
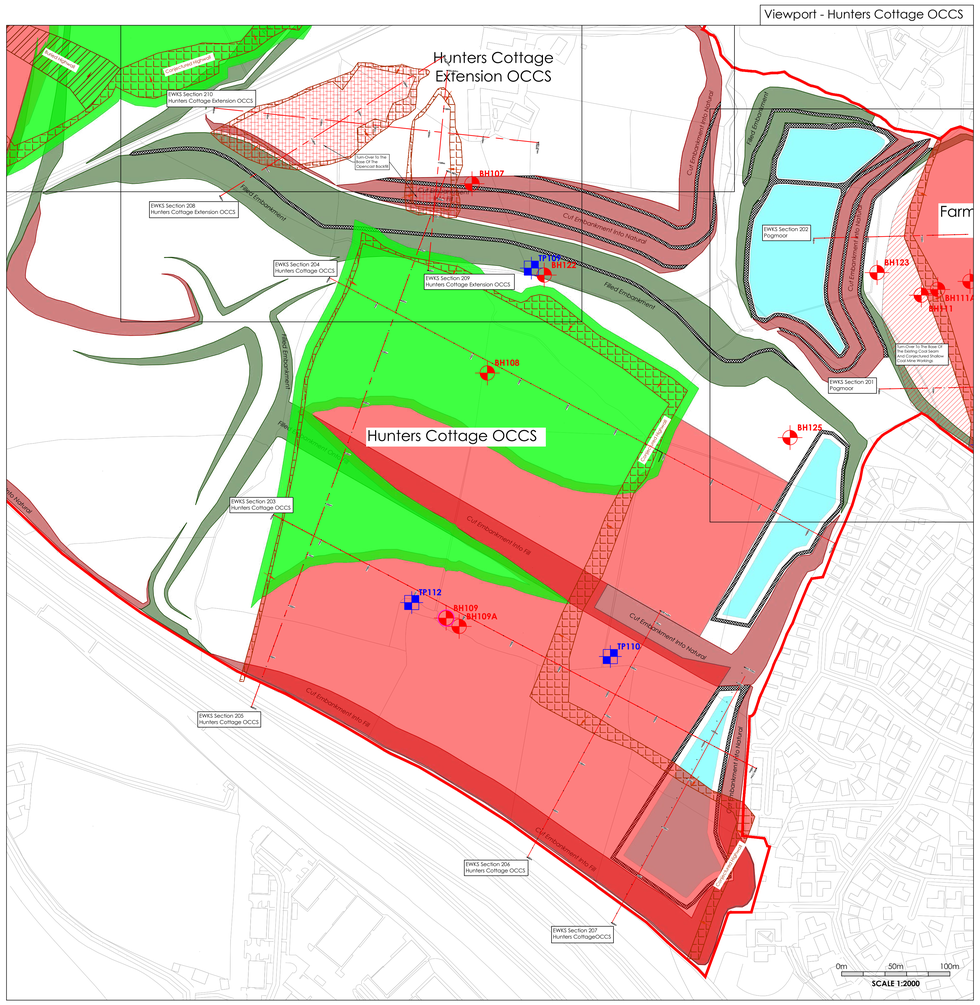


Location Plan



REV	DESCRIPTION	DATE	CHK	BY
P02	UPDATED LEVELS TO ACCOMMODATE FOOTPATHS.	15.04.21	CPH	OLT
P01	FIRST ISSUE.	25.02.21	CPH	OLT

Project
BARNSLEY WEST

Drawing Title
EARTHWORKS REQUIREMENT-
HUNTERS COTTAGE OCCS

PLANNING

JPG
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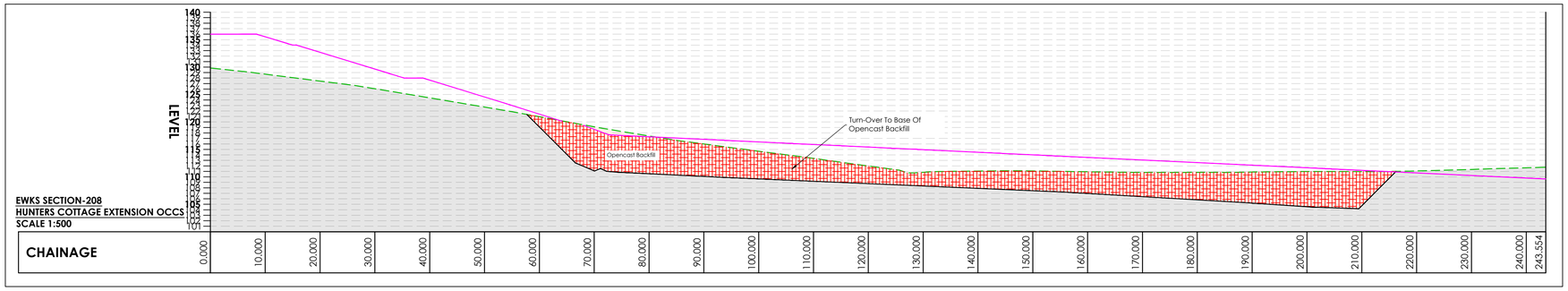
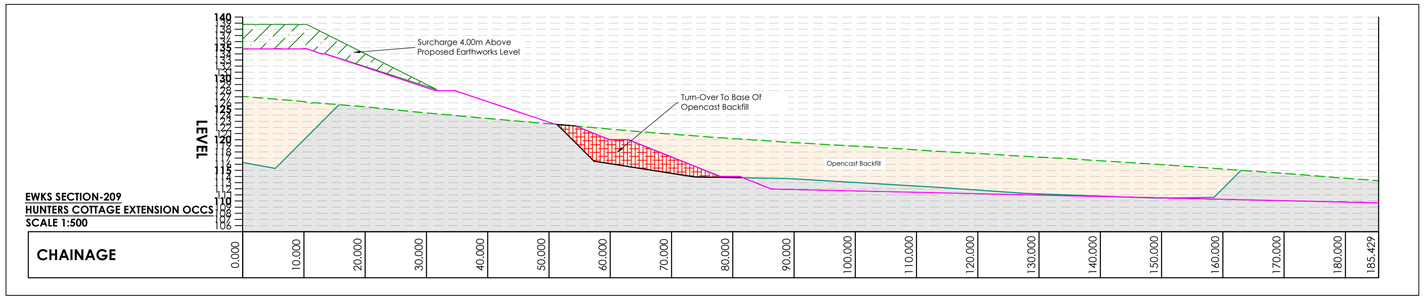
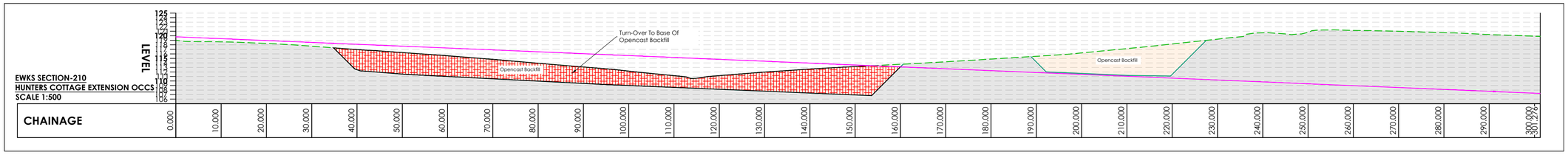
Leeds - 0113 263 1155 | London - 0207 947 4148

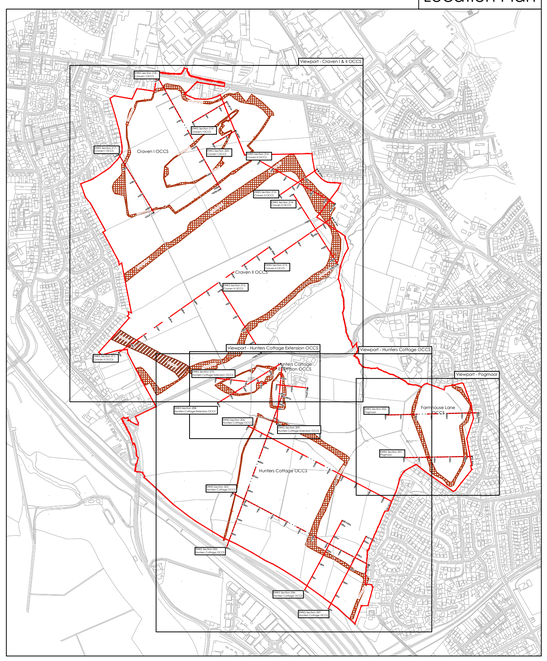
4848-JPG-SW-00-DR-G-1326 | S4 | P02



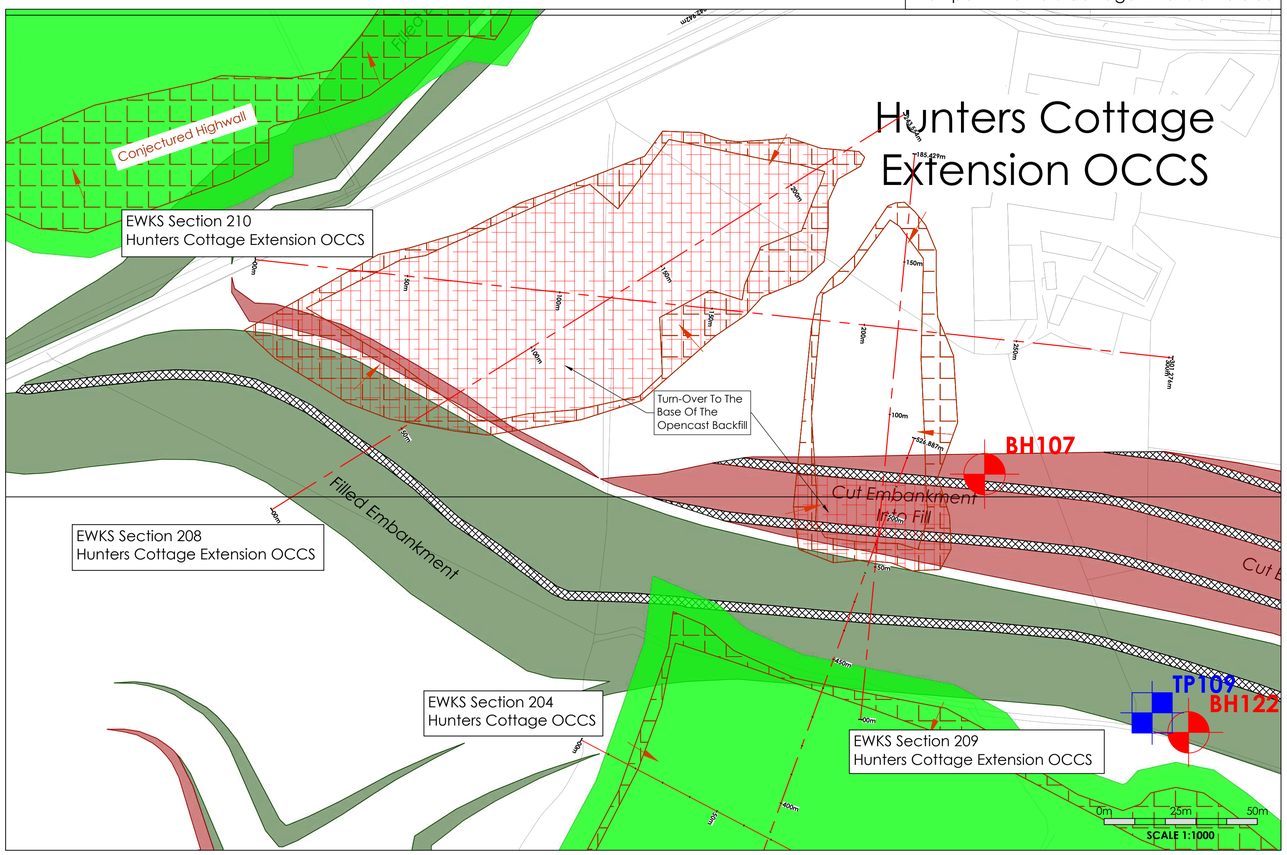




Location Plan



Viewport - Hunters Cottage Extension OCCS



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REV	DESCRIPTION	DATE	CHK	BY
P02	UPDATED LEVELS TO ACCOMMODATE FOOTPATHS.	15.04.21	CPH	OLT
P01	FIRST ISSUE.	25.02.21	CPH	OLT

Project
BARNSLEY WEST

Drawing Title
EARTHWORKS REQUIREMENT-
HUNTERS COTTAGE EXTENSION OCCS

PLANNING

JPG
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4848-JPG-SW-00-DR-G-1327 | S4 | P02

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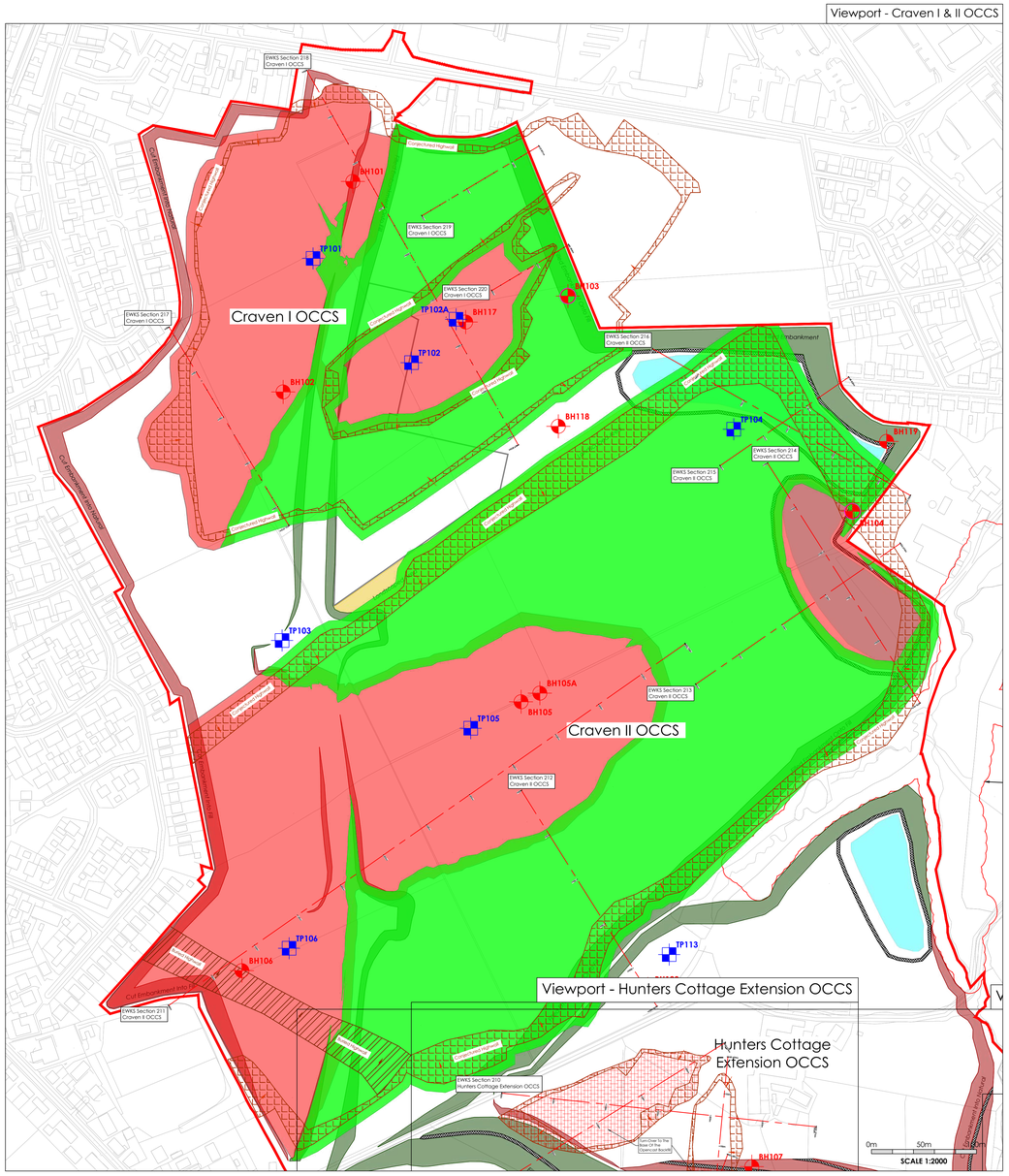
NOTES

Viewport - Craven I & II OCCS


EWKS Section 218
Craven I OCCS
EWKS Section 219
Craven I OCCS
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Craven II OCCS
EWKS Section 213
Craven II OCCS
EWKS Section 212
Craven II OCCS
EWKS Section 211
Craven II OCCS
EWKS Section 219
Hunters Cottage Extension OCCS
Craven I OCCS
Craven II OCCS
Hunters Cottage Extension OCCS
Viewport - Hunters Cottage Extension OCCS
Embankment
Cut Embankment
Connected Highwall
Proposed Highwall
Proposed Highwall Ramp
Proposed Drainage
Cut Embankment Highwall Ramp
Cut Embankment Highwall Ramp
Cut Embankment Highwall Ramp

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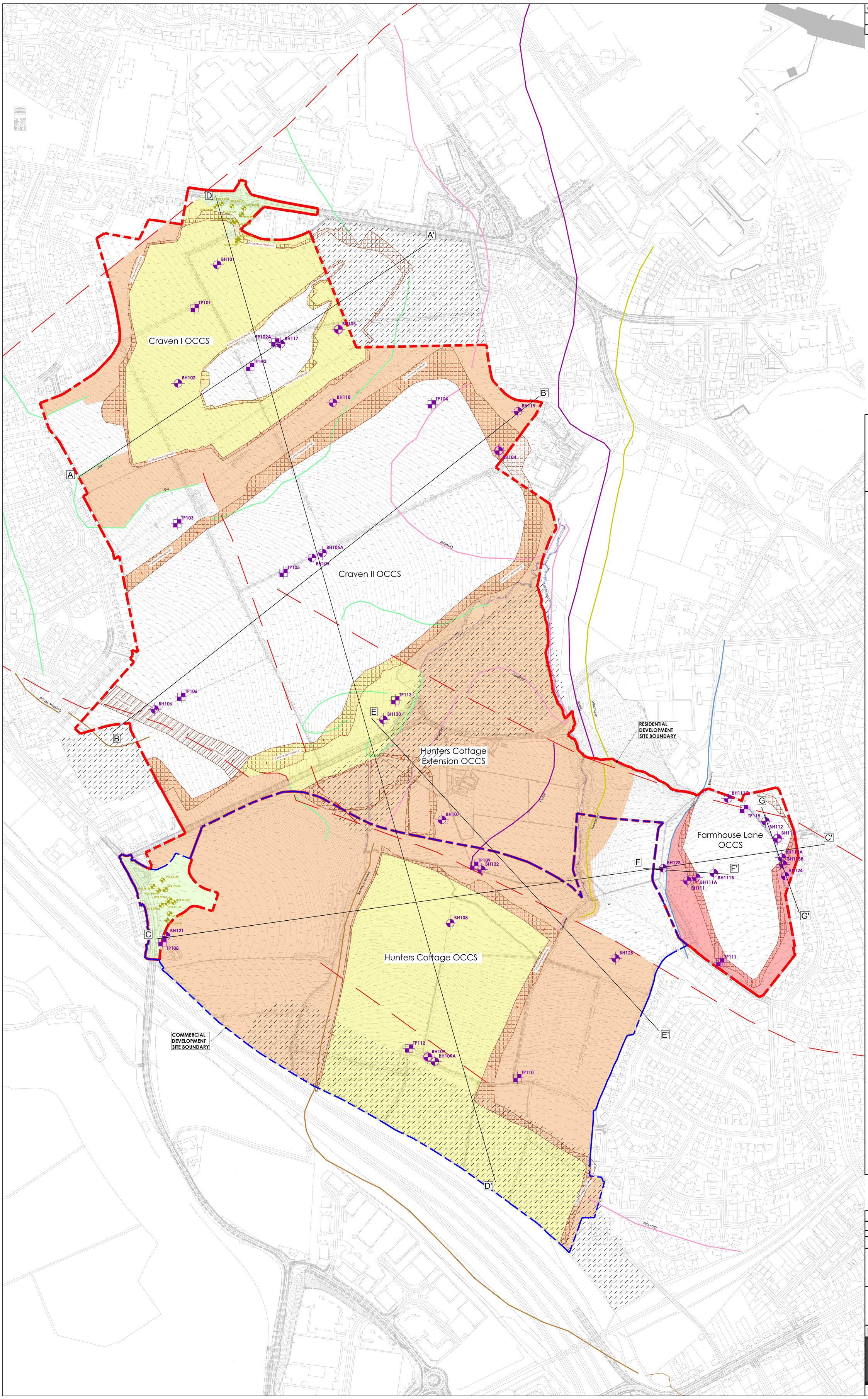

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3. EXTENT OF RISK AREA HAS BEEN GENERATED FROM A CONCEPTUAL GROUND MODEL AND GROUND CONDITIONS MAY DIFFER TO WHAT HAS BEEN SHOWN.
4. PROJECTED SEAM OUTCROPS AND COAL SEAM THICKNESS ARE LIKELY TO DIFFER TO RECORDED INFORMATION. FURTHER SITE INVESTIGATION IS REQUIRED TO CONFIRM.

LEGEND

DENOTES AREAS NOT INCLUDED IN THE SITE INVESTIGATION

DENOTES CONJECTURED HIGHWALL LOCATION
(ARROW INDICATING DIP DIRECTION)

DENOTES CONJECTURED BURIED HIGHWALL LOCATION
(ARROW INDICATING DIP DIRECTION)

SHALLOW COAL MINING RISK LEVELS

VERY LOW RISK
(NO ADDITIONAL SITE INVESTIGATION REQUIRED)

LOW RISK
(PRUDENT TO UNDERTAKE ADDITIONAL SITE INVESTIGATION)

LOW-MODERATE RISK
(FURTHER SITE INVESTIGATION REQUIRED)

MODERATE - HIGH RISK
(REMEDIAL ACTION ANTICIPATED)

PROJECTED HIGHWALLS HAVE BEEN ESTABLISHED USING HISTORICAL OPENCAST MINE ABANDONMENT PLANS:
OE/COMP/O3/311 - CRAVEN I & II, OE/COMP/O3/121 - HUNTERS COTTAGE & EXTENSION, FARM HOUSE LANE COLLIERY- NO. 2 MINE - BARNSLEY BED PILLARS, N.E.415 FARM HOUSE LANE PRIVATE OPENCAST SITE.
FURTHER SITE INVESTIGATION IS REQUIRED TO CONFIRM HIGHWALL LOCATIONS.

AREAS OF POTENTIAL SHALLOW COAL MINE WORKINGS WITHIN INFLUENTIAL DEPTH OF SURFACE LEVEL ARE INDICATED WITHIN THE SITE RED-LINE BOUNDARY ONLY. MAXIMUM RECORDED COAL SEAM THICKNESS USED TO DETERMINE AREA OF RISK. THE MAXIMUM RECORDED COAL SEAM THICKNESS HAS BEEN ESTABLISHED USING JPG 2019 INTRUSIVE SITE INVESTIGATION FINDINGS AND HAVE BEEN STATED IN REPORT REF: '4848-JPG-XX-XX-RP-G-0603-S2-P01- PRELIMINARY GEOTECHNICAL GROUND INVESTIGATION'.
THE MAXIMUM RECORDED COAL SEAM THICKNESS USED ARE AS FOLLOWS (IN SEQUENCE ORDER):
BARNSLEY SEAM: 3.00m
UNNAMED SEAM: 0.70m
DUNSIL SEAM: 0.85m
GAWBER SEAM: 1.00m
THIN SEAM: 0.80m
SWALLOW WOOD SEAM: 1.60m
TOP HAIGH MOOR SEAM: 1.70m
LOW HAIGH MOOR SEAM: 1.90m
LIDGETT SEAM: 1.52m (TAKEN FROM BGS RECORDS)
JOAN SEAM: 0.61m (TAKEN FROM BGS RECORDS)
FLOCKTON THICK SEAM: 2.16m (TAKEN FROM BGS RECORDS)

CONJECTURED FAULT

CONJECTURED BARNSLEY SEAM OUTCROP

CONJECTURED DUNSIL SEAM OUTCROP

CONJECTURED GAWBER SEAM OUTCROP

CONJECTURED THIN SEAM OUTCROP

CONJECTURED SWALLOW WOOD SEAM OUTCROP

CONJECTURED UNNAMED SEAM ABOVE DUNSIL SEAM

COAL SEAM OUTCROPS HAVE BEEN DETERMINED USING BRITISH GEOLOGICAL SURVEY MAP, 1:10,000 SHEET SE30NW (BARNSLEY), OR SEAM OUTCROPS RECORDED IN OCCS ABANDONMENT PLANS WHERE POSSIBLE.

RECORDED MINE ENTRY

RECORDED MINE ENTRY - ADIT

RECORDED MINE WORKINGS ENCOUNTERED DURING OPENCAST EXTRACTION.

ADITS, MINE ENTRIES AND/OR SHALLOW MINE WORKINGS RECORDED IN THIS AREA.
MINING FEATURES MAY STILL EXIST, THE CURRENT STATE OF WHICH IS UNKNOWN.
CAUTION TO BE EXERCISED IN THIS AREA AS OPEN VOID MAY BE PRESENT BELOW GROUND LEVEL. SEEK ADVISE FROM ACTING ENGINEER BEFORE WORKS COMMENCE IN THIS AREA.

JPG GROUP - 2020
(S278 GROUND INVESTIGATION)

BGR_BH101 — ROTARY BOREHOLE LOCATION

HCR_BH101 — ROTARY BOREHOLE LOCATION

BGR_TP101 — TRIAL PIT LOCATION

HCR_TP101 — TRIAL PIT LOCATION

JPG GROUP - 2019
(PRELIMINARY GROUND INVESTIGATION)

BH101 — ROTARY BOREHOLE LOCATION

BH101 — ROTARY BOREHOLE LOCATION
(WITH EXTENSOMETER INSTALLATION)

TP101 — TRIAL PIT LOCATION

0m 2.5m 5m
SCALE 1:100

REV	DESCRIPTION	DATE	CHK	BY
P03	ADDITION OF S278 INVESTIGATIONS.	25.02.21	OLT	OLT
P02	AMENDMENT TO RED-LINE BOUNDARY.	31.07.19	JBW	OLT
P01	FIRST ISSUE.	18.07.19	JBW	OLT

Project
BARNSLEY WEST

Drawing Title
CONCEPTUAL GROUND MODEL - COAL MINING RISK LEVEL ASSESSMENT

INFORMATION ISSUE

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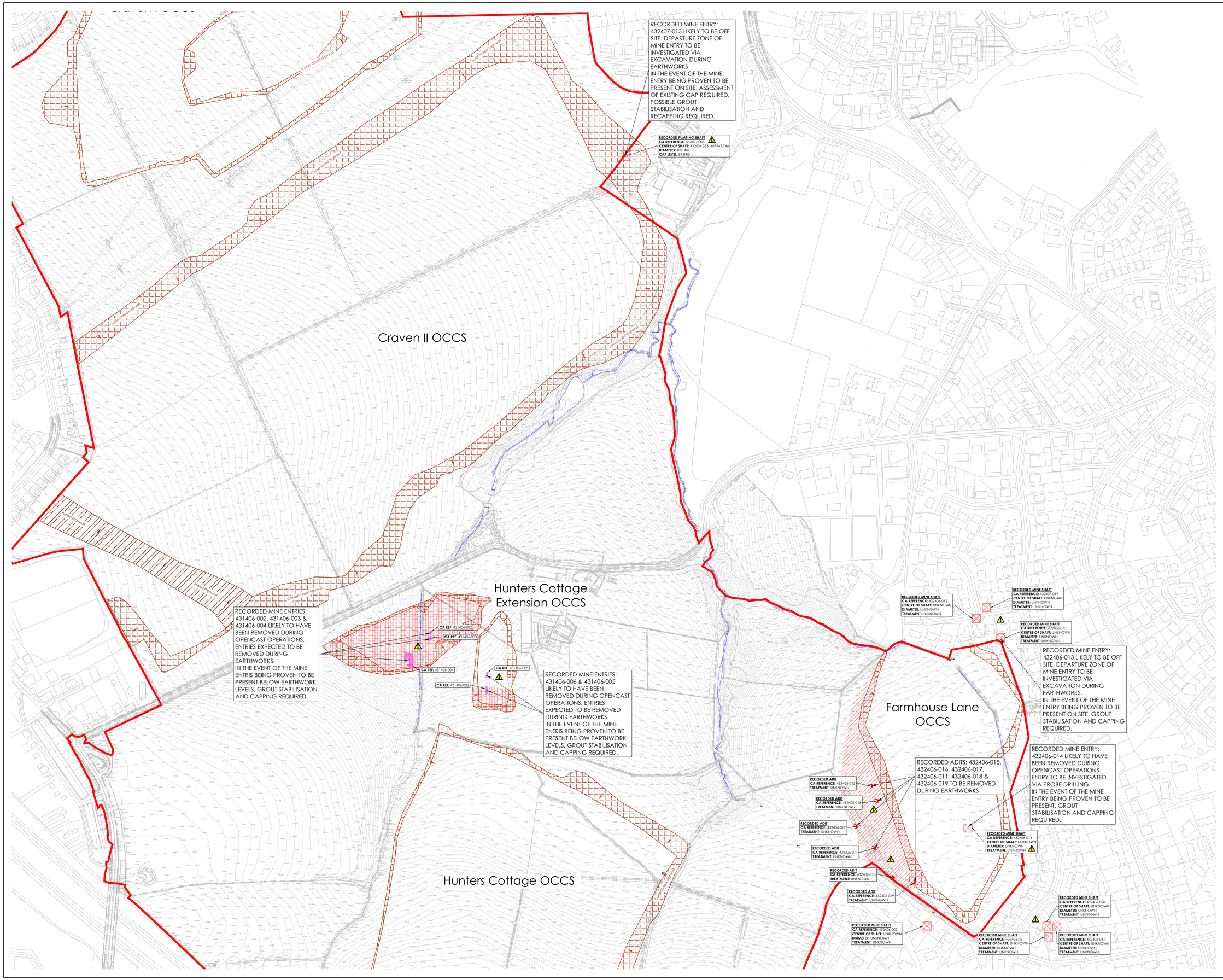
4848-JPG-SW-00-DR-G-1307 | S2 | P03



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NOTES

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3. CONJECTURED EXTENTS OF OPENCAST BACKFILL AND HIGHWALLS HAVE BEEN DETERMINED USING LIMITED SITE INVESTIGATION AND HISTORICAL COAL SEAM EXTRACTION PLANS AND IS SUBJECT TO FURTHER INVESTIGATION.
4. FURTHER SITE INVESTIGATION IS REQUIRED PRIOR TO UNDERTAKING OF EARTHWORKS.

LEGEND

- DENOTES EXTENTS OF ADDITIONAL TURN-OVER (TO THE BASE OF OPENCAST BACKFILL)
- DENOTES EXTENTS OF ADDITIONAL TURN-OVER (TO THE BASE OF COAL SEAM)
- DENOTES CONJECTURED HIGHWALL LOCATION
- CAUTION: THE CURRENT CONDITION OF RECORDED MINE ENTRIES HAS NOT BEEN INVESTIGATED. OPEN VOIDS MAY BE PRESENT BELOW GROUND LEVEL.
- RECORDED MINE SHAFT.
- RECORDED ADIT.
- RECORDED MINE ENTRY NOTED IN HISTORICAL OPENCAST ABANDONMENT PLANS.

0m 50m 100m

SCALE 1:2000

REV	DESCRIPTION	DATE	CHK	BY
P02	PLANNING ISSUE.	25/02/21	CPH	OLT
P01	FIRST ISSUE.	30/04/20	CPH	OLT

Project
BARNSLEY WEST

Drawing Title
EARTHWORKS REQUIREMENT
MINE ENTRY TREATMENT

PLANNING

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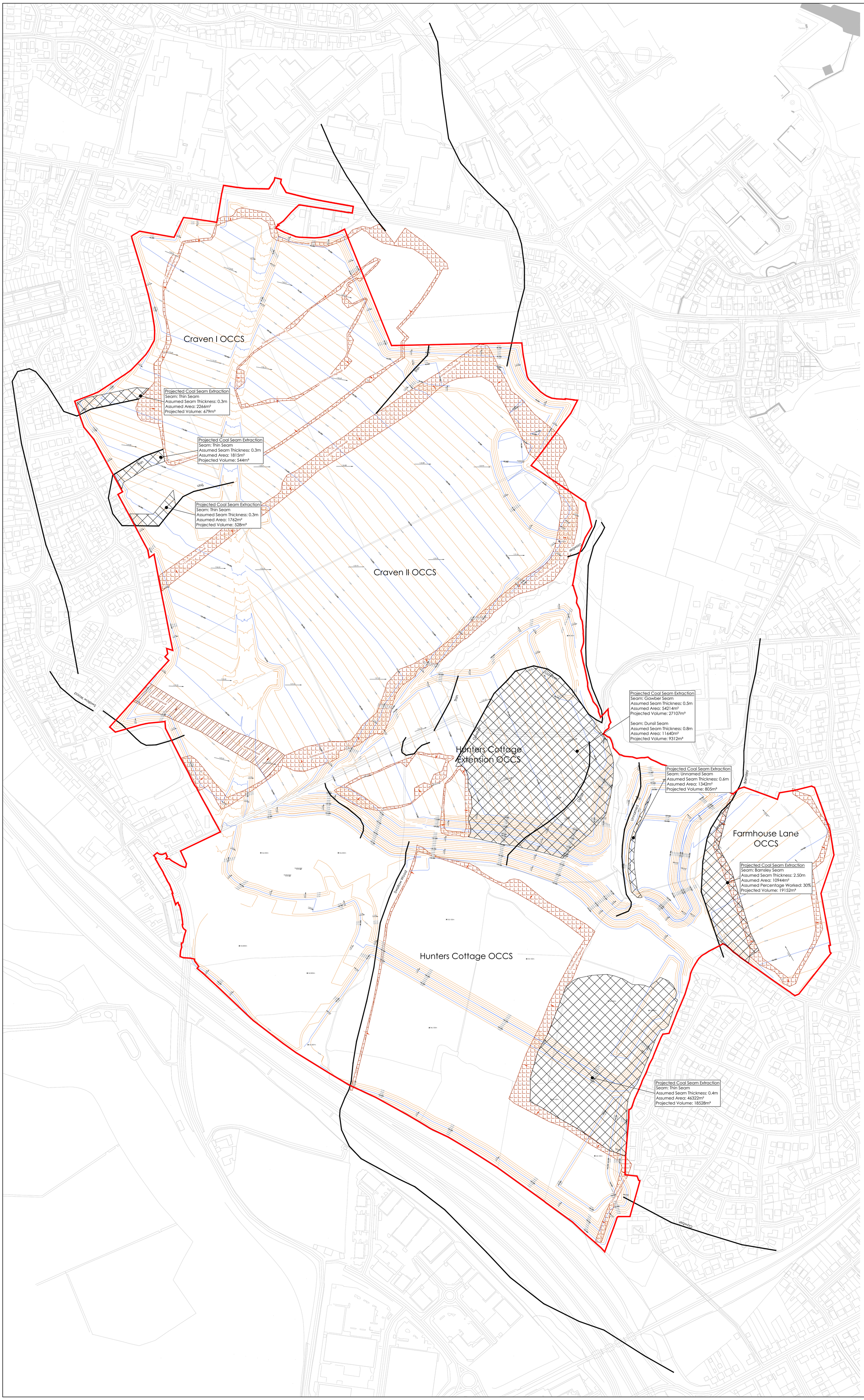
NOTES



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3. VOLUME ESTIMATES HAVE BEEN GENERATED FROM A CONCEPTUAL GROUND MODEL AND GROUND CONDITIONS MAY DIFFER TO WHAT HAS BEEN SHOWN.
4. PROJECTED SEAM OUTCROPS ARE LIKELY TO DIFFER TO RECORDED INFORMATION. SITE INVESTIGATION IS REQUIRED TO CONFIRM INDICATED LOCATIONS.
5. COAL SEAM THICKNESS HAVE BEEN ESTABLISHED USING RECORDED BRITISH GEOLOGICAL SURVEY AND HISTORICAL COAL SEAM EXTRACTION PLAN INFORMATION. THE SEAM THICKNESS IS LIKELY TO VARY LATERALLY WITHIN THE COAL SEAM.

LEGEND

- 0.000 — DENOTES PROPOSED MAJOR CONTOURS
- 0.000 — DENOTES PROPOSED MINOR CONTOURS
- 1:40 — DENOTES PROPOSED GRADIENTS
- DENOTES EXTENTS OF ADDITIONAL TURN-OVER (TO THE BASE OF COAL SEAM)
- DENOTES CONJECTURED HIGHWALL LOCATION (ARROW INDICATING DIP DIRECTION)
- DENOTES CONJECTURED BURIED HIGHWALL LOCATION (ARROW INDICATING DIP DIRECTION)
- Barnsley — DENOTES CONJECTURED COAL SEAM OUTCROP (NAME ON YOUNGING SIDE)

TOTAL ESTIMATED INCIDENTAL COAL VOLUME	76655.000m

0m 50m 100m
SCALE 1:2000

REV	DESCRIPTION	DATE	CHK	BY
P03	UPDATED LEVELS TO ACCOMMODATE FOOTPATHS.	15.04.21	CPH	OLT
P02	AMENDED PROPOSED EARTHWORKS AND UPDATED COAL VOLUMES.	24.02.21	CPH	OLT
P01	FIRST COSTING ISSUE.	30.04.20	CPH	OLT

Project
BARNSLEY WEST

Drawing Title
CONJECTURED INCIDENTAL COAL SEAM EXTRACTION

PLANNING

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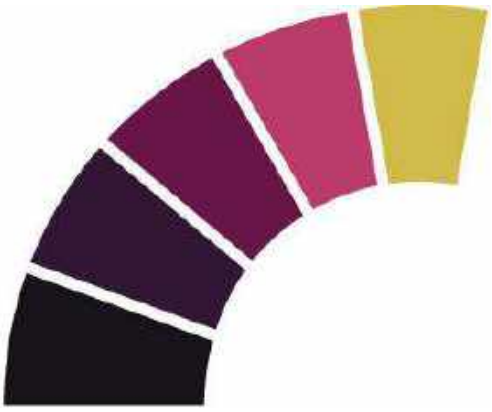
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