

STAIRFOOT BRICKWORKS, WOMBWELL LANE, STAIRFOOT, BARNSELY

FLOOD RISK AND DRAINAGE ASSESSMENT

Final Report v1.2
July 2025

Report Title **Stairfoot Brickworks, Wombwell Lane, Stairfoot, Barnsley**
Flood Risk and Drainage Assessment
Final Report v1.2

Client Axis PED Ltd

Date of issue 30 July 2025

Prepared by Rebecca Murphy BSc (Hons) MCIWEM *Associate Director*
Dan Hodson BEng (Hons) MCIWEM *Senior Engineer*

Checked by Keely Bonser BSc (Hons) MSc PhD MCIWEM *Director*
Tim Brook BSc (Hons) MCIWEM *Technical Director*

Approved by Keely Bonser BSc (Hons) MSc PhD MCIWEM *Director*

This document has been prepared solely as a Flood Risk and Drainage Assessment for Axis PED Ltd. This report is confidential to Axis PED Ltd and Weetwood Services Ltd accepts no responsibility or liability for any use that is made of this document other than by Axis PED Ltd for the purposes for which it was originally commissioned and prepared.

Contents

Signature Sheet	i
Contents	ii
List of Tables, Figures & Appendices	iii
List of Abbreviations	iv
1 Introduction.....	1
1.1 Purpose of Report	1
1.2 Background.....	1
1.3 Structure of the Report	1
1.4 Relevant Documents and Planning Policy	2
1.5 Third Party Surveys, Drawings and Assessments	2
1.6 Explanatory Note on Flood Probability	2
2 Site Details and Proposed Development.....	4
2.1 Site Location	4
2.2 Proposed Development.....	4
2.3 Surface Waterbodies in the Vicinity of the Site.....	5
2.4 Topographic Levels	6
2.5 Ground Conditions	6
3 Planning Policy and Guidance	7
3.1 National Planning Policy and Policy Guidance	7
3.2 Local Planning Policy	8
3.3 Drainage Technical Guidance	9
3.4 Water Framework Directive	10
4 Review of Flood Risk.....	11
4.1 Historical Records of Flooding.....	11
4.2 Flood Risk from the Sea (Tidal / Coastal) and Rivers (Fluvial)	11
4.3 Flood Risk from Small Watercourses and Surface Water (Pluvial)	12
4.4 Flood Risk from Reservoirs, Canals and Other Water Impounding Structures	13
4.5 Flood Risk from Groundwater	14
4.6 Flood Risk Mitigation.....	15
4.7 Flood Risk Elsewhere.....	15
4.8 Flood Risk Sequential Test.....	16
4.9 Exception Test	16
5 Surface Water Management	17
5.1 Surface Water Drainage at the Existing Site.....	17
5.2 Surface Water Drainage at the Developed Site.....	17
6 Summary and Recommendations	19

List of Tables

Table 1:	Greenfield Runoff Rate	17
Table 2:	Maintenance Requirements	18

List of Figures

Figure 1:	Site Location.....	4
Figure 2:	Location of Surface Waterbodies.....	5
Figure 3:	Digital Terrain Model from LiDAR Data.....	6
Figure 4:	Historic Flood Map	11
Figure 5:	Flood Map for Planning (Flood Zones 2 and 3)	12
Figure 6:	Long Term Flood Risk (Surface Water).....	13
Figure 7:	Long Term Flood Risk (Reservoirs)	14
Figure 8:	BGS Susceptibility to Groundwater Flooding Map and JBA Groundwater Flood Risk Indicator Map.....	15

List of Appendices

Appendix A:	Proposed Phasing Plan and Contours
Appendix B:	Topographical Survey
Appendix C:	Greenfield Runoff Calculations
Appendix D:	Preliminary Surface Water Drainage Layout

List of Abbreviations

AEP	Annual Exceedance Probability	ha	Hectare
AOD	Above Ordnance Datum	IDB	Internal Drainage Board
ASGWF	Areas Susceptible to Groundwater Flooding	km	Kilometres
bgl	Below Ground Level	LFRMS	Local Flood Risk Management Strategy
BGS	British Geological Survey	LiDAR	Light Detection and Ranging
BRE	Building Research Establishment	LLFA	Lead Local Flood Authority
BSI	British Standards Institute	LPA	Local Planning Authority
CC	Climate Change	l/s	Litres per Second
CCMA	Coastal Change Management Area	m	Metres
CDA	Critical Drainage Area	m ²	Square Metres
CFMP	Catchment Flood Management Plan	m ³	Cubic Metres
CIRIA	Construction Industry Research and Information Association	NFM	Natural Flood Management
CRT	Canal and River Trust	NGR	National Grid Reference
DEFRA	Department for Environment, Food and Rural Affairs	NPPF	National Planning Policy Framework
EA	Environment Agency	NVZ	Nitrate Vulnerable Zone
FCERM	Flood and Coastal Erosion Risk Management	OS	Ordnance Survey
FFL	Finished Floor Level	PFRA	Preliminary Flood Risk Assessment
FMfP	Flood Map for Planning	PPG	Planning Practice Guidance
FMP	Flood Management Plan	QBAR	Mean annual maximum flow rate
FRA	Flood Risk Assessment	QMED	Median annual maximum flow rate
FRDA	Flood Risk and Drainage Assessment	RBD	River Basin District
FRDSA	Flood Risk, Drainage and Sequential Assessment	RBMP	River Basin Management Plan
FRMP	Flood Risk Management Plan	RFI	Request for Information (to the EA)
FRSA	Flood Risk and Sequential Assessment	RMA	Risk Management Authority
FRSSA	Flood Risk Sequential Site Assessment	RoFSW	Risk of Flooding from Surface Water
FWA	Flood Warning Area	SAC	Special Area of Conservation
FWEP	Flood Warning and Evacuation Plan	SFRA	Strategic Flood Risk Assessment
FWMA	Flood and Water Management Act	SMP	Shoreline Management Plan
FWS	Flood Warning System	SoP	Standard of Protection
GSPZ	Groundwater Source Protection Zone	SSSI	Site of Special Scientific Interest
		SuDS	Sustainable Drainage System
		SWMP	Surface Water Management Plan
		WFD	Water Framework Directive

1 INTRODUCTION

1.1 Purpose of Report

Weetwood Services Ltd ('Weetwood') has been instructed by Axis PED Ltd on behalf of Green Earth Development (Group) Ltd ("the applicant") to prepare a FRDA report to accompany a full planning application submitted to Barnsley Metropolitan Borough Council (BMBC) for the restoration of Yew Tree Quarry ("the application site") at the Stairfoot Brickworks, Wombwell Lane, Stairfoot, Barnsley.

The assessment has been undertaken in accordance with the requirements of the NPPF and PPG.

1.2 Background

The former Stairfoot Quarry complex is circa 23.3 ha of land comprising a series of former clay pits used for the manufacture of bricks. The quarry was developed for clay extraction purposes incrementally across four primary areas: the North Quarry, South Quarry and Yew Tree Quarry, Marine Band Quarry and Area 3 Quarry (also referred to as 'Area B').

Historically Stairfoot Quarry has been restored (either in part or in entirety) using imported material as well as mineral waste from on site, with the current state of the Quarry described as 'semi-restored'.

The public planning files for the site are limited in their coverage, consequently certain documentation appears to be missing from the historical records.

The original planning permission for Stairfoot Quarry is Ref. B/93/0247/BA, granted 25 November 1993 for the "*Determination of Conditions on an Interim Development Order Permission - Winning of Minerals, Stairfoot Quarry*".

Planning permission was subsequently granted in October 2007 under Section 73 of the Town and Country Planning Act 1990 for the: "*Variation of Condition 1 of planning permission B/93/0247/BA to extend extraction and restoration period*" (Ref. 2007/1069). Consequently, upon implementation planning permission 2007/1069 became the 'operative' permission for the majority of working and restoration at Stairfoot Quarry (except for Area 3).

The 2007/1069 permission required mineral extraction and restoration of the site to be completed to the satisfaction of the Mineral Planning Authority (MPA) by 10 June 2016.

In January 2008 Hanson Building Products submitted a document entitled "5-Year Restoration and Aftercare Scheme for North Quarry, Stairfoot" (Ref. 031/C17/R/00-122(V2)) to BMBC, which was approved in November 2008. This area appears to have been restored in broad accordance with the approved scheme, with an existing surface waterbody resulting from historical quarrying activities remaining.

A further SLR Consulting Ltd document is on public file entitled "Initial Restoration and Outline Aftercare Scheme - May 2011". The document states that it was submitted pursuant to restoration and aftercare conditions on the planning permissions B/93/0247/BA (the Interim Development Order - albeit this should have referenced 2007/1069, which superseded the former). This included a restoration scheme for Yew Tree Quarry; however, the scheme was never discharged and therefore implemented.

Extraction at the site ceased over 10 years ago and there are no extant planning permissions or approved restoration schemes. However, the land is now owned by the applicant, who has a Habitat Management and Monitoring Plan agreed and is currently progressing a conservation covenant for the establishment of the Stairfoot Habitat Bank which commenced trading of offset biodiversity units in January 2025.

1.3 Structure of the Report

The report is structured as follows:

Section 1 Introduction and report structure

Section 2 Provides background information relating to the development site

Section 3 Presents national and local flood risk and drainage planning policy

Section 4 Assesses the potential risk of flooding to the development site

Section 5 Presents an illustrative surface water drainage scheme

Section 6 Presents a summary of key findings and the recommendations

1.4 Relevant Documents and Planning Policy

The assessment has been informed by the following documents, policy and information:

- Non-Statutory National Standards for Sustainable Drainage Systems, DEFRA, 19 June 2025, <https://www.gov.uk/government/publications/national-standards-for-sustainable-drainage-systems/national-standards-for-sustainable-drainage-systems-suds>;
- National Planning Policy Framework, Ministry of Housing, Communities and Local Government, Updated 12 December 2024, <https://www.gov.uk/government/publications/national-planning-policy-framework--2>;
- Preparing a Flood Risk Assessment - Standing Advice, EA, Updated 23 August 2024, <https://www.gov.uk/guidance/flood-risk-assessment-standing-advice>;
- Using Modelling for Flood Risk Assessments, EA, 12 December 2023, <https://www.gov.uk/guidance/using-modelling-for-flood-risk-assessments#when-to-consider-using-modelling>
- Planning Policy Guidance Section 7 - Flood Risk and Coastal Change, Ministry of Housing, Communities and Local Government, Updated on 25 August 2022, <https://www.gov.uk/guidance/flood-risk-and-coastal-change>;
- Flood Risk Assessments - Climate Change Allowances, Government, Updated 27 May 2022, <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>;
- Barnsley Local Plan, BMBC, July 2019
- Local Flood Risk Management Strategy, BMBC, September 2017
- The SuDS Manual (C753), CIRIA, December 2015;
- Preliminary Flood Risk Assessment, BMBC, July 2011;
- Level 1 Strategic Flood Risk Assessment, BMBC, September 2010;
- HR Wallingford Greenfield Runoff Tool, www.uksuds.com;
- Soilscales, Soil and AgriFood Institute, Cranfield University, www.landis.org.uk/soilscales;
- National Geoscience Data Centre's Single Onshore Borehole Index, <https://www.bgs.ac.uk/products/onshore/SOBI.html>;
- BGS Mapping of Surface Geology, <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/>;
- MAGIC, Natural England, <https://magic.defra.gov.uk/>.

1.5 Third Party Surveys, Drawings and Assessments

The assessment has been informed by the following third party surveys, drawings and assessments:

- Phasing Plan, Axis, Ref.2363-01-SK002, October 2024 (**Appendix A**); and
- Topographical Survey, Malcolm Hughes - Survey undertaken in May 2024 (**Appendix B**).

1.6 Explanatory Note on Flood Probability

This report refers to the likelihood of a flood event occurring in terms of an AEP expressed as a percentage. This terminology is consistent with the definition of flood zones presented in Table 1 of the PPG (refer to **Section 4.2** of this report).

The AEP is the reciprocal of the return period which describes the rarity of an event in terms of its statistical reoccurrence interval in years. For example, a '1 in 30 year flood' has a $1/30 = 0.033$ (3.3%) probability of occurring in any one year, whilst a '1 in 100 year flood' has a $1/100 = 0.010$ (1.0%) probability of occurring in any one year.

AEP	AEP (expressed as a %)	Return Period (years)	Alternative Expression
1.000	100.0%	1	1 in 1
0.500	50.0%	2	1 in 2
0.435	43.5%	2.3	1 in 2.3
0.100	10.0%	10	1 in 10
0.050	5.0%	20	1 in 20
0.033	3.3%	30	1 in 30
0.020	2.0%	50	1 in 50
0.010	1.0%	100	1 in 100
0.005	0.5%	200	1 in 200
0.001	0.1%	1,000	1 in 1,000

2 SITE DETAILS AND PROPOSED DEVELOPMENT

2.1 Site Location

The circa 23.3 ha former Stairfoot Quarry complex is located approximately 2.0 km from the centre of Barnsley on the eastern edge of the town at OS NGR SE 381 051, as shown in **Figure 1**. The application site comprises Yew Tree Quarry, which is approximately 5.1 ha.

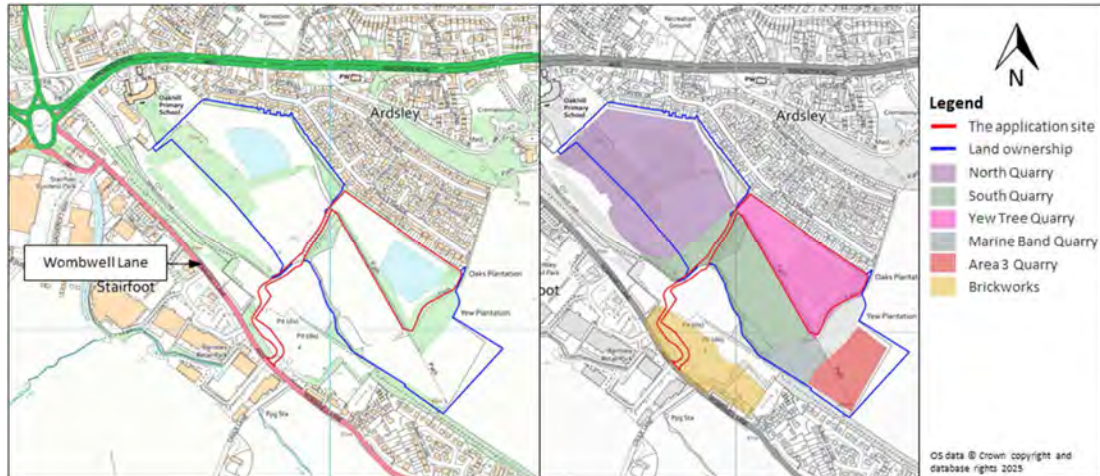


Figure 1: Site Location

2.2 Proposed Development

The proposed development comprises the comprehensive restoration of Yew Tree Quarry delivering biodiversity benefits and removing health and safety risks associated with the existing surface waterbody on the site.

The proposals include re-engineering of the landform of the application site through the importation of circa 400,000 m³ of non-hazardous soil materials (including construction, demolition and excavation material) and the introduction of a new restoration scheme. The proposed restoration scheme will include grassland species and shrub boundary planting.

In developing a restoration concept that delivers an appropriate level of Biodiversity Net Gain (BNG) i.e. development of the land so that it leaves biodiversity and ecological habitat in a measurably better state than before the development took place; the applicant is also looking to ensure that the restored site provides the opportunity for improved public access.

The applicant has a Habitat Management and Monitoring Plan agreed and is currently progressing a conservation covenant for the establishment of the Stairfoot Habitat Bank which commenced trading of offset biodiversity units in January 2025. The Habitat Bank will support off-site, third-party developments within the BMBC area and the wider Nottinghamshire, Derbyshire and Yorkshire Coalfield National Character Area.

The proposed development will require the construction of a *temporary* site compound which would include a wheelwash, parking and welfare facilities.

Access to the application site would be provided via the historical access into the former brickworks off Wombwell Lane.

The proposed phasing plan, which also illustrates the proposed contours is provided in **Appendix A**.

The NPPF classifies amenity open space, nature conservation and biodiversity uses as Water Compatible development.

2.3 Surface Waterbodies in the Vicinity of the Site

The River Dearne and River Dove flow east approximately 1.1 km to the north and 725 m to the south-east of the application site respectively.

Dob Sike flows north-east and then south-east approximately 100 m to the south-west of the application site (at its nearest point), outfalling to the River Dove. A tributary of Dob Sike flows south approximately 375 m to the west of the application site.

A number of drainage ditches are located to the east/south-east of the application site (approximately 750 m at their nearest point) and also outfall to the River Dove.

The River Dearne and River Dove downstream of Wombwell Lane/Barnsley Road are designated main river. Upstream of Wombwell Lane/Barnsley Road, the River Dove and a short section (circa 850 m) of Dob Sike falls under the jurisdiction of the Danvm Drainage Commissioners IDB (**Figure 2**). The remaining watercourse/drainage ditches are classified as ordinary watercourse.

An existing surface waterbody is located on the application site resulting from the historical quarrying activities. A surface waterbody is also located approximately 150 m to the north-west within the North Quarry and approximately 100 m to the south in the Marine Band Quarry.

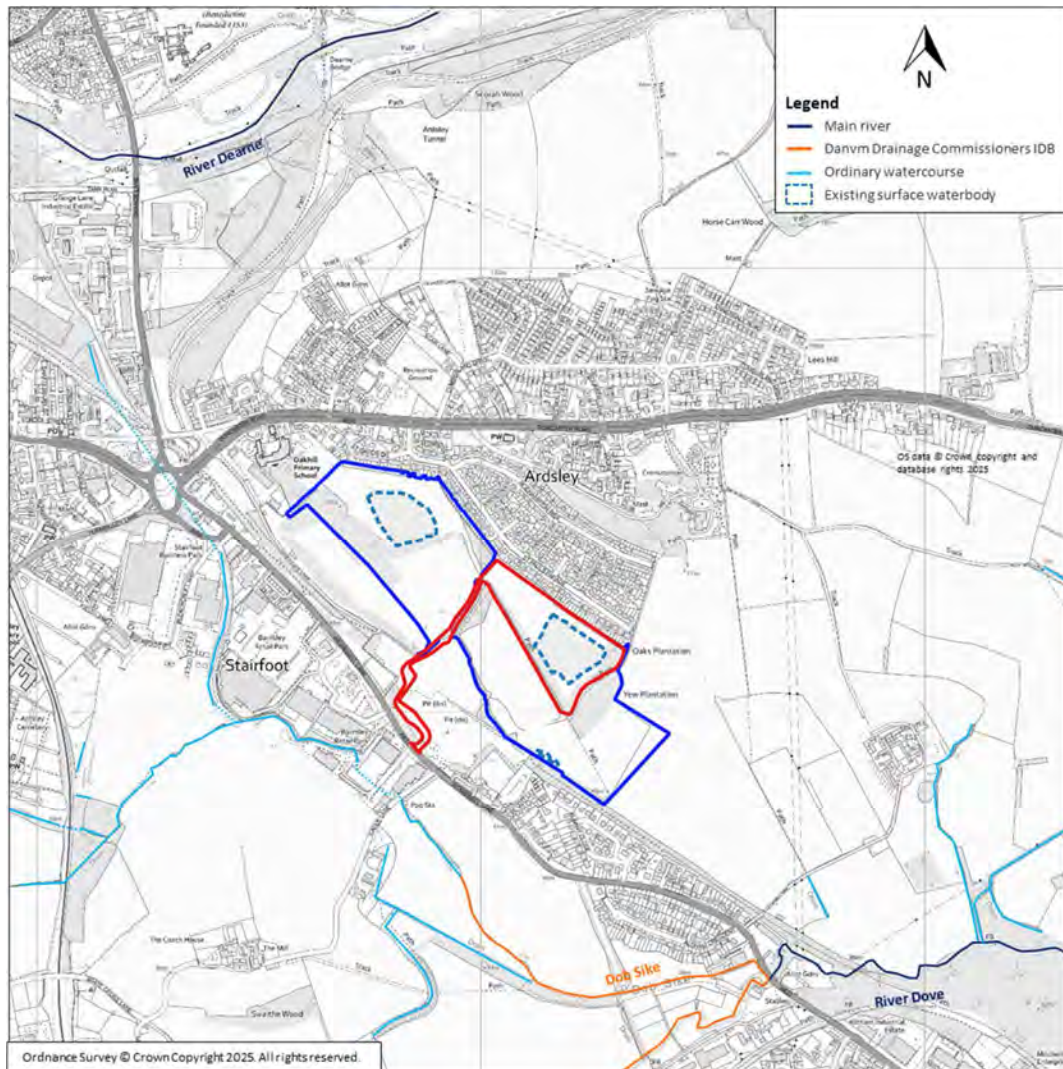


Figure 2: Location of Surface Waterbodies

2.4 Topographic Levels

A topographical survey of Stairfoot Quarry has been undertaken by Malcolm Hughes (**Appendix B**) and LiDAR data has been used to develop a digital terrain model of the site and surrounding area as illustrated in **Figure 3**.

Existing ground levels within Yew Tree Quarry are indicated to be in the region of circa 61.0 - 65.0 m AOD around the periphery, falling to circa 52.9 m AOD in the vicinity of the existing surface waterbody.

Ground levels on the internal access road are indicated to be in the region of 47.0 - 60.5 m AOD, falling to the south towards Wombwell Road.

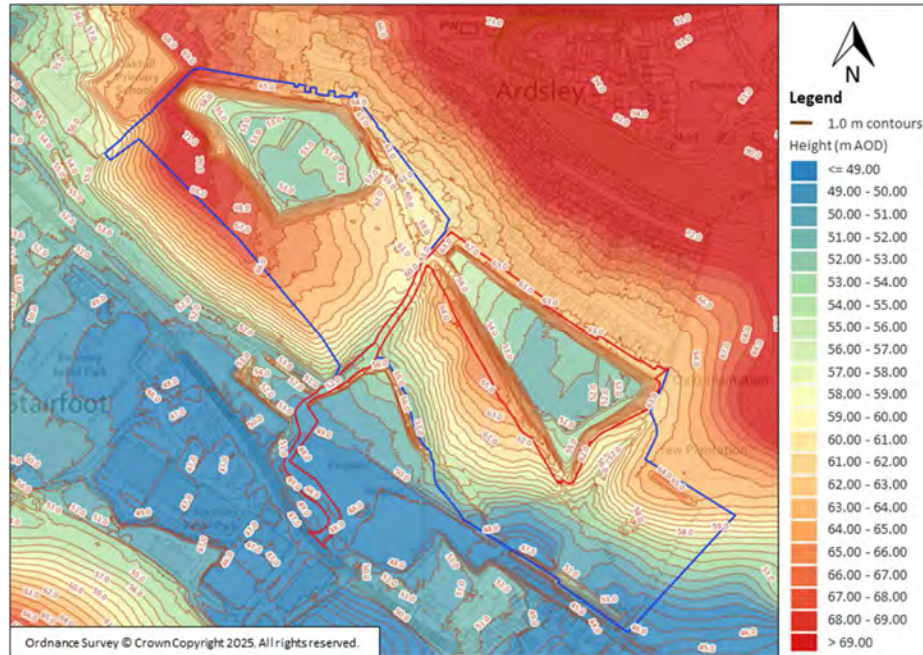


Figure 3: Digital Terrain Model from LiDAR Data

2.5 Ground Conditions

According to the Soilsapes soils dataset produced by the Cranfield Soil and AgriFood Institute¹, soil conditions at the application site and within the surrounding area are described as slowly permeable loamy and clayey soils with impeded drainage.

BGS mapping of surface geology² indicates the underlying bedrock formation predominately comprises Ackton Rock - Sandstone, with Pennine Middle Coal Measures Formation - Mudstone, Siltstone and Sandstone to the north and south. No superficial deposits are recorded at the application site.

According to the MAGIC website³ the bedrock is classified as a Secondary A aquifer. The site is not shown to be located within a designated GSPZ.

¹ www.landis.org.uk/soilsapes/

² <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/>

³ <https://magic.defra.gov.uk/MagicMap.aspx>

3 PLANNING POLICY AND GUIDANCE

3.1 National Planning Policy and Policy Guidance

The thrust of national planning policy, as articulated in the NPPF is that inappropriate development in areas at risk of flooding should be avoided where possible, as summarised below:

- Inappropriate development in areas at risk of flooding should be avoided and that development should be directed away from areas at highest risk (whether existing or future), but where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere (NPPF para. 170).
- A sequential risk-based approach should be taken to individual applications in areas known to be at risk now or in the future from any form of flooding (NPPF para. 173). The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites, appropriate for the proposed development in areas with a lower risk of flooding (NPPF para. 174).
- The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk) (NPPF para. 175).
- Applications for some minor development and changes of use should also not be subject to the sequential, nor the exception test (NPPF para. 176), but should still meet the requirements for site-specific flood risk assessments set out in footnote 63.
- Having applied the Sequential Test, if it is not possible for development to be located in zones with a lower risk of flooding (taking into account wider sustainable development objectives) the Exception Test may have to be applied. The need for the test will depend on the potential vulnerability of the site and of the development proposed (as set out in Annex 3 of NPPF; also PPG Table 2) (NPPF para. 177). For example, the Exception Test need not be applied for less vulnerable development in any flood zone, or for more vulnerable development in flood zones 1 or 2.
- Where the Exception Test must be applied, application of the test for development proposals at the application stage should be informed by a site-specific flood risk assessment. For the test to be passed it should be demonstrated that: (a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; (b) and the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall (NPPF para. 178). Both elements of the test should be satisfied for the development to be permitted (NPPF para. 179).
- A site-specific flood risk assessment should be provided for all development in flood zones 2 and 3 [whilst] in flood zone 1, an assessment should accompany all proposals involving: sites of 1 ha or more; land which has been identified by the EA as having critical drainage problems; land identified in a SFRA as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use (NPPF para. 181).
- Development should not increase flood risk elsewhere (NPPF para. 181).
- Development should only be allowed in areas at risk of flooding where the flood risk assessment (and the sequential and exception tests, as applicable), demonstrate that: a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location; b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment; c) the development incorporates SuDS, unless there is clear evidence that this would be inappropriate; d) any residual (flood) risk can be safely managed; and e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan (NPPF para. 181).
- Applications which could affect drainage on or around the site should incorporate SuDS to control flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible, through facilitating improvements in water quality and biodiversity, as well as benefits for amenity. SuDS provided as part of proposals for major development should: a) take account of advice from the LLFA; b) have

appropriate proposed minimum operational standards; and c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development (NPPF para. 182).

Guidance on application of the sequential and exception test is provided in the PPG - Flood Risk and Coastal Change. For example:

- The approach is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. This means avoiding, so far as possible, development in current and future (i.e. taking climate change into account) medium and high flood risk areas considering all sources of flooding including areas at risk of surface water flooding (PPG para. 7-023).
- Where it is not possible to locate development in low risk areas, the Sequential Test should go on to compare reasonably available sites within medium risk areas and then, only where there are no reasonably available sites in low and medium risk areas, within high risk areas (PPG para. 7-024).
- Initially, the presence of existing flood risk management infrastructure should be ignored, as the long-term funding, maintenance and renewal of this infrastructure is uncertain. Climate change will also impact upon the level of protection infrastructure will offer throughout the lifetime of development (PPG para. 7-024).
- The Sequential Test should be applied to 'Major' and 'Non-major development' proposed in areas at risk of flooding, but it will not be required where; the site has been allocated for development and subject to the test at the plan making stage (provided the proposed development is consistent with the use for which the site was allocated and provided there have been no significant changes to the known level of flood risk to the site, now or in the future which would have affected the outcome of the test); the site is in an area at low risk from all sources of flooding, unless the SFRA, or other information, indicates there may be a risk of flooding in the future; the application is for a development type that is exempt from the test, as specified in [footnote 62] of the NPPF (PPG para. 7-027).
- For individual planning applications subject to the Sequential Test, the area to apply the test will be defined by local circumstances relating to the catchment area for the type of development proposed. For some developments this may be clear, for example, the catchment area for a school. In other cases, it may be identified from other Plan policies. For example, where there are large areas in Flood Zones 2 and 3 (medium to high probability of flooding) and development is needed in those areas to sustain the existing community, sites outside them are unlikely to provide reasonable alternatives. Equally, a pragmatic approach needs to be taken where proposals involve comparatively small extensions to existing premises (relative to their existing size), where it may be impractical to accommodate the additional space in an alternative location. For nationally or regionally important infrastructure the area of search to which the Sequential Test could be applied will be wider than the LPA boundary (PPG para. 7-027).
- 'Reasonably available sites' are those in a suitable location for the type of development with a reasonable prospect that the site is available to be developed at the point in time envisaged for the development. These could include a series of smaller sites and/or part of a larger site if these would be capable of accommodating the proposed development. Such lower-risk sites do not need to be owned by the applicant to be considered 'reasonably available' (PPG para. 7-028).
- The Exception Test should only be applied as set out in Table 2 [of the PPG ("Flood Risk Vulnerability and Flood Zone Incompatibility")] and only if the Sequential Test has shown that there are no reasonably available, lower risk sites, suitable for the proposed development, to which the development could be steered (PPG para. 7-032).

3.2 Local Planning Policy

The Barnsley Local Plan was adopted by BMBC in July 2019. The following policies are relevant in respect of flood risk and drainage:

Policy CC1 Climate Change states, in part that the Council "*will seek to reduce the causes of and adapt to the future impacts of climate change by...Locating and designing development to reduce the risk of flooding; Promoting the use of [SuDS]...*".

Policy CC3 Flood Risk

The extent and impact of flooding will be reduced by:

Not permitting new development where it would be at an unacceptable risk of flooding from any sources of flooding, or would give rise to flooding elsewhere;

Ensuring that in the Functional Floodplain (Flood Zone 3b), only water compatible development or essential infrastructure (subject to the flood risk exception test) will be allowed. In either case it must be demonstrated that there would not be a harmful effect on the ability of this land to store floodwater;

Requiring developers with proposals in Flood Zones 2 and 3 to provide evidence of the sequential test and exception test where appropriate;

Requiring site-specific [FRAs] for proposals over 1 hectare in Flood Zone 1 and all proposals in Flood Zones 2 and 3;

Expecting proposals over 1000 m² floor space or 0.4 hectares in Flood Zone 1 to demonstrate how the proposal will make a positive contribution to reducing or managing flood risk; and

Expecting all development proposals on brownfield sites to reduce surface water run-off by at least 30% and development on greenfield sites to maintain or reduce existing run-off rates requiring development proposals to use [SuDS] in accordance with policy CC4; and

Using flood resilient design in areas of high flood risk.

Policy CC4 Sustainable Drainage Systems (SuDS)

All major development(will be expected to use [SuDS] to manage surface water drainage, unless it can be demonstrated that all types of SuDS are inappropriate.

The Council will also promote the use of SuDS on minor development.

To enable the Council to determine the suitability of a proposed SuDS scheme:

Outline Planning applications must be supported by a conceptual drainage plan and SuDS design statement; and

Detailed Planning applications must be supported by a detailed drainage plan and SuDS design statement, which should contain information on how the SuDS will operate, be managed and maintained for the lifetime of the development.

Policy CC5 Water Resource Management

To conserve and enhance the Boroughs water resources proposals will be supported which:

- a. Do not result in the deterioration of water courses and which conserve and enhance:

 - i. The natural geomorphology of water courses;*
 - ii. Water quality; and*
 - iii. The ecological value of the water environment, including watercourse corridors.**
- b. Make positive progress towards achieving “good” status or potential under the [WFD] in the boroughs surface and ground water bodies;*
- c. Manage water demand and improve water efficiency through appropriate water conservation techniques including rainwater harvesting and grey-water recycling; and*
- d. Dispose of surface water appropriately and improve water quality through the incorporation of SuDS, in accordance with Policy CC4.*

3.3 Drainage Technical Guidance

Non-statutory technical standards for sustainable drainage published by DEFRA in June 2025 set out how surface water runoff generated during the 50.0%, 3.3% and 1.0% AEP rainfall events should be managed, how peak runoff rates should be restricted, how water quality measures should be implemented, how amenity and biodiversity should be used in SuDS and how maintenance and management plans shall be considered.

3.4 Water Framework Directive

The WFD provides a legal framework for the protection, improvement and sustainable use of inland surface waters, groundwater, transitional waters, and coastal waters across England, and seeks to:

- Prevent deterioration in the status of surface water and groundwater bodies;
- Protect, enhance and restore surface water and groundwater bodies (except artificial or heavily modified water bodies) with the aim of achieving good ecological, chemical and groundwater quantitative status by December 2021;
- Protect and enhance artificial and heavily modified water bodies with the aim of achieving good ecological potential and good chemical status by December 2021;
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment and progressively reduce pollution of groundwater.

The WFD applies to any proposed development which has the potential to impact on a waterbody. Where this is the case, the EA may require evidence demonstrating that the proposed development does not compromise the aims of the WFD.

4 REVIEW OF FLOOD RISK

4.1 Historical Records of Flooding

The EA Historic Flood Map⁴ (refer to extract in **Figure 4**) indicates that there is one recorded incident of surface water flooding at the application site in June 2007, with two further incidents in the wider former Stairfoot Quarry complex. These are consistent with the location of the existing surface waterbodies present on site, as identified on the topographical survey (refer to **Appendix B**), apart from the incident in Marine Band Quarry which appears to have been restored between 2008 and 2009.

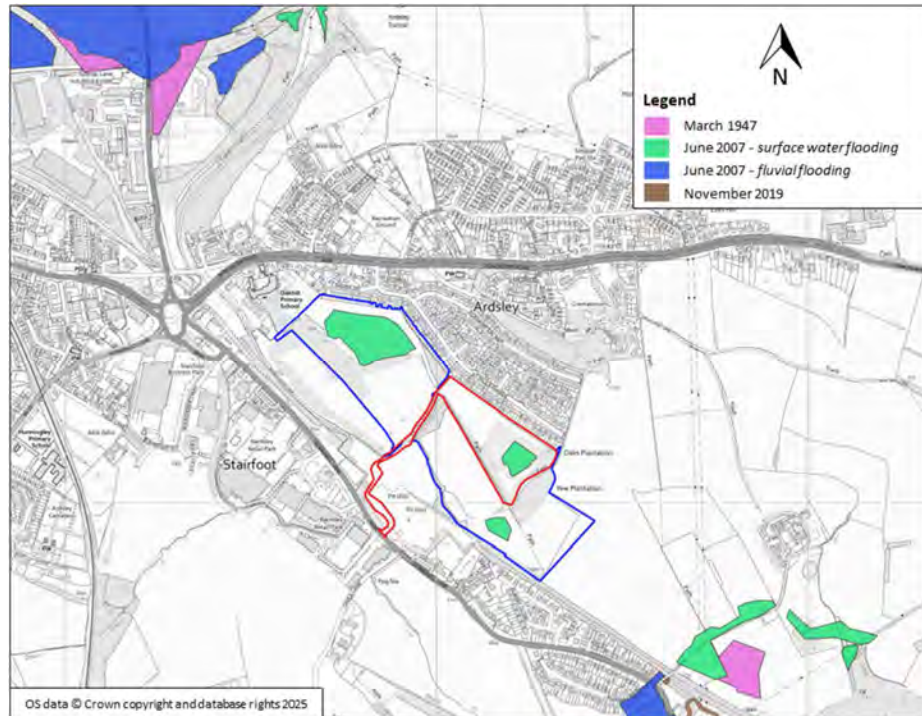


Figure 4: Historic Flood Map

Source: gov.uk website; Accessed: June 2025

4.2 Flood Risk from the Sea (Tidal / Coastal) and Rivers (Fluvial)

The EA FMfP (Flood Zones 2 and 3) dataset⁵ (**Figure 5**) indicates the application site to be located in flood zone 1.

Table 1 of the PPG defines flood zones as follows:

- Flood zone 1: Low Probability. Land having a less than 0.1% annual probability of river or sea flooding
- Flood zone 2: Medium Probability. Land having between a 1.0% and 0.1% annual probability of river flooding or between a 0.5% and 0.1% annual probability of sea flooding
- Flood zone 3a: High Probability. Land having a 1.0% or greater annual probability of river flooding or a 0.5% or greater annual probability of sea flooding
- Flood zone 3b: Functional Floodplain. Land where water from rivers or the sea has to flow or be stored in times of flood. Land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively or land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as a 0.1% annual probability of flooding).

⁴ <https://data.gov.uk/dataset/76292bec-7d8b-43e8-9c98-02734fd89c81/historic-flood-map>

⁵ <https://flood-map-for-planning.service.gov.uk/>

The FMfP (River and Sea with/without Defences) dataset accounts for climate change using the Central allowance for the 2080s epoch for river flooding and the Upper End (95th Percentile; 95P) allowance for 2125 for tidal flooding. The mapping (not shown) indicates that the flood extents are similar to those shown in **Figure 5**. As such, the effects of climate change do not pose a risk of flooding at the site.

It is concluded that the application site is not at risk of flooding from the sea (tidal/coastal) and is at a Very Low risk of flooding from rivers (fluvial).

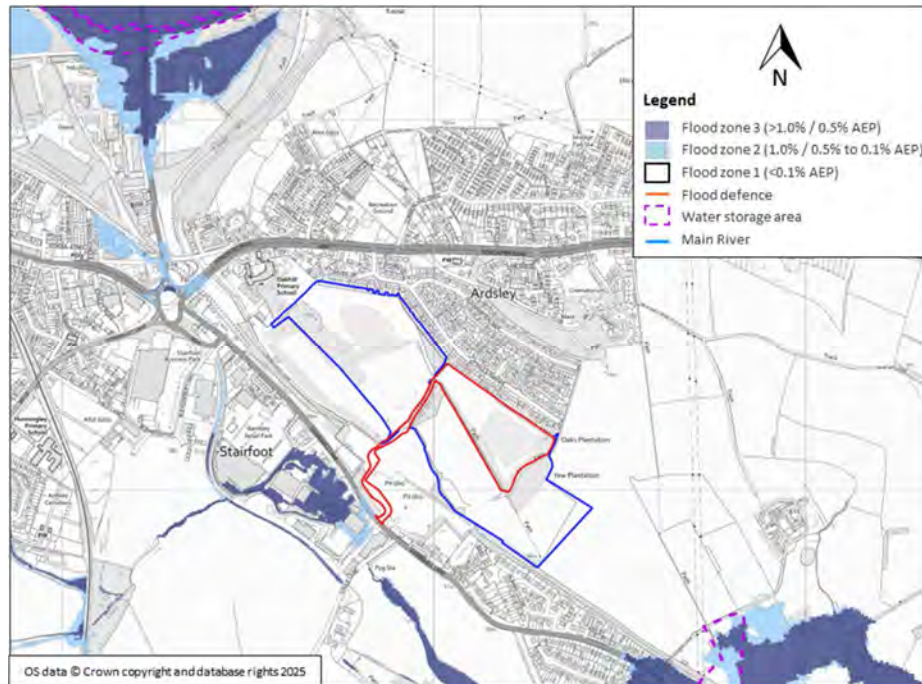


Figure 5: Flood Map for Planning (Flood Zones 2 and 3)

Source: gov.uk website; Accessed: June 2025

4.3 Flood Risk from Small Watercourses and Surface Water (Pluvial)

As detailed in **Section 2.3**, a number of drainage ditches are located to the east/south-east of the application site. No modelled information is available for these watercourses. The Long Term Flood Risk (Surface Water) dataset (**Figure 6**) has therefore been utilised to assess the risk of flooding from these sources and surface water. This mapping indicates that the site and access are not at risk of flooding from the existing drainage ditches to the east/south-east and are typically not at risk of flooding from surface water in up to a 0.1% AEP event including an allowance for climate change.

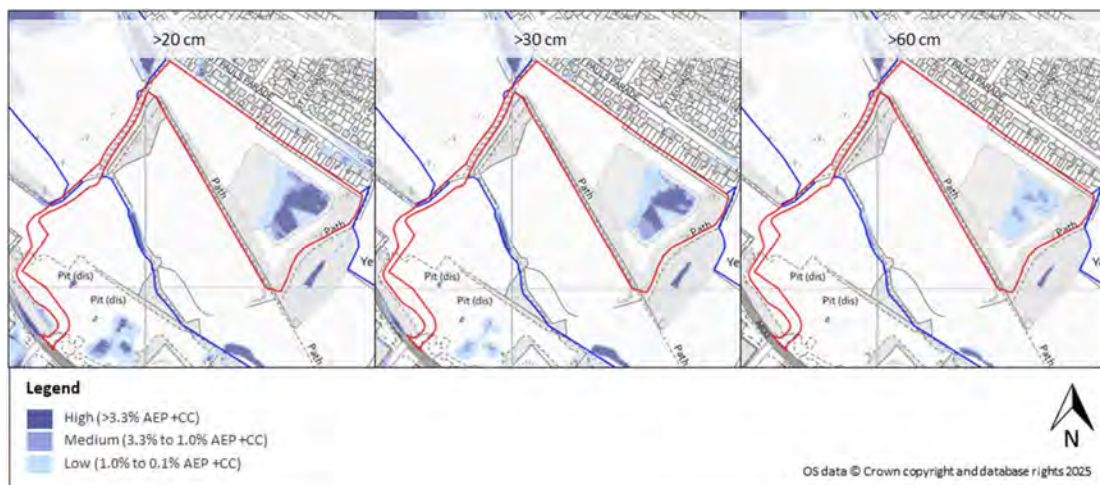
Ponding of surface water is indicated in the south-east of the application site during a Low to High risk event; however, this correlates with the location of the existing surface waterbody on site.

There are also some isolated areas of Low to High risk indicated on the access off Wombwell Lane. The areas of identified risk are relatively confined and represent localised depressions in the topography, with the anticipated flood depth < 0.20 m.

It is concluded that the application site is not at risk of flooding from small watercourses and is at a Very Low risk of flooding from surface water, except for the area of the existing surface waterbody which is at a Low to High risk.



(a) Extent



(b) Depth - Climate Change Scenario

Figure 6: Long Term Flood Risk (Surface Water)

Source: gov.uk website; Accessed: June 2025

4.4 Flood Risk from Reservoirs, Canals and Other Water Impounding Structures

The Long Term Flood Risk (Reservoirs) dataset (**Figure 7**) indicates that the application site is not at risk of flooding from such sources. Furthermore, there are no canals located within the immediate vicinity of the application site.

As detailed in **Section 2.3**, several surface waterbodies are located on the former Stairfoot Brickworks complex, including one on the application site. The Long Term Flood Risk (Surface Water) dataset (**Figure 6**) indicates that these do not pose a risk to the application site, except in the location of the waterbody itself.

It is concluded that the application site is not at risk of flooding from reservoirs and canals and is at a Very Low risk of flooding from water impounding structures, except for in the location of the existing surface waterbody on site.



Figure 7: Long Term Flood Risk (Reservoirs)

Source: gov.uk website; Accessed: June 2025

4.5 Flood Risk from Groundwater

The BGS Susceptibility to Groundwater Flooding map (**Figure 8**) indicates that there is limited potential for groundwater flooding to occur across the majority of the site, except for an area in the south-east, which is consistent with the location of the existing surface waterbody and where there is potential for groundwater flooding of property situated below ground level and a section of the access where the potential for groundwater flooding to occur at the surface is indicated.

The JBA Groundwater Flood Risk Indicator map (**Figure 8**) indicates that groundwater levels at the site may be 0.025 - 0.5 m bgl (defined as Medium risk) during a 1.0% AEP groundwater flood event.

Due to the nature of the historical quarrying activities, there may be an existing risk of groundwater flooding.

It is concluded that the site is at a Medium risk of flooding from groundwater.

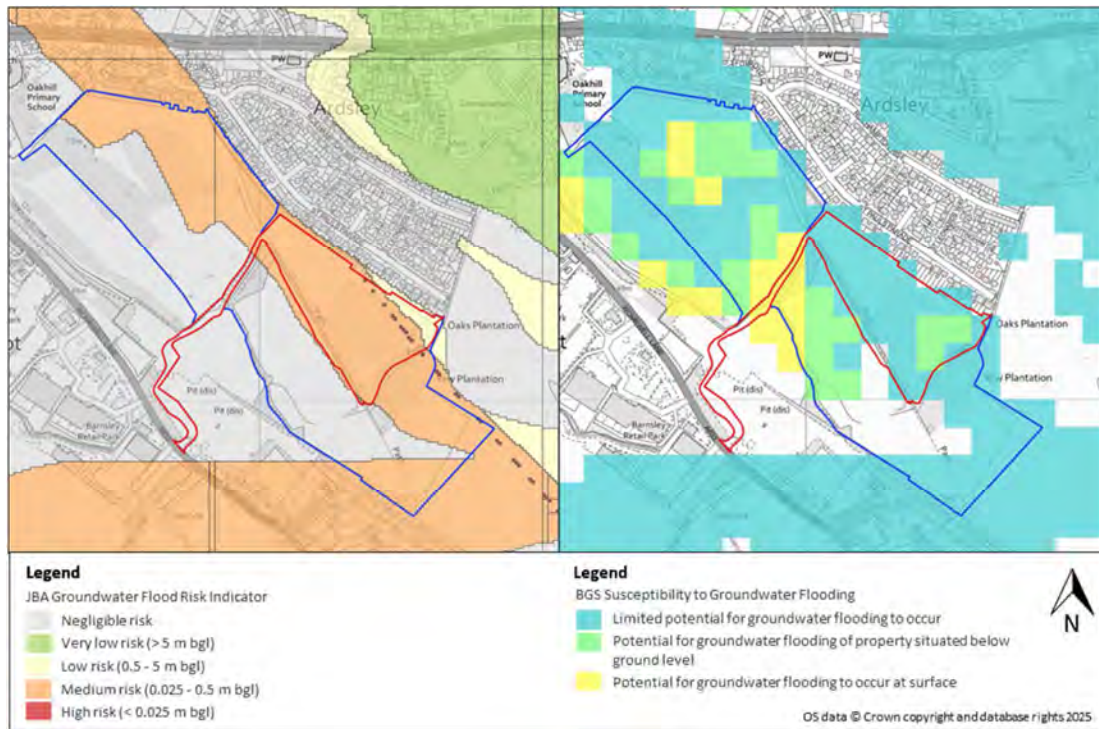


Figure 8: BGS Susceptibility to Groundwater Flooding Map and JBA Groundwater Flood Risk Indicator Map
Source: Blue Sky Maps; Accessed: February 2025

4.6 Flood Risk Mitigation

The existing void on the application site is assessed to be at risk of flooding from surface water and groundwater. There may also be limited potential for groundwater emergence to occur along the site access, but the risk is assessed to be low given the steeply sloping nature of the topography. The risk of flooding to the application site from all other identified sources is assessed to be negligible / low.

The restoration of Yew Tree Quarry will include dewatering of the existing void prior to it being filled. The existing arrangements for controlling the level of water within the void include pumping, with water allowed to flow overland to the existing surface waterbody identified on the topographical survey to the south (refer to **Figure 2**), which is understood to have a 150 mm outlet pipe. The applicant is not aware of any formal agreement that is in place for this; however, it is understood that the EA, fire service and local politicians were party to discussions on the proposal due to the health and safety concerns raised as a result of youths swimming in the waterbody on site.

It is proposed to dewater the void in a similar manner prior to the proposed restoration. The discharge rate should be restricted to ensure that the risk of flooding beyond the land ownership boundary is not increased and should be agreed as part of the Construction Environmental Management Plan (CEMP).

In the unlikely event of significant inundation of the void during restoration, this should be evacuated until such time as surface water/groundwater levels have receded.

No further flood risk mitigation measures are proposed.

4.7 Flood Risk Elsewhere

The application site is not at risk of flooding in up to a 1.0% AEP fluvial and 0.5% AEP tidal event including an allowance for climate change. Whilst surface water is stored within the existing void on the application site, the restored site will comprise permeable surfaces and consequently any rain falling onto the site would runoff at greenfield rates. As such, the proposals would not be expected to impact flood risk elsewhere.

Conversely, infilling and restoration of the quarry would provide betterment by allowing surface water to be disposed of naturally by a combination of infiltration and evapotranspiration (refer to **Section 5**), and remove the health and safety risks associated with unauthorised swimming in the existing surface waterbody, which currently occurs.

During the construction phase, water from the dewatering activities will be disposed of in the same manner as at present and the discharge rate should be restricted to ensure that the risk of flooding beyond the land ownership boundary is not increased.

4.8 Flood Risk Sequential Test

NPPF para. 175 states that the Sequential Test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk).

On the basis of the assessment presented in this report, and specifically due to the risk of flooding from surface water and groundwater, the proposals are not considered to be exempt from the Sequential Test. However, the proposals are for the restoration of an existing quarry and therefore cannot be located elsewhere.

As such, the proposals comply with the requirements of the flood risk Sequential Test, and no sequential assessment of potential alternative sites is required.

4.9 Exception Test

The Exception Test need not be applied for 'Water Compatible' development within flood zone 1.

5 SURFACE WATER MANAGEMENT

5.1 Surface Water Drainage at the Existing Site

The application site typically comprises undeveloped greenfield and a void associated with the former quarry, with the historical access into the former brickworks off Wombwell Lane comprising hardstanding.

Surface water runoff is expected to flow overland as dictated by topography and infiltrate to ground as conditions allow. It is understood that at present the void is dewatered regularly by the site owner to ensure the depth of water is kept to a minimum for safety reasons. As detailed in **Section 4.6**, pumped water is discharged onto the land surface of South Quarry and allowed to flow overland in a southerly direction, collecting in the waterbody located to the south of Marine Band Quarry. This is subsequently understood to discharge off site via a 150 mm diameter sewer in a south-easterly direction towards the River Dove. It should be noted that at the time of writing, it is not known where the 150 mm diameter sewer outfalls to, should this existing sewer eventually discharge to public sewer it will need to be disconnected as land drainage is not permitted to discharge to public sewers.

The site has a total area of 5.1 ha; however, for the purposes of this assessment the proposed area is taken as approximately 4.1 ha. This excludes the existing access off Wombwell Lane and areas where site levels are to remain the same, which are expected to continue to drain as existing.

The greenfield surface water runoff rates for the site, calculated using the HR Wallingford Greenfield Runoff Tool⁶ are presented in **Table 1**. Details of the input parameters and the output results are provided in **Appendix C**.

Table 1: Greenfield Runoff Rate

AEP of Rainfall Event	Greenfield Runoff Rate (l/s/ha)	Greenfield Runoff Rate for 4.1 ha Site (l/s)
100.0%	1.4	5.7
QBAR	1.6	6.6
3.3%	2.8	11.5
1.0%	3.3	13.5

5.2 Surface Water Drainage at the Developed Site

5.2.1 Disposal of Surface Water

In accordance with PPG para. 7-056, surface water runoff should be disposed of according to the following hierarchy: Into the ground (infiltration); To a surface water body; To a surface water sewer, highway drain, or another drainage system; To a combined sewer.

During the restoration phase, surface water would be pumped to the existing waterbody in Marine Band Quarry, as per the existing dewatering arrangements. Appropriate silt control and pollution prevention measures should be put in place, typically covered under a CEMP.

Following completion of the restoration works, the site will be returned to greenfield, which includes the seeding of land to promote vegetation, increase biodiversity and improve amenity. As such, surface water will be disposed of naturally by a combination of infiltration and evapotranspiration, with any off site flows discharging at greenfield runoff rates. Although the runoff rates are not expected to increase, the direction of runoff will be altered by the infilling of the existing void.

A preliminary surface water drainage layout is provided in **Appendix D** and indicates that a filter drain will be installed along the northern boundary of the site to intercept and divert runoff away from the residential development to the north, discharging flows towards the wooded area to the south-east boundary and maintaining existing drainage regimes.

⁶ www.uksuds.com

5.2.2 Adoption and Maintenance of SuDS

SuDS elements will be maintained by the site operator, Green Earth Development (Group) Ltd, or their appointed management company.

An indicative maintenance schedule is presented in **Table 2**.

Table 2: Maintenance Requirements

Schedule	Required action	Frequency
Filter Drain		
Regular maintenance	Remove litter including leaf litter and debris from drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly (or as required)
Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly (or as required)
	Clear perforated pipework of blockages	As required

6 SUMMARY AND RECOMMENDATIONS

This report has been prepared on behalf of Green Earth Development (Group) Ltd to accompany a planning application to BMBC for the restoration of Yew Tree Quarry at the Stairfoot Brickworks, Wombwell Lane, Stairfoot, Barnsley.

The EA FMfP (Flood Zones 2 and 3) dataset indicates the application site to be located in flood zone 1.

An assessment of flood risk from all identified potential sources of flooding has been undertaken using best available information. The existing void on the application site is assessed to be at risk of flooding from surface water and groundwater. There may also be limited potential for groundwater emergence to occur along the site access, but the risk is assessed to be low given the steeply sloping nature of the topography. The risk of flooding to the application site from all other identified sources is assessed to be negligible / low.

The restoration of Yew Tree Quarry will include dewatering of the existing void prior to it being filled. The existing arrangements for controlling the level of water within the void include pumping, with water allowed to flow overland to the existing surface waterbody identified on the topographical survey to the south, which is understood to have a 150 mm outlet pipe. It is proposed to dewater the void in a similar manner prior to the proposed restoration. The discharge rate should be restricted to ensure that the risk of flooding beyond the land ownership boundary is not increased and should be agreed as part of the CEMP.

In the unlikely event of significant inundation of the void during restoration, this should be evacuated until such time as surface water/groundwater levels have receded.

No further flood risk mitigation measures are proposed.

The application site is not at risk of flooding in up to a 1.0% AEP fluvial and 0.5% AEP tidal event including an allowance for climate change. Whilst surface water is stored within the existing void on the application site, the restored site will comprise permeable surfaces and consequently any rain falling onto the site would runoff at greenfield rates. As such, the proposals would not be expected to impact flood risk elsewhere.

Conversely, infilling and restoration of the quarry would provide betterment by allowing surface water to be disposed of naturally by a combination of infiltration and evapotranspiration, and remove the health and safety risks associated with unauthorised swimming in the existing surface waterbody, which currently occurs.

During the construction phase, water from the dewatering activities will be disposed of in the same manner as at present and the discharge rate should be restricted to ensure that the risk of flooding beyond the land ownership boundary is not increased.

On the basis of the assessment presented in this report, and specifically due to the risk of flooding from pluvial surface water and groundwater, the proposals are not considered to be exempt from the Sequential Test. However, the proposals are for the restoration of an existing quarry and therefore it would be impractical to locate this elsewhere. It is, therefore, concluded that the proposals satisfy the requirements of the flood risk Sequential Test, and that no sequential assessment of potential alternative sites is required.

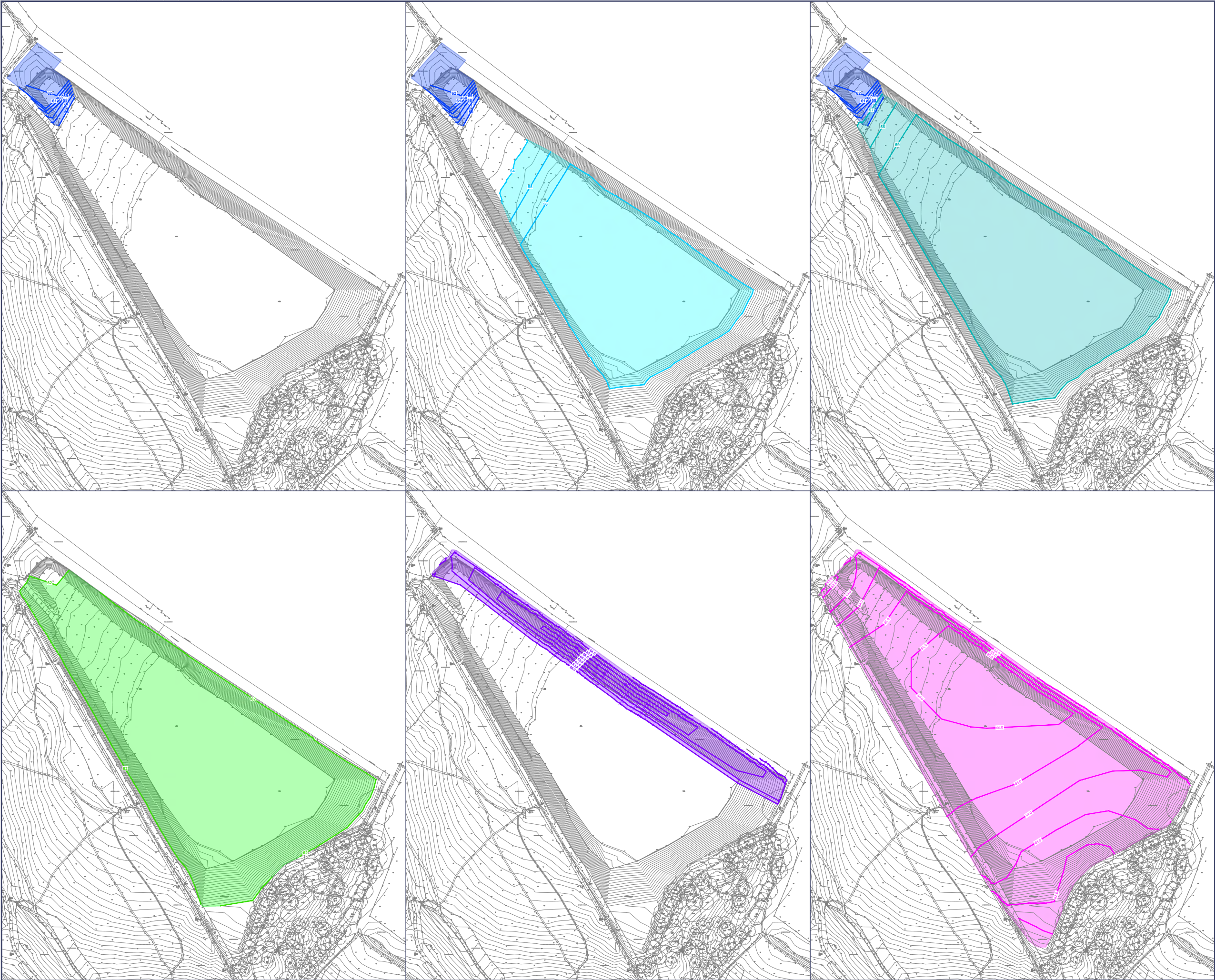
The Exception Test need not be applied for 'Less Vulnerable' development within flood zone 1.

Following restoration, which will include the seeding of land to promote vegetation, surface water will be disposed of naturally by means of infiltration and evapotranspiration, with any off site flows discharging at greenfield runoff rates. A filter drain will be incorporated along the northern boundary of the site to intercept and divert runoff away from the residential development to the north, discharging flows towards the wooded area to the south-east boundary.

In conclusion, this report demonstrates that the proposed development may be completed in accordance with the requirements of planning policy.

APPENDIX A

Proposed Phasing Plan and Contours



- Phase 1
- Phase 2
- Phase 3
- Phase 4
- Phase 5
- Phase 6

0344 8700 007
axis.co.uk



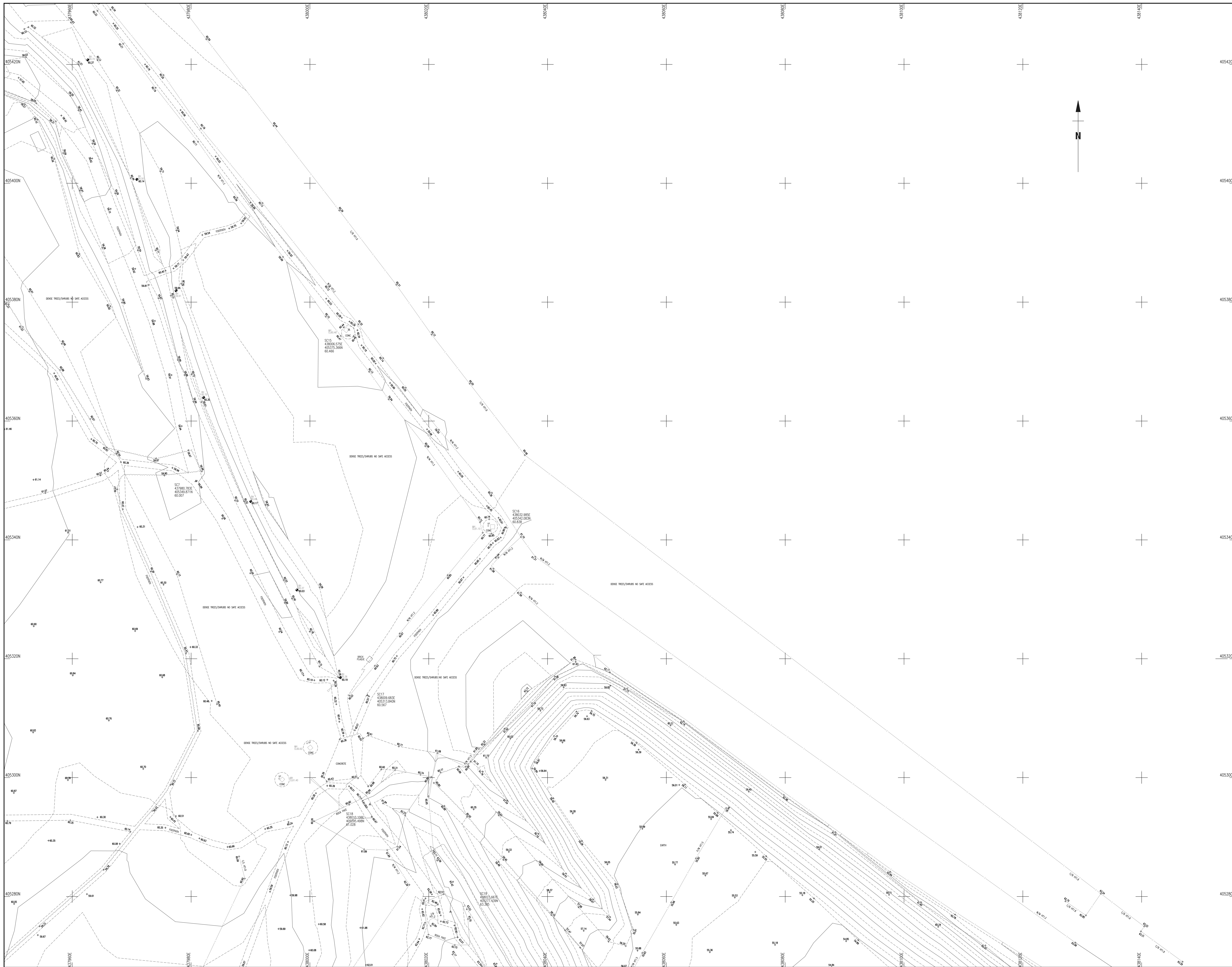
Client	Green Earth Group		
Project	Stairfoot Quarry Restoration		
Drawing Title	Phasing Plan		
Scale	1:3000 @A3	Status	--
Date	October 2024	Drawn	SM
		Checked	SH
Dwg no	2363-01-SK002	Rev	

This drawing is the copyright of AXIS P.E.D Limited and may not be loaned, copied or reproduced in any way - or used for any offer, quote, tender or construction purposes without written consent of the company to do so. Follow any figured dimensions - do not scale for construction purposes. If in doubt ask.



APPENDIX B

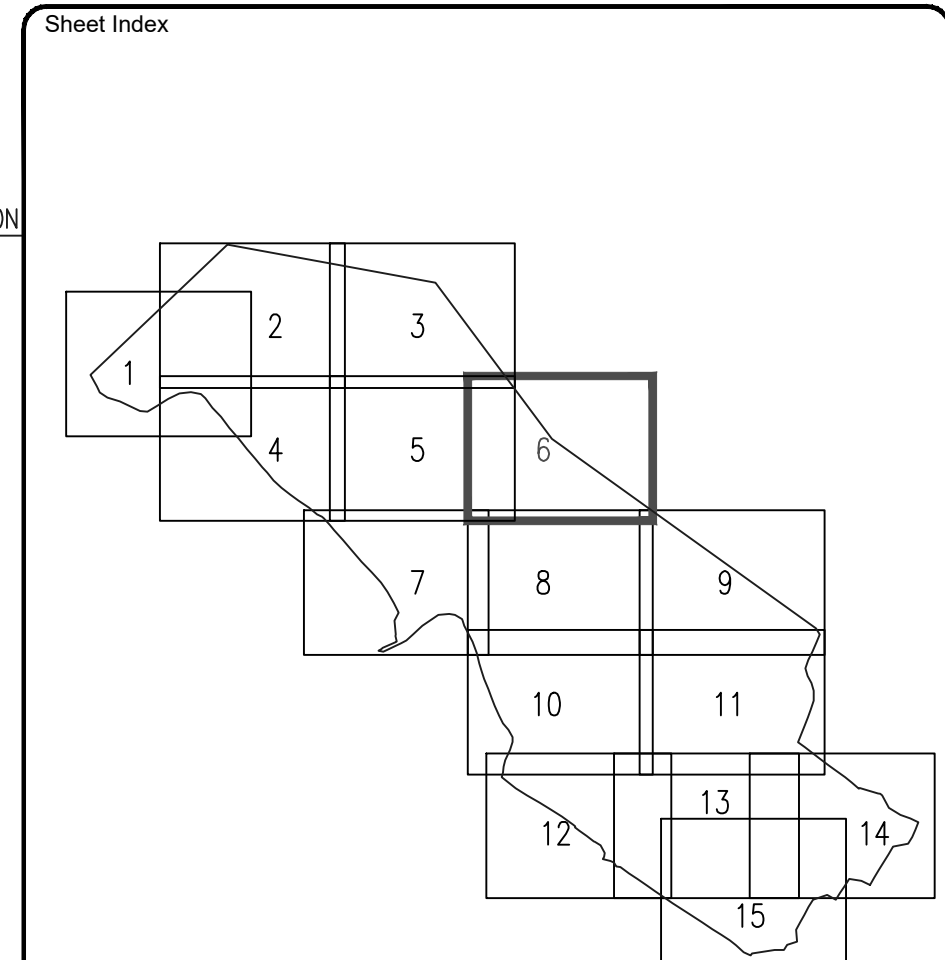
Topographical Survey



Survey Notes	
Grid:	Local, plane metric related to OS grid at Station SC1
Levels:	OS Datum from GNSS positioning converted using the National Geoid Model OSGM15

Notes

Substantial areas in the site with limited or no access.
Contour lines within these areas are indicative only

[illegible][illegible]



**MALCOLM
HUGHES**

**CHARTERED
LAND SURVEYORS**

Amree House, Trident Business Park
Dallen Avenue, Risley, Warrington,
WA3 6BK, Tel 0161 950 1205
www.malcolmhughes.co.uk
survey@mhsltd.co.uk

Accreditations








Client

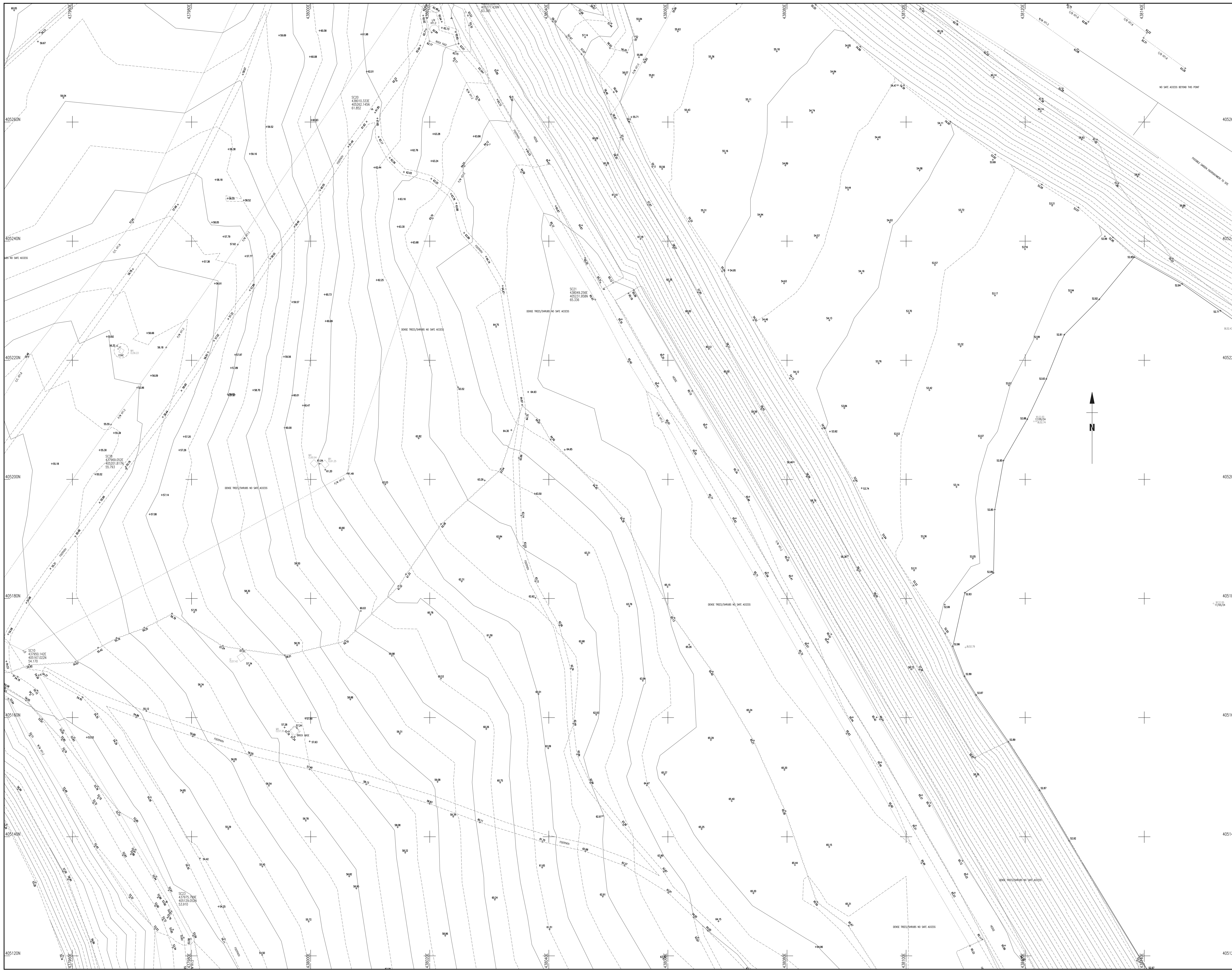
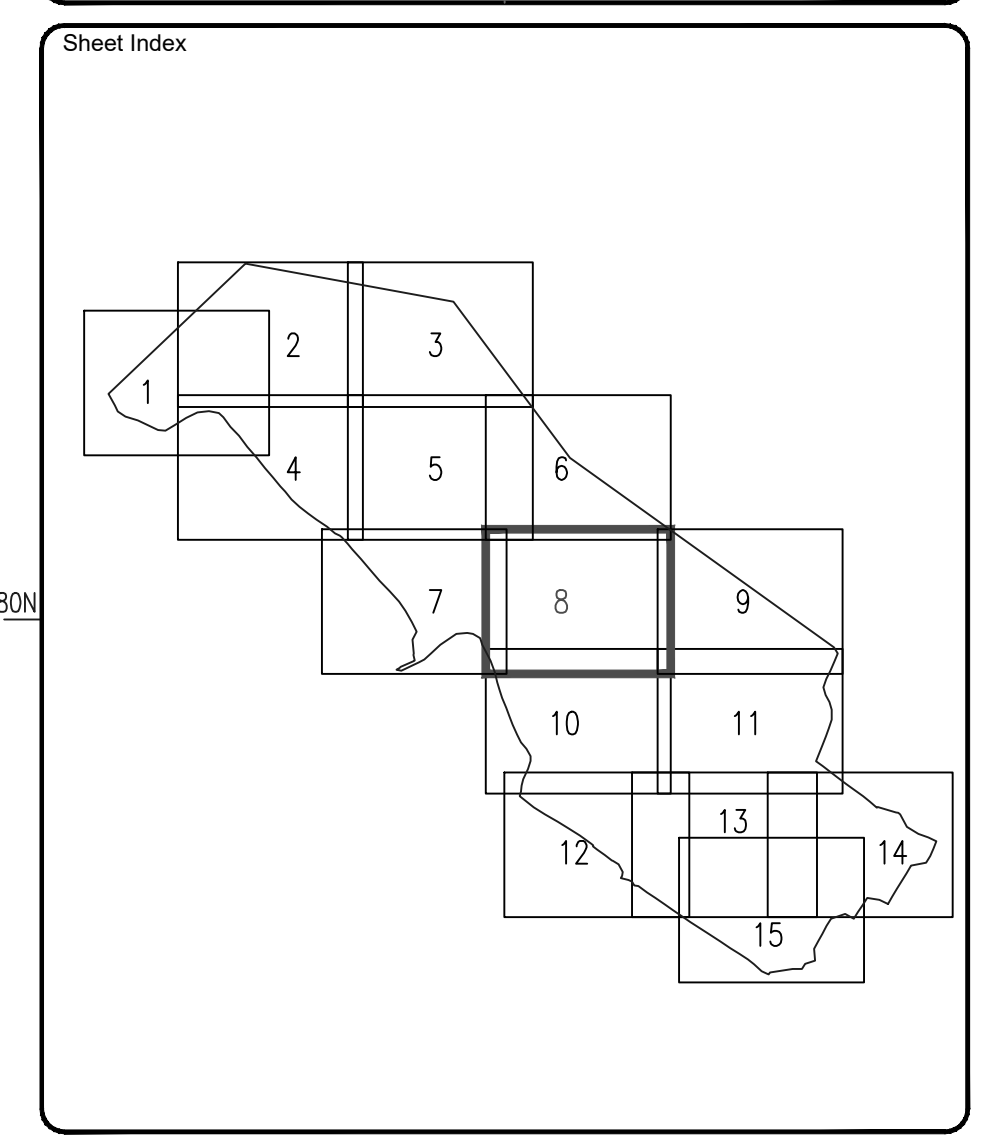
Axis PED Ltd

Project

Stairfoot Quarry
Barnsley S70 3NX

Topographical Survey
Sheet 6 of 15

Drawn By YW	13/06/2024	Survey Date May 2024
Checked by MRS	14/06/2024	Scale A0 @ 1:200
Drawing No 61739_Topo		Revision

[illegible][illegible]



**MALCOLM
HUGHES**

**CHARTERED
LAND SURVEYORS**

Amree House, Trident Business Park
Dorset Avenue, Risley, Warrington,
WV3 6BX. Tel 0191 910 1265
www.malcolmhughes.co.uk
survey@mhsls.co.uk

Accreditations








Client

Axis PED Ltd

Project

Stairfoot Quarry
Barnsley S70 3NX

Drawing Title
Topographical Survey Sheet 8 of 15

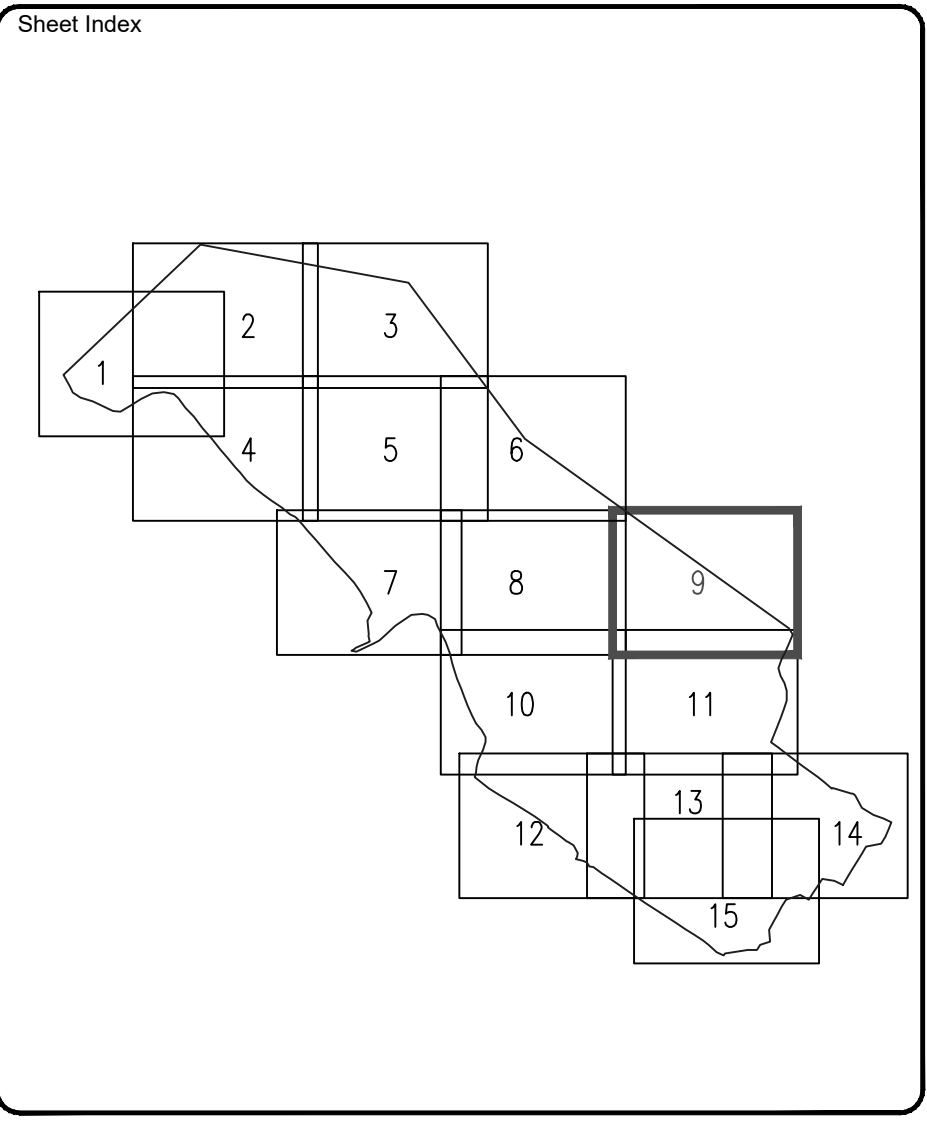
Drawn By	YW	13/06/2024	Survey Date	May 2024
Checked by	MRS	14/06/2024	Scale	A0 @ 1:200
Drawing No			Revision	
61739__Topo				

Survey Notes

Grid:	Local, plane metric related to OS grid at Station SC1
Levels:	OS Datum from GNSS positioning converted using the National Geoid Model OSGM15

Notes

Substantial areas in the site with limited or no access.
Contour lines within these areas are indicative only

[illegible][illegible]



**MALCOLM
HUGHES**
CHARTERED
LAND SURVEYORS

Amree House, Trident Business Park
Dorset Avenue, Roker, Warrington
WA3 6BX, Tel: 0181 955 1255
www.malcolmhughes.co.uk
survey@mh.co.uk

Accreditations







Client

Axis PED Ltd

Project

Stairfoot Quarry
Barnsley S70 3NX

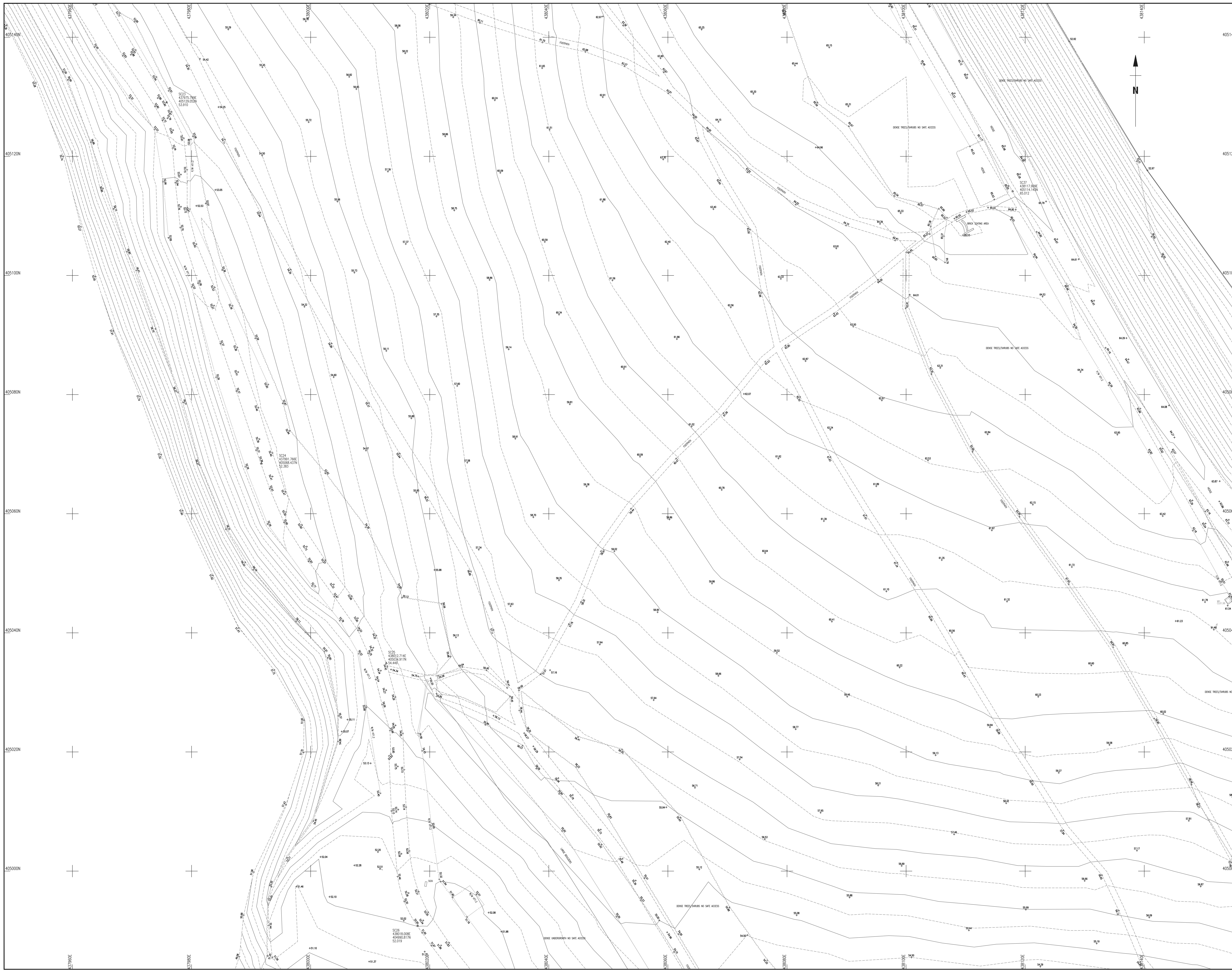
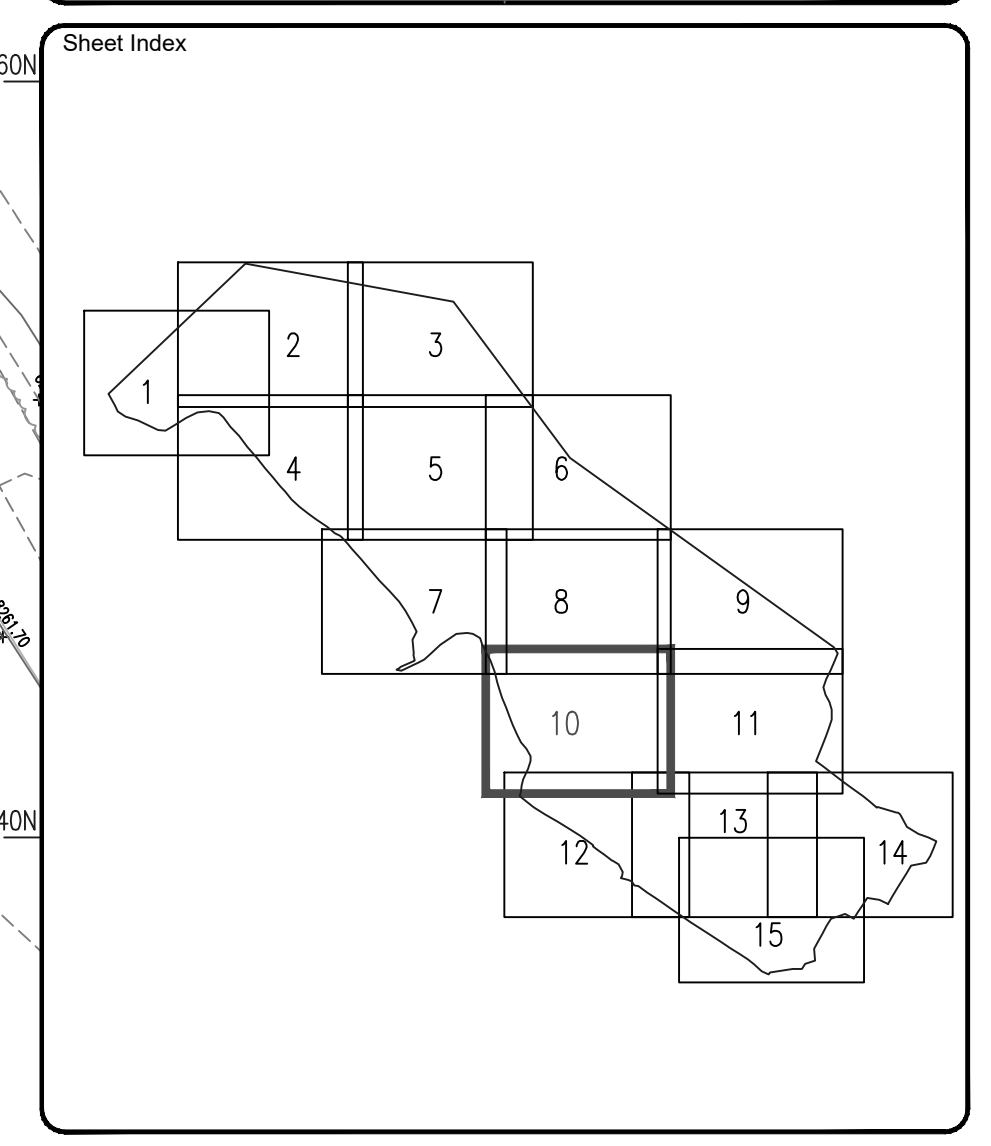
Drawing Title

Topographical Survey

Sheet 9 of 15

Drawn By	YW	13/06/2024	Survey Date	May 2024
Checked by	MRS	14/06/2024	Scale	A0 @ 1:200

Drawing No	61739_Topo	Revision
------------	------------	----------

[illegible][illegible]



**MALCOLM
HUGHES**

**CHARTERED
LAND SURVEYORS**

Amtrie House, Trident Business Park
Dutton Avenue, Risley, Warrington,
WV3 6BX. Tel: 0191 936 1265
www.malcolmhughes.co.uk
survey@mhsls.co.uk

Accreditations







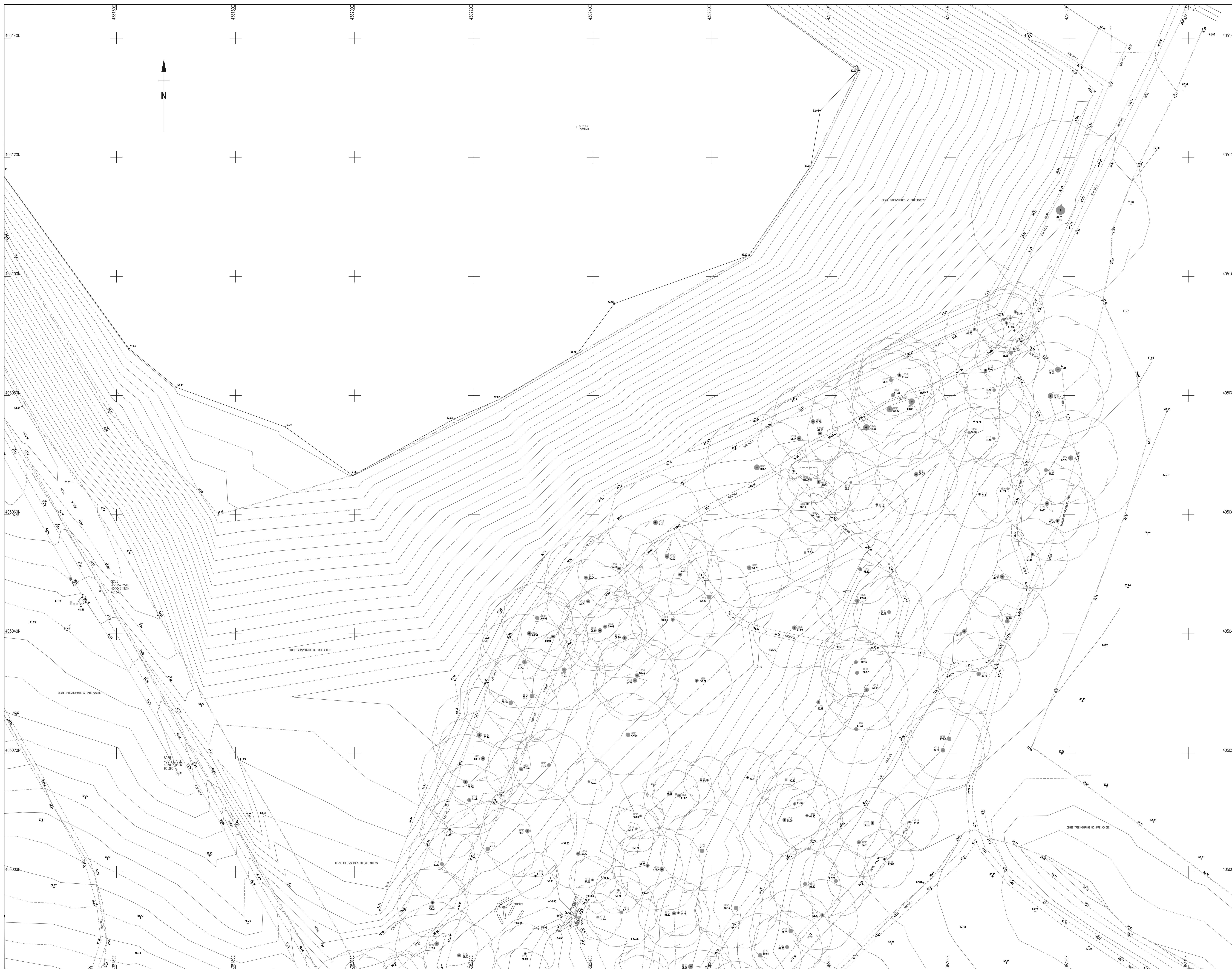
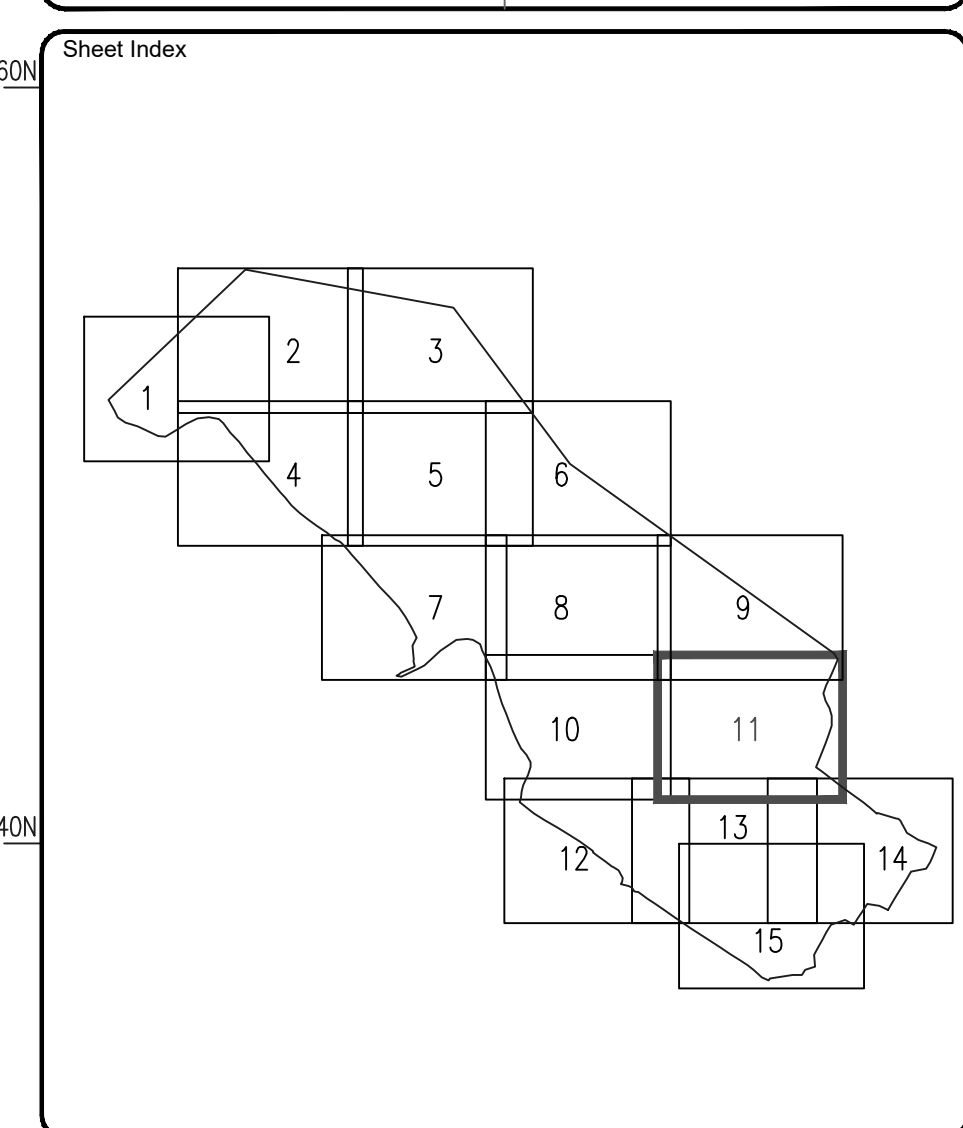

Client	Axis PED Ltd
--------	--------------

Project

Stairfoot Quarry
Barnsley S70 3NX

Drawing Title	Topographical Survey Sheet 10 of 15
---------------	---

Drawn By YW	13/06/2024	Survey Date May 2024
Checked by MRS	14/06/2024	Scale A0 @ 1:200
Drawing No 61739__Topo		Revision

[illegible][illegible]



**MALCOLM
HUGHES**

**CHARTERED
LAND SURVEYORS**

Aintree House, Trident Business Park
Dutton Avenue, Ridley, Warrington,
WA4 6BB, Tel: 0151-956-1265
www.malcolmhughes.co.uk
survey@mhsl.co.uk

Accreditations








Client

Axis PED Ltd

Project

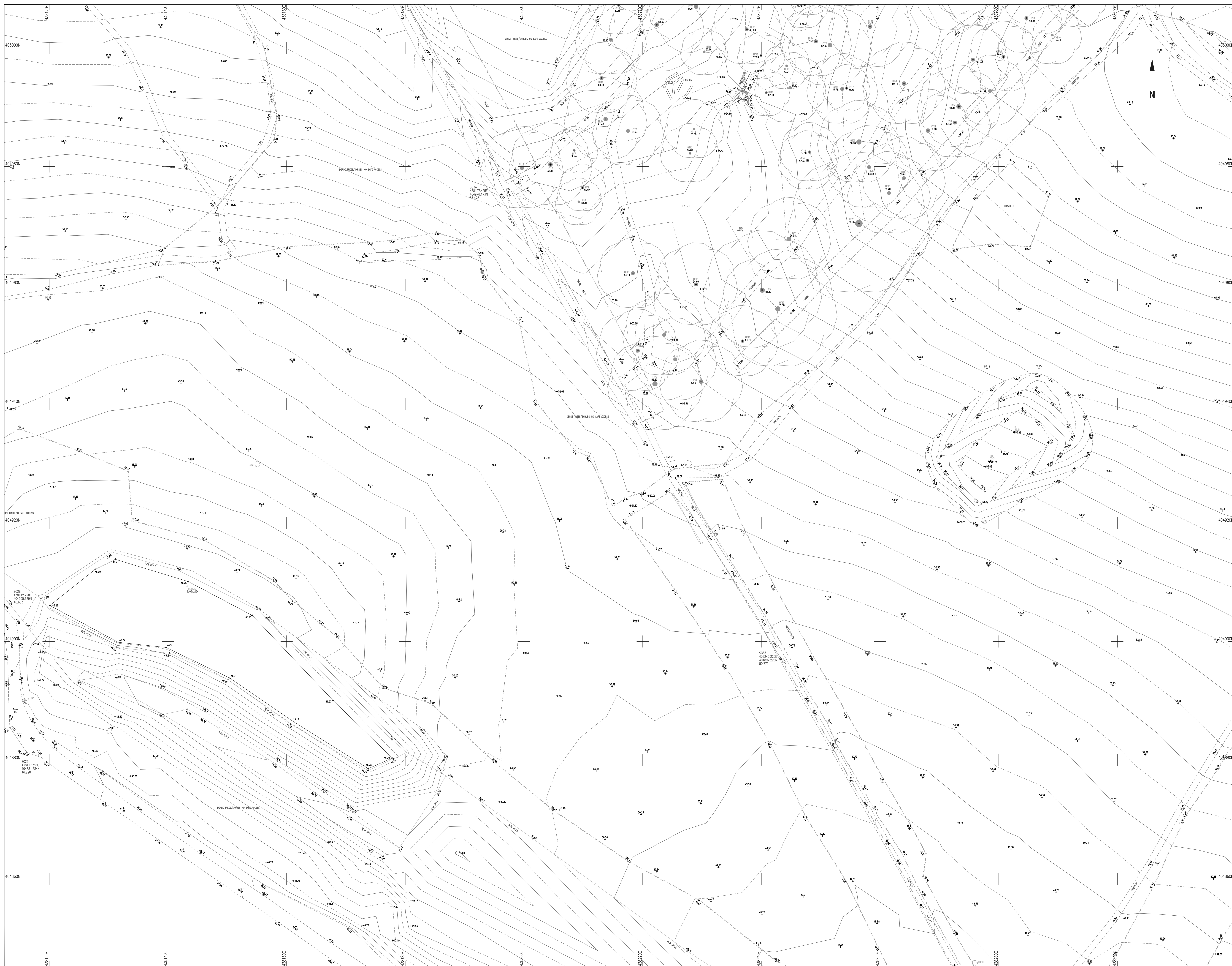
Stairfoot Quarry
Barnsley S70 3NX

Drawing Title

Topographical Survey

Sheet 11 of 15

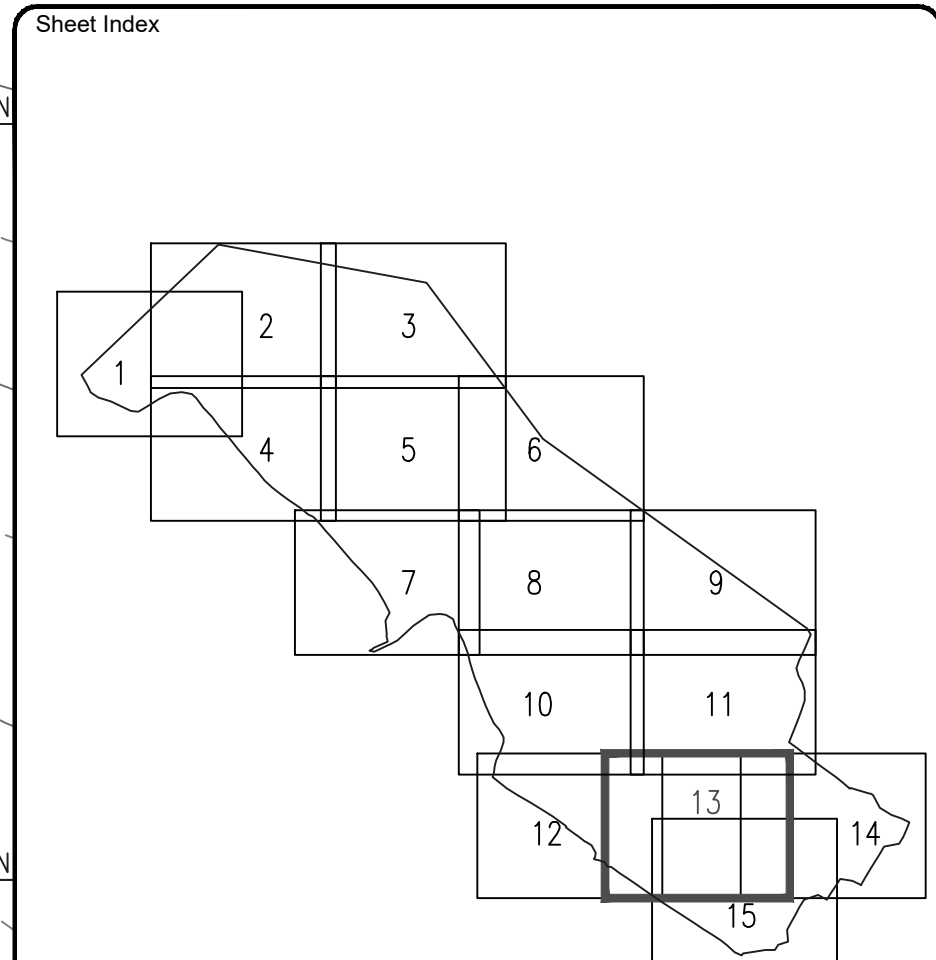
Drawn By	YW	13/06/2024	Survey Date	May 2024
Checked by	MRS	14/06/2024	Scale	A0 @ 1:200
Drawing No			Revision	
61739_Topo				



Survey Notes	
Grid:	Local, plane metric related to OS grid at Station SC1
Levels:	OS Datum from GNSS positioning converted using the National Geoid Model OSGM15

Notes

Substantial areas in the site with limited or no access.
Contour lines within these areas are indicative only

[illegible][illegible]



**MALCOLM
HUGHES**

**CHARTERED
LAND SURVEYORS**

Aintree House, Trident Business Park
Dutton Avenue, Rixley, Warrington,
WA3 6BX. Tel: 0161 966 1266
www.malcolmhughes.co.uk
surveying@mhls.co.uk

Accreditations








Client _____

Axis PED Ltd

Project

Stairfoot Quarry
Barnsley S70 3NX

Topographical Survey
Sheet 13 of 15

Drawn By	YW	13/06/2024
Checked by	MRS	14/06/2024

Survey Date	May 2024
Scale	A0 @ 1:200

Drawing No	61739 Topo	Revision
------------	------------	----------

APPENDIX C

Greenfield Runoff Calculations

Calculated by:	Keely Bonser
Site name:	6178 Stairfoot Quarry Restoration
Site location:	Barnsley

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.54153° N
Longitude:	1.42552° W
Reference:	3288074608
Date:	Jan 22 2025 07:56

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	1
-----------------------	---

Methodology

Q _{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Notes

(1) Is $Q_{\text{BAR}} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

Soil characteristics

	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

Hydrological characteristics

	Default	Edited
SAAR (mm):	626	626
Hydrological region:	3	3
Growth curve factor 1 year:	0.86	0.86
Growth curve factor 30 years:	1.75	1.75
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

(3) Is $\text{SPR/SPRHOST} \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

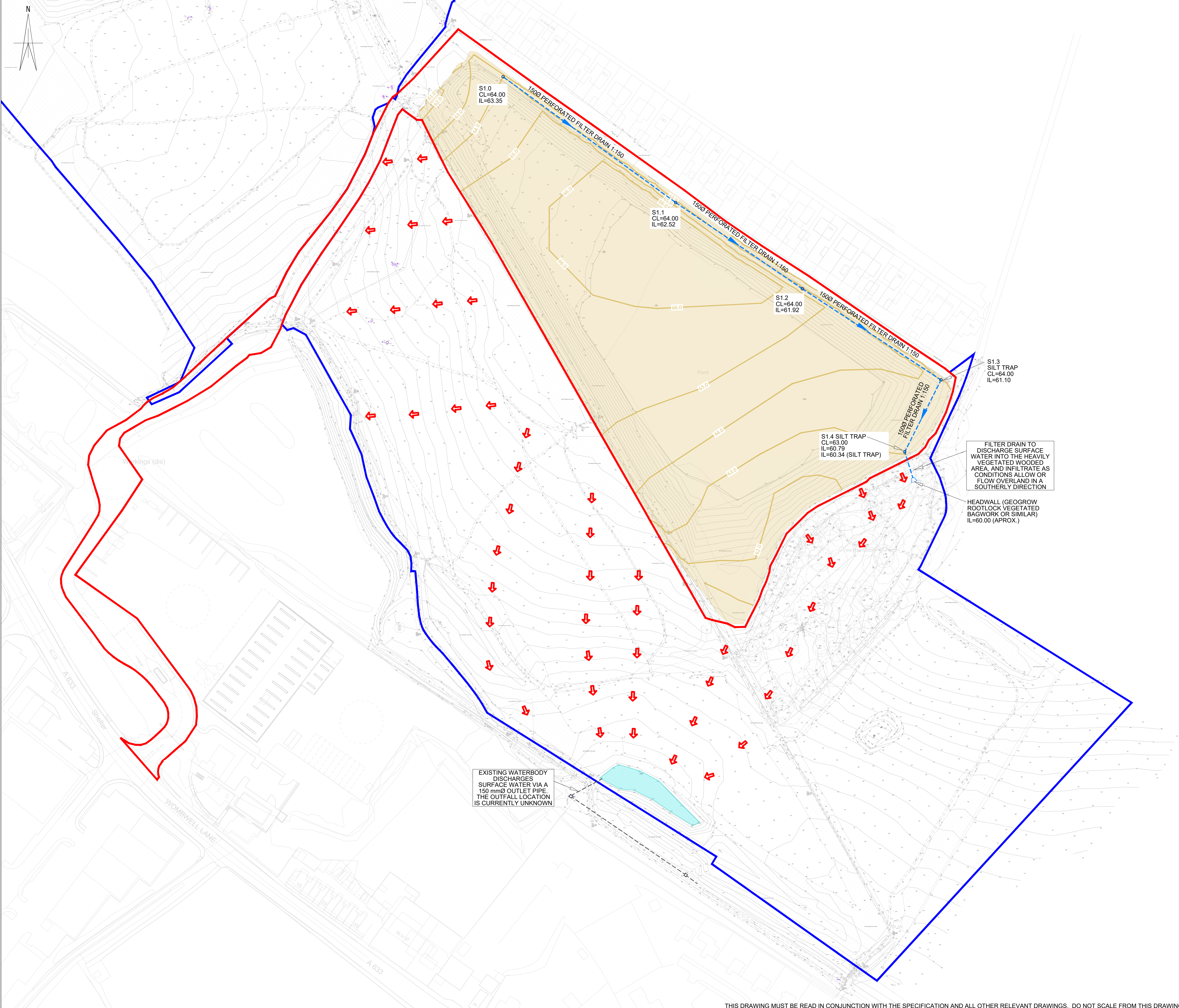
Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	1.6	1.6
1 in 1 year (l/s):	1.38	1.38
1 in 30 years (l/s):	2.8	2.8
1 in 100 year (l/s):	3.33	3.33
1 in 200 years (l/s):	3.79	3.79

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

APPENDIX D

Preliminary Surface Water Drainage Layout



- NOTES**
- THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT WEETWOOD DRAWINGS. ANY DISCREPANCIES, ERRORS OR OMISSIONS TO BE BROUGHT TO THE ATTENTION OF WEETWOOD.
 - ANNUAL EXCEEDANCE PROBABILITY RAINFALL EVENTS:
 - 100.0% (1:1) AEP RAINFALL EVENT
 - 50.0% (2:2) AEP RAINFALL EVENT
 - 43.5% (QBAR) AEP RAINFALL EVENT
 - 3.3% (1:30) AEP RAINFALL EVENT
 - 1.0% (1:100) AEP RAINFALL EVENT
 - PROPOSED SITE LAYOUT AND LEVELS/CONTOURS TAKEN FROM AXIS 'PHASING PLAN' DRAWING (REF: 2363-01-SK002, DWG FILE RECEIVED JUN 2025).
 - EXISTING LEVEL INFORMATION TAKEN FROM MALCOLM HUGHES 'TOPOGRAPHIC SURVEY' (REF: 61739, MAY 2024).

DRAINAGE KEY

- EXISTING SURFACE WATER SEWER
- EXISTING WATERBODY
- PROPOSED FILTER DRAIN
- PROPOSED SURFACE WATER MANHOLE
- +1.000 EXISTING LEVEL
- APPLICATION SITE BOUNDARY
- OWNERSHIP BOUNDARY
- OVERLAND FLOW ROUTE
- PROPOSED EXTENTS OF INFILL
- PROPOSED CONTOUR

P2	26.06.25	SITE BOUNDARY AND INFILL EXTENTS UPDATED	DSH	TB
P1	13.02.25	INITIAL ISSUE	DSH	TB

REV	DATE	DESCRIPTION	DRAWN BY	CHECK BY
Weetwood Development • Planning • Environment Park House, Ffordd Byrmwr Gwair, Mold CH7 1FQ Tel 01352 700045 info@weetwood.net www.weetwood.net				

Client AXIS PED	
Drawing Status PLANNING	Date FEB 2024 Scale (A1) 1:1000
Project STAIRFOOT QUARRY, WOMBWELL LANE, STAIRFOOT, BARNSELY	Drawn by DSH Check by TB
Drawing Number 6178-WTWD-00-XX-DR-D-1000	Revision P2
Drawing Title YEW TREE QUARRY POST RESTORATION SURFACE WATER DRAINAGE LAYOUT	

Delivering client focussed services nationally

Flood Risk Assessments
Flood Consequences Assessments
Surface Water Drainage
Foul Water Drainage
Environmental Impact Assessments
River Realignment and Restoration
Water Framework Directive Assessments
Environmental Permit and Land Drainage Applications
Sequential, Justification and Exception Tests
Utility Assessments
Expert Witness and Planning Appeals
Discharge of Planning Conditions

www.weetwood.net