CAMBRIAN QUARRY ENVIRONMENTAL SETTING AND SITE DESIGN REPORT

ASH Resource Management (Cambrian Quarry) Limited

Version:	1.1	**Date:**	7 October 2024		
Doc. Ref:	0426-021-E	**Author(s):**	MM	**Checked:**	RS
Client No:	0426	**Job No:**	021		

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Document History:

Version	Issue date	Author	Checked	Description
1.0	01/10/2024	MM	RS	Initial Draft
1.1	07/10/2024	MM	RS	Application submission

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Appendix I – Drawings

Drawing No. ASH/CQ/09 (Rev B) – Restoration Masterplan

Drawing No. ASH/CQ/10 (Rev B) – Cross Sections

1 Introduction

1.1 Oaktree Environmental Ltd (Oaktree) has been commissioned by ASH Resource Management (Cambrian Quarry) Limited to prepare the Cambrian Quarry Environmental Setting and Site Design Report (ESSD) in support of the resubmission of an application for a variation of the existing bespoke environmental permit issued by Natural Resources Wales (NRW), which permits the deposit of waste for recovery on land at the site. This report reviews the documentation which exists for the site and draws attention to key issues for the variation application. The response to the returned application acknowledged that there is an overlap in information held in the various documents required for the variation application. This ESSD report includes as assessment of site stability, conceptual site model and the hydrogeological risk assessment for the site to reduce the overlap in information.

1.2 The permit (EPR/JB3034RN) was issued on 17th October 2014 and permits the acceptance of no more than 200,000 tonnes per year of wastes listed in Schedule 2 to the permit, with a total input tonnage of 779,00 tonnes for recovery. Permitted activities also include treatment of the waste i.e. sorting, crushing or screening prior to deposit, which will remain unchanged.

1.3 Only the total volume permitted for recovery will change i.e. the existing permit allows 779,000 tonnes but the variation is required to concur with the amendment to the planning consent relating to the bat cave on site and protection of the bats (more detail in Paragraph 1.7 below) and associated landform. It is proposed that approximately 110,000 m^3 of additional fill material is imported to the site to complete the restoration of the former quarry. This equates to approximately 209,000 tonnes, based on a compaction density of approximately 1.9 tonnes/m^3. It should be noted that compaction rates vary but this conversion is expected to be the maximum required using the volume stated above and brings the total for deposit to 988,000 tonnes. This is consistent with the approved waste recovery plan.

1.4 In addition to the approval of the waste recovery plan by NRW it is important to note that the additional volume has been approved by Flintshire County Council (FCC) in the recently issued planning consent. The approved plans have been included in the variation application.

1.5 The original planning and permit application were supported by a significant volume of site-specific reports relating to the hydrogeology of the site. These reports are still valid but to provide a current dataset for the site a Groundsure Report was purchased and has been used in combination with existing site reports to prepare this document. Commentary on the

Groundsure report will be limited to the 500 metre search buffer which can be clearly observed in the mapping data provided within the Enviro and Geo Insight Reports. The site area shown in the Groundsure Report is based on the approximate permit boundary.

1.6 The site is not located within a Source Protection Zone (SPZ) for potable water supply, which is confirmed in the Envirocheck Report (Mapping-Page 70). There are no drinking water abstraction licences within 200 metres of the site. The site is located within Flood Zone 1 and is not at risk from surface or groundwater flooding. There have been no material changes which impact on the original flood risk assessment prepared by Hafren Water in February 2013.

1.7 The site was designated as a Site of Special Scientific Interest (SSSI) before infilling operations commenced. The designation is of biological interest because of the presence of a large population of lesser horseshoe bats (*Rhinolophus hipposideros*), with significant work completed on site to protect the entrance to the roosting/hibernation cave which is within the quarry. This work has and will be carried out in accordance with the planning consents for the development issued by FCC and licence issued by NRW. An update on the management of the bat cave is detailed in Paragraph 3.1.5 of the updated and approved waste recovery plan. The planning decision relating to the bat cave was issued by FCC on 26th November 2019.

2 Site Stability

2.1 A stability risk assessment was undertaken by Geotechnics Ltd before operations commenced, issuing report Reference PN122722 in February 2013, based on fieldwork carried out in May 2012. A copy of the report has been submitted with the permit variation application for context as this review is an assessment of the changes that have taken place since infill commenced and does not duplicate information on the site geology which is comprehensively covered in the report. Many of the observations in the report will no longer be relevant as the vast majority of exposed faces are now beneath the infilled profile, the detail of which is reviewed below and reduce the slope stability risks identified in the report.

2.2 Natural Resources Wales has approved an updated waste recovery plan to enable the completion of the quarry profile with non-hazardous wastes.

2.3 As stated in the report *"The object of the investigation was to obtain information to enable an assessment of the medium to long-term stability of the quarry high walls, within the limitations posed by the exposed quarry faces, access constraints and the scope of approved survey time on site."* This assessment included the possible impact of past mine workings on the stability of the proposed slopes within the quarry.

2.4 Stability observations from the 2012 survey include:

2.4.1 Section 7.3 Conclusions with Respect to Existing Slope Stability: It was noted that "*both the southern and eastern quarry high walls are showing signs of recent and potential slope instability*" but concluded that the risks were limited to small volume failures associated with weathering. Other locations were identified that had significant potential for planar and wedge failures to occur. It was noted that these failures would be acceptable in a working quarry but "*are unacceptable with respect to public access and for the long-term maintenance of secure ownership boundaries.*" It was also noted that "*the act of filling the quarry void above the level of the workings will contribute significant lateral restraint to the pillars in close proximity to the quarry void and will therefore aid stability*" of the mine workings.

2.4.2 Section 7.4 Infilling Operations – Stability: This section made recommendations in respect of the potential fill materials to be excluded, which are consistent with the restrictions on the waste types imported since operations began. The recommendations in respect of reducing lifts to 1metre, dozing the material flat with nominal compaction from the plant have been

followed during operations. The recommendation that bench heights should not exceed 5 metres, berm widths should not be less than 3 metres and for the restriction of the local slope angle (no more than 23^{O}) have also been adhered to.

2.4.3 Reference was also made to the fact that the quarry is a basin like structure and "*there is no significant risk of tipped material escaping from the site*". The overall stability and shape of the site is such that there is no potential for slippage of materials once deposited, which is unchanged.

2.4.4 Section 7.5 concluded that the access road design would not be impacted by the presence of recorded mine workings.

2.4.5 The restoration operations to date have stabilised the potentially unstable lower faces, which are now below the restoration fill and cannot provide a danger to site users or the public (after restoration). Some of the minor faces will remain exposed but to a much lesser extent. Planning Drawing ASH/CQ/09 (Revision B) is the approved master plan for the site which shows 3 cross sections. Planning Drawing ASH/CQ/10 (Rev B) is the approved cross section plan showing the sections highlighted on ASH/CQ/09 showing that the Eastern elevation of Section 1-1 will have some exposed faces but with an estimated height of less than 4 metres.

3 Waste Types

3.1 Based on the information presented in the Waste Recovery Plan the material imported into the site to construct the engineered fill component of the landform will be limited strictly to the waste types in Schedule 2 of the Permit and will not be varied. To date the majority of wastes accepted (from a review of the submitted waste returns) are soil, stones, bricks, concrete and minerals submitted under European Waste Catalogue (EWC) codes 17 01 07, 17 05 04 and 19 12 09.

3.2 No hazardous wastes have been or will be accepted at the site and the material imported to the site will not contain hazardous substances. On this basis it is considered that the material accepted at the site will contain no discernible concentrations of hazardous substances and that the leachable concentrations of any non-hazardous pollutants in the waste will not pose a significant risk to groundwater quality i.e. no change to the current regime in place for waste acceptance. Current waste acceptance procedures are compliant with version 1.2 of NRW's WM3 guidance "Waste Classification. Guidance on the classification and assessment of waste. Technical Guidance WM3" v1.2".

3.3 A review of 12 compliance assessment reports (CARs) issued by NRW from 2016 to 2024s reveals that compliance scores in 11 inspections were zero, with one exception on 7th October 2021 i.e. a single C3 score relating to waste coding and volumes of waste accepted.

4 Receptors

4.1 Planning drawing No. ASH/CQ/09 Rev B shows the site setting and proposed landform and functions as the restoration masterplan, showing significant biodiversity net gain once restored. The principal receptors are the residential properties to the East of the permit boundary and the SSSI, which has been mentioned above.

4.2 To minimise the potential for disruption to receptors the site will operate in accordance with the environmental management procedures referred to in Table S1.2 of the permit titled Operating Techniques. The site operating procedures have been prepared to meet the outcome of the risk assessment prepared for the original application and the updated risk assessment carried out in 2024, which is included with the application and explained in Section 9 of this document.

4.3 The site's operational procedures are also enshrined in the Ash Group (UK) Limited's Competence Management Scheme (CMS) and backed by managers with the relevant CIWM/WAMITAB Certificate covering deposit for recovery i.e. MROC 1 or equivalent (non-hazardous waste treatment).

5 Hydrology/Hydrogeology

5.1 A Hydrological and Hydrogeological Impact Assessment was been carried out on Cambrian Quarry for the original permit application. The main features of the assessment are still relevant and have been reviewed in conjunction with the new Groundsure Report.

5.2 Watercourses and drains. The quarry is situated within the surface water catchment of the River Alyn, which is located approximately 3.5 km to the east of the site, following a northerly and easterly course through Mold. The River Alyn is a tributary of the River Dee. The closest watercourse to the site is approximately 800 m northwest of the site and is a tributary of the River Alyn. The topography is such that surface water drainage from the site is more likely to flow eastwards. The nearest watercourse to the east is approximately 1 km southeast of the site and is an unnamed stream which is an eastward-draining tributary of the River Alyn.

5.3 Springs and wells. A number of small pools, springs and wells are identified east of the site on the 1:25,000 scale map but are not impacted by the site. The Groundsure Report shows that there are no licensed abstractions within the 500 metre search buffer. There may be unlicensed abstractions in the area but no unlicensed abstractions were identified in the vicinity of the site before infill commenced. It was concluded that neither of the two closest wells are adjacent to buildings and it was assumed that they are not used for potable supply.

5.4 Waterbodies and ponds. There are no other marked drains or springs within 1 km of the site. Drainage in the area around the site is generally in an easterly or north-easterly direction although substantially influenced by the elevated terrain.

5.5 The management of waste inputs has been strictly monitored to ensure that the risk to surface and groundwater is minimised. The waste accepted at the site principally arises from in group operations which enables the necessary information to be obtained before waste deposit to comply with the WM3 guidance and demonstrate that incoming waste is inert or non-hazardous with low leachability.

5.6 Water management during restoration. The base of the quarry was dry when infill commenced, which was assumed to be because the groundwater level is below the quarry base. Rainwater entering the partly restored quarry void accumulates on site and disperses naturally and does not need to be discharged off site as a point source discharge.

5.7 Water management after restoration. The proposed restoration landform is presented on Drawing No. ASH/CQ/09 (Rev B). This represents a significant change in the overall restoration profile as the completed site will be restored to open woodland, with a wetland area to the north of the site.

5.8 The site will not be capped so that surface water will be able percolating down through the inert infill. This landform and its drainage are not expected to affect groundwater levels under the site, which are currently below the floor of the quarry.

6 Pollution Control Measures

6.1 Site engineering. As discussed above it is considered that the material accepted at the site will contain no discernible concentrations of hazardous substances and that the leachable concentrations of any non-hazardous pollutants in the waste will not pose a significant risk to groundwater quality. This approach was accepted when the permit was originally issued so there are no proposals for a geological barrier on sidewalls or a geological capping layer.

6.1.1 Notwithstanding this assessment it is considered likely that following placement the material imported to the site will have a generally a low hydraulic conductivity so the potential for rainfall incidents to the restored landform to infiltrate the waste deposited will be limited.

6.1.2 As discussed in the Waste Recovery Plan the aim of the works is to restore the quarry to have an acceptable visual impact within the area in keeping with the surrounding landscape.

6.1.3 It is not considered necessary to attenuate the quantity of surface water runoff at the site as the site will be restored in keeping with the surrounding landscape and consistent with the pre-extraction situation. On this basis no surface water or groundwater management infrastructure are proposed in respect of the works.

7 Monitoring

7.1 The existing environmental permit does not require the monitoring of in waste gas, surface water or groundwater. Permit condition 3.1 regulates emissions and requires the submission of an emissions management plan in the event that activities are deemed to be giving rise to pollution. As stated above, the compliance record of the site is good and NRW have not enforced this condition.

7.2 Operations have typically taken place within the shelter of the quarry bowl and have been managed to ensure that no waste deposit takes place during adverse weather conditions. Dust management procedures are in place for operational areas that have not been restored so it is considered unnecessary to undertake meteorological monitoring at the site.

7.3 The materials to be imported to the site will comprise strictly inert materials and as such will not contain putrescible matter or other organic materials in quantities which may give rise to ground gas generation. As such it is not proposed that qualitative ground gas risk assessment is undertaken.

8 Site Condition report

8.1 A Site Condition Report (SCR) was prepared for the original permit application, based on NRW's H5 template and has been reviewed for changes for the variation application.

8.2 The geology and hydrogeology sections of the SCR remain unchanged and concurs with the information presented in preceding chapters of this report.

8.3 There are no records of polluting incidents that affect the site since the SCR reviewed them in 2014. The Groundsure EnviroInsight Report confirms this finding. The map on page 6 shows some incidents off Glyndwr Road but the operator has never been informed of the incidents by NRW so can safely assume that they are not significant. The review of the NRW CAR forms above also demonstrates the lack of issues arising from operations on site. In addition the operator maintains a site diary to record incidents, which would be notified to NRW if they were to occur.

8.4 The previously tipped areas of the site have not been disturbed and no further stone has been extracted.

8.5 Sections 1 to 10 of the site condition report are considered suitable for this application.

9 Environmental Risk Assessment Model

9.1 The environmental risk assessment model prepared for the returned application was based on NRW's own risk assessment format. This has been reviewed with additional considerations for the bespoke permit and variation proposals using Oaktree Environmental's scoring system, which has been accepted for many permit applications and is consistent with NRW's own format for ease of reference.

9.2 The definitions used are set out below:

9.2.1 **Source/Hazard:** A property or situation that in particular circumstances could lead to harm.

9.2.2 **Consequences or harm:** The adverse effects or harm as the result of realising a hazard which causes the quality of human health or the environment to be impaired in the short or long term.

9.2.3 **Risk:** A combination of the probability of occurrence of a defined hazard and the magnitude of the consequences of the occurrence.

9.3 Pathways are defined as follows:

9.3.1 It is important in the assessment of a particular risk(s) and to inform the subsequent management of the risk(s) is the identification of the pathway(s) through which the risk may affect the identified receptor(s). The following are examples of pathways:

- Air
- Ground
- Water
- Direct contact / exposure

9.4 Harm can be defined as harm to people [i.e. injury (minor or major) and death] and to the environment though air, water or land pollution.

9.5 Effects of consequences. In order to quantify the level of risk and identify the appropriate management procedures, the potential effects must be considered, as outlined in the table below (Table 2 in the risk assessment excel sheet 0426-ERA v1):

Abbreviation	Consequences	Management Requirements
S	SEVERE	In all cases
Mo	MODERATE	In most cases
Mi	MILD	Occasionally
N	NEGLIGIBLE	No

Note: "Management" is the action required to reduce the risk of a hazard causing a problem on site. Contingency measures are procedures which are in place to reduce the consequences of a hazard.

9.6 Risk estimation and evaluation (probability/frequency of occurring hazard). The following table allows the likelihood by frequency of an occurrence of an identified risk to be present (Table 1 in the risk assessment excel sheet 0426-ERA v1):

Abbreviation	Probability	Evaluation	Probability/ frequency
1	Very likely	Could occur during any working day	High
2	Likely	Could occur regularly	Medium
3	Possible	Event possible	Low
4	Unlikely	Event very unlikely	Very Low

9.7 Risk assessment outcome (combination of probability & consequence). The following table shows the resultant risk of an identified hazard or potential situation. This uses the hierarchy of both probability and consequence to assess the level of risk. The level of risk determines what level of management would be required in order to reduce the risk of occurrence and/or scale.

		Consequence of exposure to hazard			
		S	**Mo**	**Mi**	**N**
Probability	**1**	High	High	Medium	Low
	2	High	Medium	Low	Near-Zero
	3	Medium	Low	Near-Zero	Near-Zero
	4	Low	Near-Zero	Near-Zero	Near-Zero

9.8 Where the risk assessment outcome is high, first-level management of the risk is essential, i.e. removal of hazard, implementation of major infrastructure/structural design measures to contain the risk/hazard and company policy changes to incorporate the management of the risk. All risk management measures must be supplemented with detailed induction training, spot training and tool-box talks to ensure all site staff and users are made fully aware of the risk/hazard, all potential consequences and necessary management and contingency procedures.

9.9 Where the risk assessment outcome is medium, the management of the risk should be tackled by management or delegated. If removal of the hazard is not possible, management will normally be met through implementing minor structural design measures or by imposing procedures for the prevention of occurrences which will be conveyed to all site staff through the appropriate training, including any contingency measures/procedures.

9.10 Where the risk assessment outcome is low, the management of the risk can be done wholly through appropriate training to site staff including any contingency measures/procedures.

9.11 Where the risk assessment outcome is near-zero, site staff should be made aware of the possibility of an occurrence and contingency measures should be readily available to all staff should they be required.

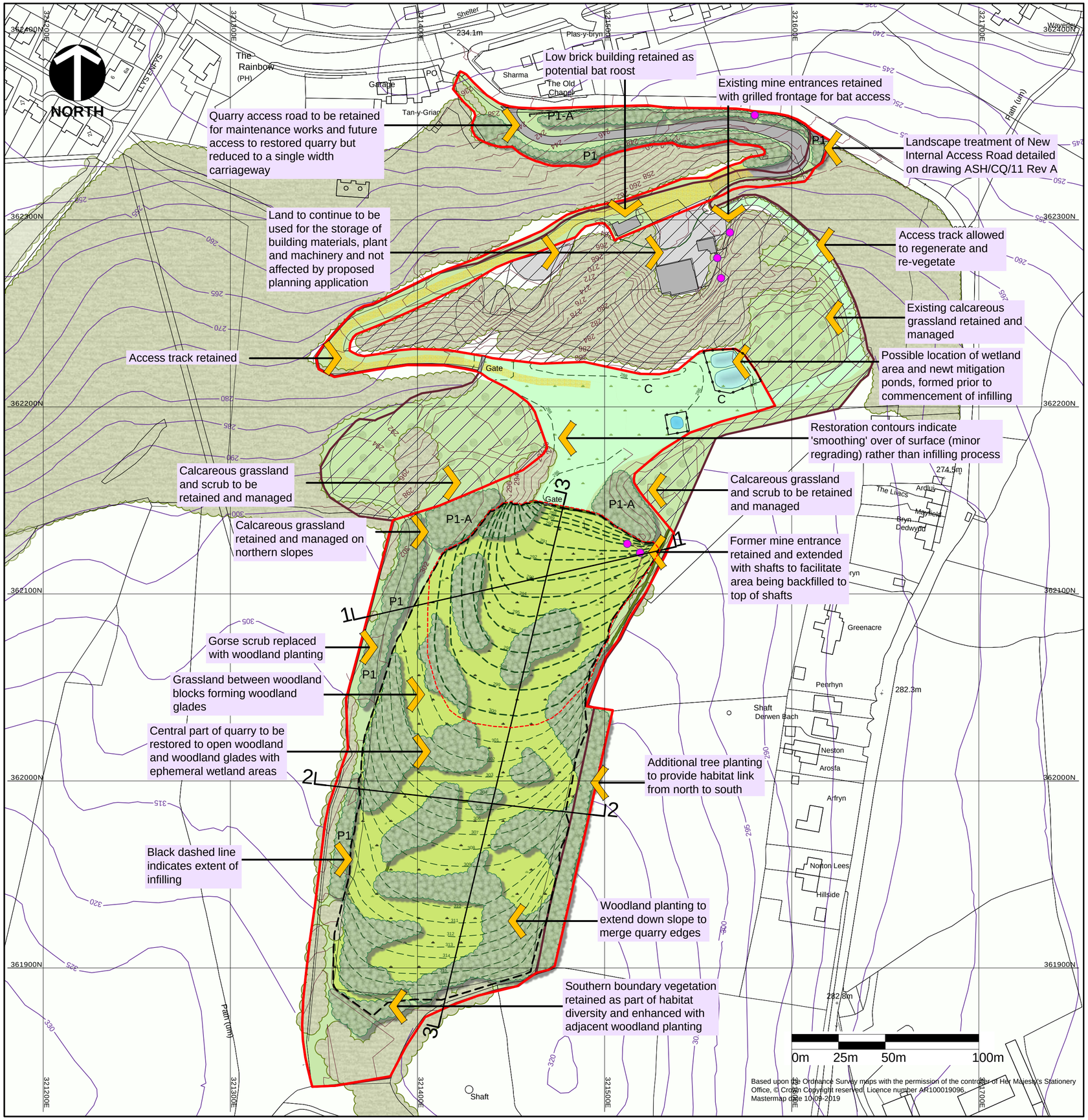
10 Conceptual Site Model

10.1 The risk assessment has been prepared as an excel spreadsheet which has been submitted with the variation application. The

10.2 Based on the risk assessment and the document review presented in this report it is considered that the proposed increase in the quantity of imported material at the site as described will not pose a significant risk to human health or controlled waters or of loss of amenity.

Appendix I

Drawings



Legend

- Revised Application Site (the Site)
- Cambrian Quarry
- Existing contours (beyond area of infill (including areas not infilled) and Ordnance Survey contours beyond Site.
- Permitted restoration contours (above 300m)
  Proposed restoration contours (level 300m to 287m)
- Drainage 'sink' area
- Boundary (extent) of infilling
- Existing calcareous grassland to be managed
- Restored areas of calcareous grassland
- Grassland for woodland grazing
- Existing woodland (within and beyond the Site)
- Proposed woodland planting and hedgerows (Woodland areas with 'P1' will be established in Phase 1, and areas noted as P1-A will be areas of 'gapping-up' planting retaining existing woody vegetation and calcareous grassland)
- Wetland habitats, fencing for grazing management regime
- Mine entrances
- Area beyond the Application Site but within Cambrian Quarry area where ongoing management is proposed
- Alignment for illustrative cross sections (See Figure L13)
- Existing buildings and yard area retained within areas beyond the Application Site
- Internal Site access tracks to be retained
- Boundary delineating the changes to the restoration design as proposed in the September 2019 Rev B plan issue

Rev B: Dated September 2019, variation of final contours

Client: **Ash Resource Management (Cambrian Quarry) Ltd.**

Project: **Cambrian Quarry Restoration Application**

Title: Restoration Masterplan (Revised September 2019)

CAD Ref:	Version:	Drawn by:	Plot size:	Date:
CA1170-D1v1 Rev B	1	RB	A2 Scale: Plan 1:1500	September 2019

Restoration layout is indicative only. All site details to be measured, underground services checked and layout adjusted accordingly prior to implementation. Levels in metres above Ordnance Datum. All dimensions to be checked on site.

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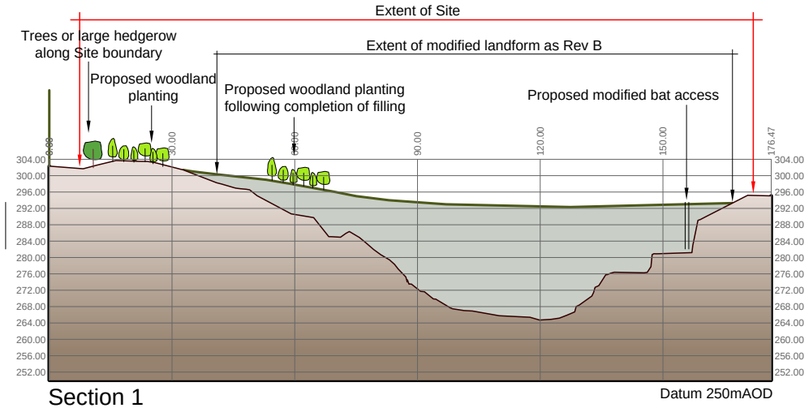
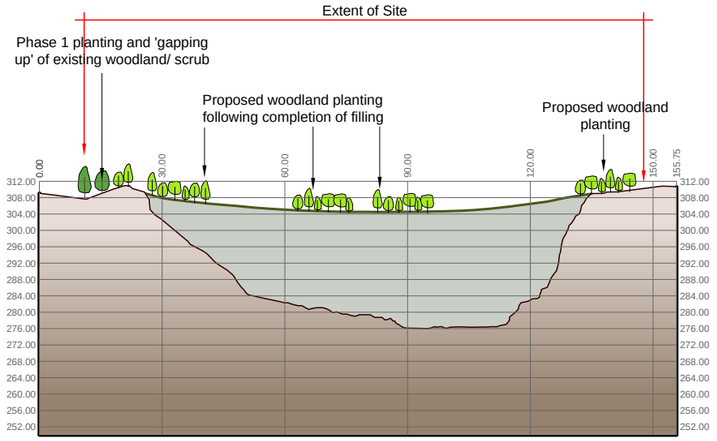
Drawing: **ASH/CQ/09 Rev B**



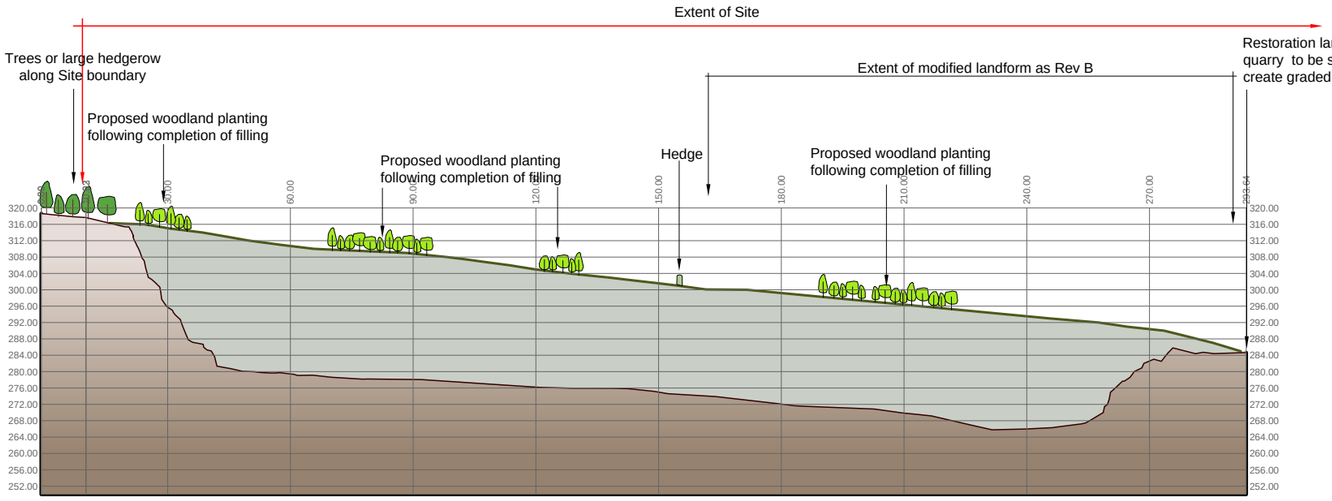
Section 1

Datum 250mAOD



Section 2

Datum 250mAOD



Section 3

Datum 250mAOD

Key

- Extent of (permitted) Site
- Proposed restoration landform
- Existing quarry landform
- Existing vegetation
- Proposed woodland planting

Note

See ASH/CQ/09 Rev B Restoration Masterplan for Section locations.

Client:

ASH Resource Management (Cambrian Quarry) Ltd

Drawing Title:

Cambrian Quarry Restoration Application

Cross Sections

Scale	Date
1:1500 @ A3	September 2019

Plan No.	CAD ref.	Revision
ASH/CQ/10 Rev B	CA1170-D1v2	Rev B

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