

**Revised Quarry Restoration Scheme Incorporating
Tunnel Arisings from the Haweswater Aqueduct
Resilience Programme (HARP) Namely the
Bowland and Marl Hill Tunnel Sections.**

Planning Application LCC/2021/0015

Waddington Fell Quarry

Supplemental Submission

Prepared for Armstrongs Aggregates Limited

December 2021

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Prepared By: Mark Leivers

Status: FINAL

For and on behalf of Armstrongs Aggregates Limited

1. Introduction

- 1.1 The planning application for a revised restoration scheme at Waddington Fell Quarry to incorporate arisings from the Haweswater Aqueduct Resilience Programme (HARP) was submitted by Armstrongs Aggregates Ltd in January 2021 with the application being validated in May 2021.
- 1.2 There has been a number of responses in respect of the application which require either additional detail or clarification. The supplemental submission addresses the issues which have been raised to date on the application.

2. Ecology

The wildlife trust for Lancashire, Manchester and North Merseyside

- 2.1 Mr John Lamb representing the Lancashire Wildlife Trust responded on 6 May 2021 to the planning application which set out a number of concerns/issues. A copy of the response is provided in appendix 2. The individual points raised in the response are addressed separately below;
- 1) *I am not aware, and have not had time to determine, how the proposed restoration scheme would affect existing planning conditions and/or obligations associated with Waddington Fell Quarry.*
- 2.2 As this is a new planning application, the existing planning conditions would be replaced by new conditions. Where the MPA considers that the current conditions are appropriate to be retained, they will be incorporated within any new planning permission issued.
- 2) *I would like to be reassured that no aspect of the proposed development would involve works on, or encroachment in any way, into the adjacent Biological Heritage Sites on Waddington Fell (refs: BHS74NW02 and 74NW04).*
- 2.3 The restoration scheme provides details relating to works within the red line boundary and therefore will not encroach upon the adjacent Biological Heritage Sites. As the works will be bounded by the limits of the worked quarry area, below the level of the quarry rim, there is no scope to encroach upon the adjacent BHS's. Dust suppression measures will be employed throughout the processes of importation, spreading, levelling and compression of the fill, to reduce/mitigate the potential impacts of dust arising from the works and smothering the vegetation within the adjacent BHS's.
- 3) *According to the ecology report, various protected and/or Priority Species*, including bats (see below), breeding birds, Common/Viviparous Lizard and Common Toad, have been recorded in the quarry. Risk Assessment and Method Statements (RAMS) are required to avoid detrimental impacts on any of the protected /priority species, their habitats, and to avoid breaches in legislation. The RAMS should be submitted to, and approved by, the planning authority before any works are initiated. The working methodology, as approved, must be implemented in full with compliance checks carried out as part of routine planning inspections/visits.*
- 2.4 It is anticipated that Reasonable Avoidance Measures (RAMs) and Risk Assessments and Method Statements will be in place to mitigate the potential adverse impacts on protected and priority species that may arise as a result of the works. Relevant licences from Natural England will be in place prior to the works commencing where deemed necessary. It is anticipated that an Ecological Clerk of Works would oversee the implementation of the RAMs for the duration of the works.
- 4) *The quarry faces are suitable for roosting bats (Target Note 54), yet the supporting statement states that parts of the existing quarry face would be covered. How will the applicant ensure that the restoration will not affect roosting bats or breach legislation that protects bats and their roosts?*

- 2.5 Further surveys for bats have been carried out throughout 2021, as part of ongoing ecological investigations to inform the planning application. Consideration of impacts to bats and measures to avoid and mitigate these impacts are included in the survey report dated December 2021 and provided in appendix 3.
- 2.6 It is anticipated that the infill works will be very gradual, occurring over a period of up to 6-10 years, therefore the risk of adverse impacts to the very small numbers of bats that use the quarry is considered extremely low and ongoing checks, informed by surveys, will be made as the quarry faces are covered to minimise significant risks.
- 5) *According to the Geotechnical Performance Specification, Reference: 14-513-R1-RevA, January 2021 "Landscape areas shall be topsoiled in accordance with clause 618 and seeded or turfed in accordance with the requirements of the contract specifics." The use of topsoil or turf in landscaping areas of the quarry as proposed, is both unnecessary and has not been justified. Furthermore, imported soils can be contaminated with seed and/or vegetative material from invasive plant species including Giant Hogweed, Himalayan Balsam, Japanese Knotweed, Montbretia and Pick-a-back-plant. I would like to be reassured that the tunnel arisings from HARP are suitable for the establishment of appropriate habitat types, such as acidic grassland, dwarf shrub heath, and possibly upland bog/mire communities on areas of impeded drainage. How will the habitat types be created if not by relying, quite reasonably, upon natural colonisation from the adjoining Biological Heritage Site? However, it is reasonable to expect target habitat types to be specified, together with target plant species and parameters for management intervention and controls.*
- 2.7 The primary aim of the restoration plan is for the area to be left to naturally regenerate. Therefore, topsoil will not be applied to the finished surface. Imported materials from the HARP project would be utilised, in conjunction with site-derived silts/fines (as per the existing restoration scheme), to achieve the final restoration contours.
- 2.8 Whilst the material from the HARP tunnels is locally derived, there is some uncertainty over the composition of the arising. To mitigate for this uncertainty ongoing testing of the materials and assessment of suitability to be used in the restoration will be undertaken. Appropriate amelioration will be undertaken if required, for example, materials will be combined with site-derived silts/fines from the quarry, which are of local provenance. The use of site-derived silts and fines on the surface layers will also assist in the creation of locally appropriate habitats. The restoration plan, specifically states that natural regeneration will be allowed, in order for the habitats that regenerate to be local and from adjacent genetic stock. Testing will also ensure that material imported from the HARP tunnels is not fertile and therefore be appropriate for the creation of the landforms in the restoration proposal.
- 6) *According to paragraphs 1.5, 4.4.3 and 4.5.1 of the supporting statement, the importation of HARP tunnel arisings will achieve Biodiversity Net Gain (BNG). However, it is not clear how the revised restoration would provide BNG over and above the existing approved restoration. The Trust is expecting to see BNG metric calculations to justify and support these statements.*
- 2.9 The supporting statement did not state that the proposals would lead to a BNG above that of the original restoration proposals. However, that withstanding, the previous restoration plan proposed one large waterbody with limited surrounding habitats, whilst the revised proposal provides multiple water bodies, with a variety of habitats between the water bodies, which would provide a greater proportion of terrestrial

habitats and a greater extent of more varied aquatic habitats (e.g. shallows, graded banks, deeper pools). It is clear that there will be a net gain in biodiversity transforming an area that currently comprises bare rock faces, bare ground/silt/sand, and filtration lagoons into a naturally regenerating site with varying, gently graduated topography, multiple water bodies, and terrestrial habitats that should develop into fens, mires, heaths, acid grassland, sandbanks, and partially vegetated cliffs. The application of the BNG metric is not considered appropriate in this case.

7) *Do the proposed restoration plans focus too much on certain breeding birds such as Sand Martins, and not enough on other breeding species such as Black-headed Gulls, Peregrines and Cuckoos? Has enough attention been given to the potential to conserve and enhance the populations of all Priority Species* that have been recorded on the site?*

2.10 The restoration proposal refers to sand martins in respect of the new mounds between the ponds that could provide suitable habitat for these species should they colonise the site. Additionally, it refers to providing habitat for wading birds, waterfowl and peregrines. The quarry is not considered suitable for species such as cuckoo, as their preferred habitat is woodland edges and open moorland. The site will provide a range of opportunities for a number of wetland and cliff-dwelling species, including peregrines and black-headed gulls.

8) *How will the proposed restoration scheme affect existing planning conditions and/or obligations associated with the ongoing management and monitoring requirements at Waddington Fell Quarry? Are revised maintenance/management and/or surveillance and monitoring proposals required to be submitted to, and approved by, the planning authority prior to commencement of any works. Who will be responsible for carrying out the restoration, its subsequent management, and the ongoing surveillance and monitoring of progress towards target habitat types and species populations? The restoration scheme, as approved, must be implemented in full with compliance checks carried out as part of routine planning inspections/visits.*

2.11 It is anticipated that there will be pre-development conditions attached to any planning consent which will require the prior approval of several issues including (but not limited to) monitoring of the progress of the restoration of the quarry.

2.12 The infilling exercise will be carried out by the applicant using materials imported by contractors working on the HARP scheme. The applicant will therefore be responsible for completing the restoration in accordance with the approved scheme, and its subsequent management post-completion for the duration set out in planning permission.

9) *It is not clear what the long-term aspirations are for the site. Considering that the quarry is within an Area of Outstanding Natural Beauty (AONB), in between two Biological Heritage Sites, and adjacent to the B6478 between Clitheroe/Waddington and Newton/Slaidburn, the site has potential to include visitor facilities (e.g. parking, electric vehicle charging points, visitor centre with educational facilities, café and toilets, self-guided nature trails, on-site information boards and a programme of environmental activities and events etc). The Trust would be willing to take part in discussions about the above, as well as its potential development as a Local Nature Reserve - if the site was under the control of a local authority (county, borough or parish council) - and/or managed by a community group along the lines of the Grimsargh Wetlands Trust near Longridge.*

2.13 The long-term aspirations for the site have not been considered beyond this application, however, the offer for the Wildlife Trust to be willing to take part in discussions is welcomed.

Lancashire County Council Environment Team

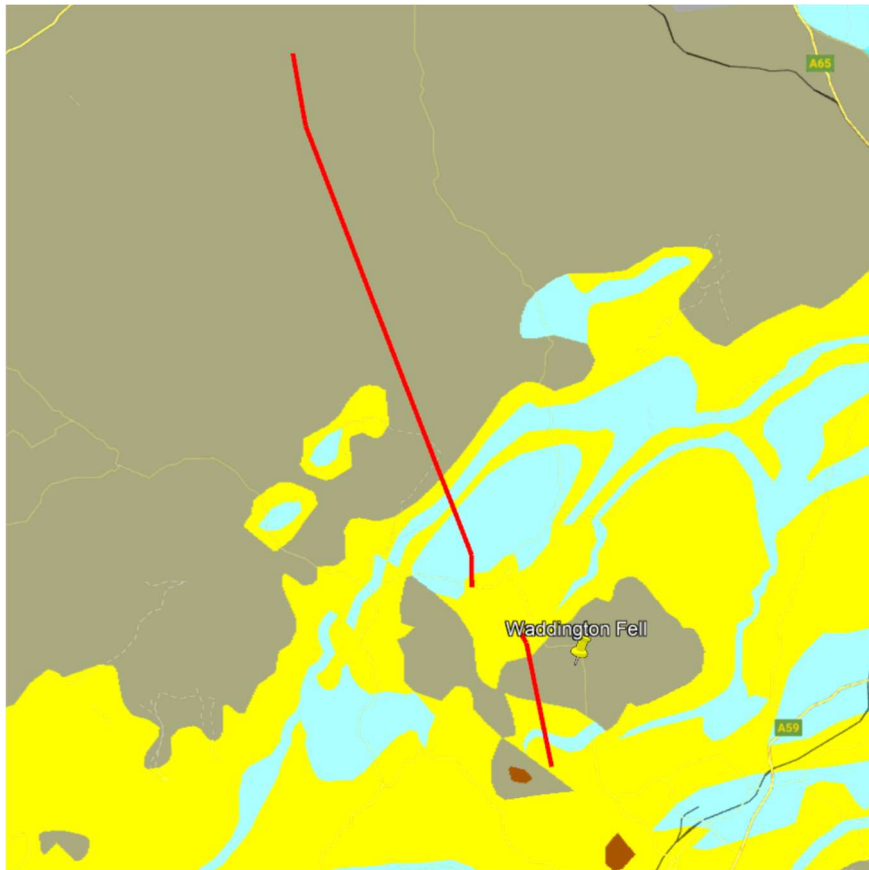
2.14 John Jones, the Senior Ecologist of the Environment Team at Lancashire County Council responded in April 2021 to the planning application. A copy of the response is included in appendix 1. There are elements within the response that have already been covered in the points outlined to the LWT above.

2.15 Environment Team response raised the issue of the suitability of the arisings stating that further information should be provided, specifically:

Further information is required in relation to the nature of the tunnel arisings from the proposed Hawswater Aqueduct. It needs to be demonstrated that any materials that would be used as part of the revised quarry restoration proposals will:

- *be suitable for the establishment of locally appropriate habitats, including moorland habitats typical of the adjoining Biological Heritage Site, such as heathland and acid grassland, and potentially mire communities on areas of impeded drainage.*
- *not affect pH and/or nutrient status of the site in such a way that would be detrimental to the establishment or long-term maintenance of habitats and native plant communities appropriate to the locality (as above).*
- *not encourage colonisation by invasive species or development of inappropriate habitats.*
- *not be in conflict with existing planning obligations associated with the quarry.*

2.16 The material to be used in the restoration works will be excavated rock associated with the HARP construction. The route of the proposed Bowland and Marl Hill length of tunnel pass through bedrock comprising Millstone Grit Group (the same formation worked at Waddington Fell Quarry) comprising mudstone, siltstone and sandstone sedimentary rock, Bowland High Group and Craven Group limestone and Bowland High Group and Craven Group mudstone, siltstone and sandstone.



An extract from the BGS bedrock geology indicates the Millstone Grit Group in light brown, the Bowland High Group in yellow and the Craven Group in blue.

The proposed route of the Bowland section of tunnel is the longer red line to the north of Waddington Fell.

The proposed route of the Marl Hill section of tunnel is identified as the shorter red line.

As can be seen, the majority of the tunnels will run through millstone Grit or sandstone/mudstone which has the same mineral composition as millstone grit.

- 2.17 The geology of the area from which the tunnel arisings will be derived is very similar in most parts to the mineral being worked at the quarry. The habitat in the area over which the proposed tunnel will traverse is broadly similar to that found in the vicinity of Waddington Fell. It is not therefore anticipated that there will be any concerns with the imported material to develop and sustain locally appropriate habitats. The pH and nutrient status of the material would be similar to the material proposed to be used in the existing quarry restoration scheme i.e. quarry waste derived from the processing of the mineral at the site. The proposal is to establish areas of natural revegetation adjacent to lower-lying wetland areas. This complex of habitat will enable the promotion of mire communities and well as areas of heathland and acid grassland on the higher, freer draining areas of the scheme.
- 2.18 There will be no imported soils to the site under the proposals, which will avoid colonisation by invasive species or inappropriate habitat. The reference to topsoil within the Geotechnical Performance Specification is incorrect. In order to ensure there is a suitable top restoration layer, the final levels will need to be 'dressed' with quarry fines and/or fines from the HARP scheme. This will effectively provide an impoverished soil layer which will promote natural revegetation.

3. Geotechnical

Environment Agency

- 3.1 The EA provided a response to the planning application in May 2021, which confirmed the Agency's objection to the proposed scheme on the basis that;
- *There is insufficient information to confirm that the tunnel waste will be uncontaminated as a result of the tunnel boring process. Contaminated waste could lead to pollution of groundwater in this location.*
 - *Groundwater levels and the source of standing water within the existing quarry must be confirmed, as deposition of material onto sources of groundwater would not be permitted*
- 3.2 To overcome the objections, the Agency has requested confirmation that the 'chemicals used within the tunnel boring process and contamination from operating the tunnel boring machines were not present a pollution risk' to groundwater once the tunnel uprisings have been used at the backfill the quarry. In addition, the EA requires details regarding groundwater levels within the quarry to be confirmed and evidence provided that the standing water at the quarry is surface water and not groundwater.

Boring Chemicals

- 3.3 United Utilities has confirmed the following in respect of the boring operations and chemical use;
- 3.4 Any chemicals used to facilitate the tunnel boring process will be strictly controlled, monitored and managed by the Contractor executing the works in accordance with their Environmental Management Plan and a specific Excavated Materials Plan will be prepared for the waste management aspect of the tunnel arisings.
- 3.5 The risk of contamination from chemicals used directly in the mechanical parts of the tunnel boring machines will be reduced by ensuring the machines are appropriately designed for the expected conditions and that a suitable maintenance regime is in place. Any arisings that are contaminated by chemical spills, should they occur, will be isolated and be disposed of appropriately.
- 3.6 The use of construction chemicals that have the potential to come into contact with the ground, if required, will be subject to an environmental risk assessment to ensure that any chemicals used do not present a pollution risk to groundwater. This will be available to the Environment Agency for review and audit at any time and any licences obtained where necessary
- 3.7 A routine monitoring regime will also be put in place to ensure that arisings comply with the waste acceptance criteria of its intended destination in accordance with the following declaration of intent.

Declaration of Intent

- 3.8 The contractor will take all necessary steps to ensure that all waste from the site is dealt with in accordance with the following:
- Revised Waste Framework Directive (2008/98/EC);

- Environmental Permitting (England and Wales) Regulations 2016 (as amended);
- Waste (England and Wales) Regulations 2011 (SI 2011/988) as amended;
- Hazardous Waste (England and Wales) Regulations 2005 (SI 2005/894) as amended;
- Waste Shipment Regulations 1013/2006, 14th June 2006;
- Environmental Protection (Duty of Care) Regulations 1991 (SI 1991/2839) as amended;
- Environment Agency, Guidance on the classification and assessment of waste, Technical Guidance WM3 (Version 1.1.GB);
- Landfill Directive 99/31/EC and Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills; and
- Environment Agency: Land Contamination Risk Management (LCRM) Guidance documents, April 2021.

3.9 The measures set out above will ensure that the material imported to the quarry will not present a pollution risk that could contaminate groundwater once deposited as part of the quarry restoration.

Groundwater

3.10 In order to verify the water table in the locality of the quarry, BGS borehole data has been evaluated. There are 11 boreholes within the immediate vicinity of the quarry drilled between 1968 and 1989, which have publicly available records. Not all of the boreholes record groundwater, however, there are sufficient data points to enable the groundwater level to be plotted. Whilst the is quite old the level of groundwater indicated by the boreholes is a sufficient depth in the vicinity of the quarry such that any fluctuations in levels will not materially affect the conclusions drawn from the data.

3.11 The borehole data is presented in the table below;

| Borehole | Easting | Northings | Date | AOD | Water AOD |
|-----------------|----------------|------------------|-------------|------------|------------------|
| SD74NW60 | 370670 | 448210 | 1979 | 220 | 105.70 |
| SD74NW59 | 370730 | 448200 | 1979 | 231 | |
| SD74NW54 | 371800 | 448220 | | 357 | |
| SD74NW85 | 371870 | 447800 | | 346 | 224.08 |
| SD74NW16 | 371680 | 447420 | 1989 | 356 | |
| SD74NW10 | 371500 | 447400 | | 378 | 319.80 |
| SD74NW9 | 371930 | 447027 | 1969 | 290 | 204.66 |
| SD74NW18 | 371920 | 446940 | 1969 | 283 | 197.66 |
| SD74NW53 | 371950 | 446740 | 1979 | 261 | |
| SD74NW8 | 371967 | 446655 | 1968 | 254 | 247.19 |
| SD74NW13 | 371900 | 446650 | | 257 | |

3.12 A cross-section through the quarry and surrounds has been generated from the data provided by the BGS, which is provided in appendix 4. The data indicates that the water table is circa 111m BGL at its highest point

i.e. at circa 233m AOD. The maximum depth of working at the quarry is proposed to be 340m AOD, thus there is a significant distance between groundwater and the base of the quarry.

- 3.13 The quarry comprises sandstone that sits above a band of shale. The mineral extraction is to the shale deposit. The shale provides an intermediate barrier that prevents surface water from free-draining leading to water collecting in the base of the quarry. This was recognised by the previous operator of the site, Aggregate Industries. In the approved restoration scheme for the quarry (reference 1980/07) dated December 2011 it notes that the level of the water areas would be 'approximately 337m AOD fluctuating seasonally'. The drawing, a copy of which is provided in appendix 6, also confirms that

The site is not significantly influenced by the local water table. However, the base of deposit lies on shale, which is largely concurrent with the quarry floor. When pumping ceases a water body is expected to form to the approximate level indicated on the drawing. This would fluctuate seasonally.

- 3.14 A copy of the BGS borehole data is also provided in appendix 5.

4. Highways

- 4.1 The Highways and Transport Department of Lancashire County Council have commented on the application and raised a number of concerns. With respect to the site access, they have stated:

1. *The existing access arrangements are not adequate for the proposal, that will see significant HGV movements to and from the north. Our initial review of ordnance survey maps suggests that the layout, turning radii and width of the existing access cannot accommodate HGV movements in and out of the Quarry simultaneously. These movements must be accommodated to ensure that HGVs are not waiting on the carriageway to access the Quarry, especially during the simultaneous tunnel bores. An improvement scheme at the access, widening the Quarry entrance and improving turning radii to the north is necessary. When the improvement scheme is developed, we would expect to see the site access layout with the swept path analysis and visibility splays.*
2. *We require a breakdown of the proposed movement values given in this application. This will allow us to understand, within the figures:*
 - a. *What are the current and expected ongoing quarry traffic movements (current permission expires December 22, but the Restoration Cross Sections drawing shows sections of stone that is to be removed)?*
 - b. *How many of the movements are specific to the HARP and its associated tunnel arisings?*
 - c. *What, if any, in these figures are for additional traffic that would have been part of restoration works and would therefore be traffic towards the south and principle network (A59)?*

Note: in parallel to this request, we will require more detailed breakdown and understanding of the figures currently provided by United Utilities (UU) in regard to the HARP scheme, to ensure that the figures provided by UU and the figures provided by this applicant correspond.

3. *Clearly, accommodating the significant uplift in HGV movements associated with the Quarry restoration proposal (including the HARP tunnel arisings) is a matter of ongoing discussion and will be the subject of wider mitigation, road condition monitoring and maintenance, which is expected to be subject to Grampian conditions linked to the HARP project.*

4. *Discussion around the detail and wording of the necessary conditions associated with both proposals.*

4.2 Sanderson Associates who are consulting highway engineers were instructed to appraise the site access and vehicle movements associated with the HARP infill proposals. A copy of their response is provided in appendix 7.

4.3 The Sanderson report summary states;

A proposed access improvement scheme has been development to accommodate the simultaneous movement of HGVs in to/out of the WFQ access and to effectively accommodate the swept path of vehicles travelling to/from the north of the site.

The predicted increase in traffic flows resulting from the HARP scheme are unlikely to be discernible in comparison to the site's existing traffic generation potential, with the exception of during Year 1, where the average frequency of vehicle movements generated by the site during operational hours will increase from 1 vehicle every 5 minutes to 1 vehicle every 3 minutes.

The predicted intensification of use is unlikely to have an adverse impact on the local road network in terms of either capacity or safety and therefore, in the context of National Planning Policy Framework paragraph 111, should not be prevented on highways grounds.

It should also be noted in terms of vehicle movements associated with the existing quarry operations, that these will have ceased prior to any importation of fill material from the HARP project.

Appendix 1 – LCC Ecology Comments

Planning Application LCC/2021/0015

**Revised Quarry Restoration Scheme Incorporating Tunnel Arisings from the
Haweswater Aqueduct Resilience Programme (HARP) Namely the Bowland
and Marl Hill Tunnel Sections.**

Waddington Fell, Slaidburn Road, Waddington

Ecology Response

John Jones

Senior Ecologist

Environment Team

Design & Construction Service

Lancashire County Council

15th April 2021

The following matters should be addressed before the planning application is determined:

- Further information is required in relation to the nature of the tunnel arisings from the proposed Haweswater Aqueduct. It needs to be demonstrated that any materials that would be used as part of the revised quarry restoration proposals will:
 - be suitable for the establishment of locally appropriate habitats, including moorland habitats typical of the adjoining Biological Heritage Site, such as heathland and acid grassland, and potentially mire communities on areas of impeded drainage.
 - not affect pH and/or nutrient status of the site in such a way that would be detrimental to the establishment or long-term maintenance of habitats and native plant communities appropriate to the locality (as above).
 - not encourage colonisation by invasive species or development of inappropriate habitats.
 - not be in conflict with existing planning obligations associated with the quarry.

- If a mixture of arisings is likely, then it will need to be demonstrated how materials will be separated and sorted so that suitable materials (such as millstone grit) for establishment of appropriate habitats will be placed on the surface of the restored site to a depth of at least 2m, to avoid adverse effects on pH and nutrient status within the rooting depth of desired plant communities.
- Topsoil must not be used. The Geotechnical Performance Specification therefore needs to be amended.
- The supporting statement suggests that import of HARP tunnel arisings will achieve a biodiversity net gain (Paragraphs 1.5, 4.4.3, 4.5.1). Sufficient information to demonstrate that the revised restoration would provide a biodiversity net gain in comparison to the approved restoration has not been provided. This should be demonstrated, for example, through statement of target plant communities and details of how these will be achieved, as well as completion of Biodiversity net gain metric calculations. This will depend upon the suitability of materials (as above).
- The ecology report submitted with the application indicates that the existing quarry faces comprise features suitable for roosting bats (for example, Target Note 54). The Supporting Statement states that parts of the existing quarry face would be covered (Section 5.2.5.1). It needs to be demonstrated that the proposed partial fill would not adversely affect any bat roosts or result in any breach of legislation that protects roosting bats.

If the above matters are adequately addressed and Lancashire County Council is minded to approve the planning application, then the following matters should be the subject of planning conditions:

- The ecology report confirms the presence of various protected and priority species at the site. This includes (but is not limited to) Peregrine falcon and other breeding birds, common lizard and common toad. Prior to commencement of the proposed works, precautionary working method statements should be submitted for approval to avoid detrimental impacts on these species and their habitat, and to demonstrate avoidance of any breach of legislation protecting these species. The approved method statements must be implemented in full.
- Changes to the restoration proposals will necessitate revision of the maintenance/management and monitoring proposals for the site. Revised maintenance/management and monitoring proposals must therefore be submitted and approved prior to commencement of the proposed restoration works. The approved maintenance/management and monitoring proposals must be implemented in full.

Appendix 2 – LWT Comments

Avison Young

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Avison Young is the trading name of GVA Grimley Limited

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Lancashire,
Manchester &
N Merseyside

6th May 2021

Rob Hope
Principal Planning Officer
Development Control Group
Lancashire County Council
County Hall
Preston
PR1 0LD

Dear Sir/Madam

RE: Planning Application LCC/2021/0015. Revised Quarry Restoration Scheme Incorporating Tunnel Arisings from the Haweswater Aqueduct Resilience Programme (HARP) Namely the Bowland and Marl Hill Tunnel Sections. Waddington Fell, Slaidburn Road, Waddington.

I am writing on behalf of the Lancashire Wildlife Trust with preliminary comments on the above application. Please note that whilst I have some familiarity with the site from a site visit in 2014, the presence of two adjacent Biological Heritage Sites (BHS – the Wildlife Sites system in Lancashire), and from looking down into the quarry from its perimeter, I have been trying to arrange a site visit with Armstrong's Planning and Environmental Manager and a couple of members of the Trust's Conservation Committee to discuss the application. Unfortunately, it was not possible to find a mutually convenient date before the 6th May – the closing date for comments on the application. Hence, I would be grateful if you would accept the following as an initial response, but also agree to accept a further response from the Trust that may be submitted following the proposed site visit:

1. I am not aware, and have not had time to determine, how the proposed restoration scheme would affect existing planning conditions and/or obligations associated with Waddington Fell Quarry.
2. I would like to be reassured that no aspect of the proposed development would involve works on, or encroachment in anyway, into the adjacent Biological Heritage Sites on Waddington Fell (refs: BHS74NW02 and 74NW04).
3. According to the ecology report, various protected and/or Priority Species*, including bats (see below), breeding birds, Common/Viviparous Lizard and Common Toad, have been recorded in the quarry. Risk Assessment and Method Statements (RAMS) are required to avoid detrimental impacts on any of the protected /priority species, their habitats, and to avoid breaches in legislation. The RAMS should be submitted to, and approved by, the planning authority before any works are initiated. The working methodology, as approved, must be implemented in full with compliance checks carried out as part of routine planning inspections/visits.
4. The quarry faces are suitable for roosting bats (Target Note 54), yet the supporting statement states that parts of the existing quarry face would be covered. How will the applicant ensure that the restoration will not affect roosting bats or breach legislation that protects bats and their roosts?



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5. According to the Geotechnical Performance Specification, Reference: 14-513-R1-RevA, January 2021 *"Landscape areas shall be topsoiled in accordance with clause 618 and seeded or turfed in accordance with the requirements of the contract specifics."* The use of topsoil or turf in landscaping areas of the quarry as proposed, is both unnecessary and has not been justified. Furthermore, imported soils can be contaminated with seed and/or vegetative material from invasive plant species including Giant Hogweed, Himalayan Balsam, Japanese Knotweed, Montbretia and Pick-a-back-plant. I would like to be reassured that the tunnel arisings from HARP are suitable for the establishment of appropriate habitat types, such as acidic grassland, dwarf shrub heath, and possibly upland bog/mire communities on areas of impeded drainage. How will the habitat types be created if not by relying, quite reasonably, upon natural colonisation from the adjoining Biological Heritage Site? However, it is reasonable to expect target habitat types to be specified, together with target plant species and parameters for management intervention and controls.
6. According to paragraphs 1.5, 4.4.3 and 4.5.1 of the supporting statement, the importation of HARP tunnel arisings will achieve Biodiversity Net Gain (BNG). However, it is not clear how the revised restoration would provide BNG over and above the existing approved restoration. The Trust is expecting to see BNG metric calculations to justify and support these statements.
7. Do the proposed restoration plans focus too much on certain breeding birds such as Sand Martins, and not enough on other breeding species such as Black-headed Gulls, Peregrines and Cuckoos? Has enough attention been given to the potential to conserve and enhance the populations of all Priority Species* that have been recorded on the site?
8. How will the proposed restoration scheme affect existing planning conditions and/or obligations associated with the ongoing management and monitoring requirements at Waddington Fell Quarry? Are revised maintenance/management and/or surveillance and monitoring proposals required to be submitted to, and approved by, the planning authority prior to commencement of any works. Who will be responsible for carrying out the restoration, its subsequent management, and the ongoing surveillance and monitoring of progress towards target habitat types and species populations? The restoration scheme, as approved, must be implemented in full with compliance checks carried out as part of routine planning inspections/visits.
9. It is not clear what the long-term aspirations are for the site. Considering that the quarry is within an Area of Outstanding Natural Beauty (AONB), in between two Biological Heritage Sites, and adjacent to the B6478 between Clitheroe/Waddington and Newton/Slaidburn, the site has potential to include visitor facilities (e.g. parking, electric vehicle charging points, visitor centre with educational facilities, café and toilets, self-guided nature trails, on-site information boards and a programme of environmental activities and events etc). The Trust would be willing to take part in discussions about the above, as well as its potential development as a Local Nature Reserve - if the site was under the control of a local authority (county, borough or parish council) - and/or managed by a community group along the lines of the Grimsargh Wetlands Trust near Longridge.

If you have any queries about any aspect of the above, please contact me via email, as below.



The Wildlife Trust for Lancashire, Manchester and North Merseyside

The Barn, Berkeley Drive, Bamber Bridge, Preston, Lancashire, PR5 6BY

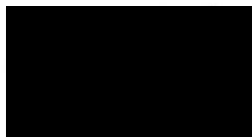
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Lancashire,
Manchester &
N Merseyside

I would be grateful if you could let me know the outcome of this application in due course, and inform me if there are any subsequent applications for the site.

Yours sincerely,



John Lamb B.Sc. (Hons.), M.Sc., MCIEEM,
Senior Conservation Officer (Lancashire)

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file ref: john/plan/rv/WFQ0521

* Priority Species, or Species of Principal Importance in England, as defined by the Natural Environment and Rural Communities (NERC) Act 2006.



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Appendix 3 – Bat Survey



Waddington Fell Quarry; *Bat Survey Report V2*

December 2021

Control sheet

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|--|---|--|
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| Job number: | BOW017/1272 | |
| Title: | Waddington Fell Quarry; Bat Survey Report V2 | |
| Client: | Armstrongs Group | |
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| <p>This report is prepared by Bowland Ecology Ltd for the sole and exclusive use of Armstrongs Group in response to their particular instructions. No liability is accepted for any costs, claims or losses arising from the use of this report or any part thereof for any purpose other than that for which it was specifically prepared or by any party other than Armstrongs Group.</p> <p>This report has been prepared by an ecological specialist and does not purport to provide legal advice. You may wish to take separate legal advice.</p> <p>The information which we have prepared and provided is true, and has been prepared and provided in accordance with the BS42020:2013 and the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.</p> <p>Bowland Ecology is accredited to Quality Guild (QG) standards in respect of our Quality, Environmental and Health and Safety procedures. The QG is an independent externally audited and accredited system that has been developed according to the principles of ISO9001, ISO14001 and OHAS18001.</p> | | |
| Signed (Author) | | Signed (QA) |
|  | |  |

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1. Introduction

- 1.1 Bowland Ecology Ltd was commissioned by Armstrongs Group to undertake bat surveys of Waddington Fell Quarry, Clitheroe, Lancashire (NGR: SD 71769 47897). The surveys are in relation to the infilling and restoration of the quarry. The aim of the surveys was to assess the existing quarry and immediate surrounding habitats, which are subject to the proposals, for evidence of roosting bats and bat activity. The survey involved a suite of emergence surveys of the existing quarry faces that are subject to the proposals, along with a remote static detector survey to assess the presence of bats and the use bats make of the location.
- 1.2 The quarry faces subject to survey, currently comprise vertical rock of some 20 - 40 m in height with numerous cracks and crevices within the rock face. The quarry is situated within a rural landscape, immediately surrounded by open moorland with heath and bog habitats, permanent pasture, marshy grassland, and scattered shrubs and trees. Filtration/sediment lagoons/ponds are present to the south east of the quarry. Farm buildings with stone barns and stone houses are scattered in the landscape within 1 km to the north and south west of the quarry. Boundary features, dominated by dry stone walls are infrequent, but those present provide bat commuting habitat and connect the site to woodlands to the east and south and the River Ribble to the south.
- 1.3 The purpose of the survey was to assess the value of the site for bats with particular reference to legal requirements (Appendix 1), further surveys, recommendations and potential development constraints.
- 1.4 This report includes a description of survey methods and results; and outlines proposals to provide protection, mitigation and enhancements for bats.

2. Methodology

- 2.1 The survey was based on a desk study and emergence and activity surveys that followed the Bat Conservation Trust's (BCT) 'Good Practice Guidelines' (Collins, 2016).

Desk Study

- 2.2 The aim of the desk study was to identify the presence of any legally protected species, notably bats/bat roosting sites.
- 2.3 The Multi-Agency Geographic Information for the Countryside (MAGIC) website (www.magic.gov.uk) was reviewed for information on locally, nationally and internationally designated sites of nature conservation importance (statutory sites only) and Habitats of Principal Importance with respect to bats on or within 1 km of the site boundary. It was also reviewed for information on active Natural England European Protected Species (EPS) Licence applications for bats in the surrounding area.
- 2.4 Ordnance Survey (OS) maps and aerial photographs (<http://maps.google.co.uk/maps>) were reviewed to help identify any suitable bat commuting, foraging and roosting habitats within the surrounding area. It was also reviewed for any continuous habitat and any other notable habitats including ponds within the surrounding area.

Static Detector Survey

- 2.5 In 2020, seven Anabat Express static detectors were left within and around the quarry for a period of up to seven nights during June and July to record bat activity for the duration. Plate 1 shows the location of the detectors. The bat detectors were positioned in the quarry from 26th June to 2nd July 2020 and 23rd July to 27th July 2020. Following collection, the results were downloaded and analysed to identify bat species using the quarry (if present). The detectors were placed to maximise the coverage of the quarry within the restrictions of health and safety due to unstable cliff faces, sheer drops and actively worked rock faces.
- 2.6 During 2021, three Anabat Express static detectors were left within the quarry for seven nights on three occasions to record bat activity for the duration. They were positioned in the northern corner, western corner and southern corner of the quarry void (see Plate 2), at the base of the quarry rock face. The bat detectors were positioned in the quarry from 28th June to 4th July 2021 and 12th August to 19th August 2021, 14th September to 21st September and 5th October to 12th October. Following collection, the results were downloaded and analysed to identify bat species using the quarry (if present).
- 2.7 The location of the static detectors in 2021 were guided by the results of the surveys in 2020 and aimed to maximise coverage of the quarry in terms of proposed impacts and highest potential for roosting opportunities.

Dusk Emergence and Activity Surveys

- 2.8 Dusk emergence and activity surveys were undertaken during 2021 with the aid of frequency division and time expansion detectors (EM Touch and Petterssen D230). Species identification was aided by the use of detectors and the experience of the surveyors. All recorded calls were subsequently analysed to confirm identification of the species encountered during the survey.
- 2.9 The surveyors positioned themselves to get optimal coverage of the site at locations shown in Plate 2. Details of the surveys, including the weather conditions, sunset and sunrise times are shown in Table 1 below.



Plate 1. Location of the static bat detectors (yellow stars) during the 2020 surveys.



Plate 2. Quarry rock faces subject to survey (red lines) and corresponding position of surveyors (green circles 1-3) and static detectors (yellow stars A-C) during the 2021 surveys.

Table 1: Dusk Emergence Survey Details

| Date | Type of survey | Time | Sunset/Sunrise | Weather | Surveyors ¹ |
|------------|----------------|-------------|----------------|---|------------------------|
| 28/06/2021 | Dusk emergence | 21:20–23:00 | 21:32 | Temp – 17°C Beaufort wind scale – F1 NW Precipitation – Dry, developing to light rain at 22:45 Cloud cover – 100 % | EL, JT, LB |
| 19/07/2021 | Dusk emergence | 21:17-23:17 | 21:15 | Temp – 22°C Beaufort wind scale – calm - F1 Precipitation – Dry Cloud cover – 10% | JT, SR, SM |
| 12/08/2021 | Dusk emergence | 20:31-22:16 | 20:46 | Temp – 17°C Beaufort wind scale – 2 W Precipitation – Dry Cloud cover – 95% | JT, MB, FD |
| 14/09/2021 | Dusk emergence | 19:13-21:58 | 19:28 | Temp – 12°C Beaufort wind scale – 2 N Precipitation – Dry Cloud cover – 100% | JT, MB, SR |
| 07/10/2021 | Dusk emergence | 18:16-20:31 | 18:31 | Temp – 16°C Beaufort wind scale – 3 SW Precipitation – Dry Cloud Cover – 100% | JT, MB, LH |

Survey Limitations

- 2.10 A detailed inspection of the rock faces for evidence of roosting bats was not possible due to health and safety reasons arising from the vertical and high nature of the cliff faces. The surveys for bats were therefore restricted to emergence surveys and static detector recordings. Static detectors were placed in locations that maximised coverage of the quarry in relation to areas of greatest proposed impact and highest roost potential, within the restrictions of health and safety. It was not possible to place static detectors around the rim of the quarry, due to sheer drops or below unstable and currently worked rock faces.
- 2.11 In addition, due to the presence of cliff faces and sheer drops, surveyors were positioned at a safe distance away from the rock faces. Personal Protective Equipment was required for all personnel working within the quarry and they were not permitted to approach the rock faces. The identification of bat species was therefore restricted by the distance of the surveyors from the bats and potential emergence locations. The monochromatic nature of the rock faces at dusk also limited visibility of the rock faces and potential bat emergence events during the survey. Deduction of potential emergence events was aided by a comparison of survey results from surveyors located at each position.
- 2.12 Bat surveys are limited by factors such as poor weather conditions and time of year. The survey was undertaken at a suitable time of year and the weather conditions were optimal.

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- 2.13 The assessment of effects on ecological features has been made using the available proposals and survey information and the professional judgement of the project ecologist. This includes a consideration of the relevant legislation (see Appendix 1) and planning guidance. If there are changes to the proposals, such as a delay in the works commencing on Site of over a year, the assessment would need to be reviewed.

3. Results

Desk Study

- 3.1 The site is located within the Bowland Fells Area of Outstanding Natural Beauty (AONB). There are no other designated sites within 1 km of the Site that include bats as part or all of their designating features.
- 3.2 With regard to European Protected Species Licences for bats within 1 km of the site; the search of the MAGIC website did not identify any within the search area.
- 3.3 Based on a review of aerial photographs and OS maps, suitable bat foraging habitat is present in the immediate surrounding landscape in the form of scattered trees and settling lagoons to the south and south east of the quarry. In the wider landscape the quarry is connected to suitable foraging habitat via dry stone walls and field boundaries, however, the closest woodlands are located between 1.2 and 1.5 km to the east, west and south of the quarry. Woodlands and stream valleys are found to the south of the site and these lead to the River Ribble 4.7 km to the south east. The majority of the surrounding habitats are dominated by open moorland and permanent pasture.
- 3.4 Woodlands provide suitable habitat for those bat species which show a preference for 'closed' habitats, such as brown long eared (*Plecotus auritus*) and Natterer's (*M. nattereri*) bats. Woodland edges, scattered trees, copses and pastoral land with surrounding boundary features such as drystone walls may be utilised by bat species that prefer 'edge' habitats, such as common pipistrelle (*Pipistrellus pipistrellus*) and whiskered bats (*Myotis mystacinus*). Open agricultural grassland and upland moorland is likely to provide favourable foraging habitat for noctule bats (*Nyctalus noctula*) which prefer to feed in 'open' habitats. These habitats may also be used by 'edge' species.
- 3.5 The desk study therefore indicates that common pipistrelle, soprano pipistrelle, noctule and myotis bats may be present in the area. It should be noted, however, that an absence of bat records on the site itself does not equate to an absence of bats at a location.

Site Description

- 3.6 The quarry comprises a deep excavation located at the top of Waddington Fell, which is at approximately 340 m altitude, with open moorland and permanent pasture (including extensive areas of marshy grassland) surrounding the site. The rock faces are vertical, with several (up to five) steps or benches, from the base of the quarry to the upper rim. The rock faces comprise jagged rocks with abundant cracks and crevices scattered throughout. The sides of the quarry subject to survey are south west and north facing.

Static Detector Recordings

- 3.7 The Anabat Express static detectors placed within the quarry from the 26th June to 2nd July 2020, 23rd July to 27th July 2020, 28th June to 4th July 2021, 12th August to 19th August 2021, 14th September to 21st September and 7th October to the 14th October. During the time in which the detectors were placed within the quarry, recordings were made from common pipistrelle bats, soprano pipistrelle bats (*Pipistrellus pygmaeus*), Myotis sp. bats, brown long eared bats and noctule bats. The recordings are summarised in Appendix 3 and weather conditions during the surveys are shown in

Appendix 4; the recordings mainly comprised foraging buzzes, however occasional social calls were also recorded.

- 3.8 In 2020, all detectors recorded pipistrelle activity in June, at a time of their peak activity. Levels of activity were lower overall in July, with some detectors recording individual or no bats in July. Of particular note were the frequency of passes by pipistrelle bats in June, which were particularly high near statics 1 and 2. These were located within the quarry at the northern end where it is most sheltered and closest to the oldest rock faces (not the most recently worked faces). Activity was moderately high around statics 4, 5 and 6. Statics 5 and 6 were located to the east and south of the quarry close to the settling lagoons and scattered trees, which are considered optimal foraging habitat for bats. Static 4 was located close to a farm building to the south of the quarry. The lowest levels of activity were recorded by statics 3 (southern end of the quarry) and 7 (quarry entrance), suggesting that these locations were suboptimal for bats and bat foraging activity. In July, no activity was recorded by statics 5 and 7.
- 3.9 The most frequently recorded bat species were common pipistrelle and soprano pipistrelle (within the quarry the highest number of passes by common pipistrelle bats recorded in one night reached 132 on the 24th June 2020), which generally reflects their frequency of occurrence in the local area. Outside the quarry, recorded by static 6, the greatest number of passes by common and soprano pipistrelle bats reached 250 on 26th June 2020. Brown long eared bats were not recorded by the statics in 2020, indicating that the habitat is unsuitable for this species. Myotis and noctule bats were recorded at low levels by statics 1, 2, 4, 5 and 6. Their activity was slightly higher near static 6, with a peak of 18 myotis passes recorded on 1st July 2020. The remainder were individual or very low numbers of myotis and noctule bats on occasional nights during 2020.
- 3.10 In 2020, bats were first detected by the static detectors within the quarry (statics 1-3) between 17 minutes and four hours after sunset. The majority of first bats detected occurred between 30 minutes and one hour after sunset (19 occasions), whilst on nine occasions the first bat was detected between one hour and four hours after sunset, and only on four occasions was the first bat detected within 20 minutes of sunset. Most of the bats (all except one) were first detected at least 30 minutes after sunset by detector 3, whereas detectors 1 and 2 each had two occasions where the first bat was detected within 20 minutes of sunset; the rest varied between 35 minutes and 4 hours after sunset.
- 3.11 During 2021, the highest levels of bat activity were recorded within the quarry at the northern end, by detector A, with up to 736 passes by bats recorded in one night. The majority of the passes recorded were by common pipistrelle bats (657 passes on 2nd July 2021). Consistently high levels of bat activity were recorded by static A throughout the surveys in June and July. Comparatively low levels of bat activity were recorded by both statics B and C, with a maximum number of passes reaching 97 at static C on 1st July 2021. Very few bats were recorded by static C during August, with up to 10 passes, on 13th August 2021. Lower levels of activity were recorded in September, with the maximum passes recorded by detector A, which recorded 478 passes on the 17th September. The majority of the recorded passes were from common pipistrelle (425 passes). Significantly less activity was observed in October. During the October deployment statics A and B recorded no activity while static C only recorded 3 pipistrelle passes on the 8th October (2 soprano pipistrelle passes and a single common pipistrelle).
- 3.12 Myotis and noctule bats were recorded infrequently, with a peak of recordings on 14th of September of 8 noctules passing static A, and six myotis bats passing static C on 13th August. The remainder were individual or very low numbers of bats on occasional nights during 2021.
- 3.13 In 2021, bats were first detected by the static detectors within the quarry (A-C) between 38 minutes before sunset and 57 minutes after sunset. For detector B, the first bat

(common pipistrelle) was recorded before sunset every day in June. During September, all first bat activity was recorded between 14 and 45 minutes after sunset by static B. Likewise, all bats detected by static A were recorded between 21 minutes and 42 minutes after sunset during June, August and September. The first bats detected by static C were slightly later, between 30 and 57 minutes after sunset during June and August. Bats were detected later during September and October by static C, with the earliest recorded 41 minutes after sunset and the latest 1 hour 58 minutes after sunset.

Evening Emergence Survey Results

- 3.14 Details of the dusk emergence and bat activity surveys of the quarry are shown in Table 1 above. The bat surveyors were positioned at locations 1, 2 and 3 in Plate 2. The results of the emergence and activity survey are shown in Appendix 3; these are summarised in Table 2 and the locations of highest bat activity are shown in Plate 3.

Table 2. Summary results of the evening emergence and activity surveys.

((PP45 = common pipistrelle, PP55 = Soprano pipistrelle, M = Myotis, N = Noctule, BLE = Brown long eared SNH = Seen not heard, HNS = Heard not seen)

| Bat Surveyor Recordings (Frequency Division and Heterodyne Detectors) | | | |
|---|---------------------------------------|--------------------------|---------------|
| 28/06/2021 | Surveyor 1 | Surveyor 2 | Surveyor 3 |
| Sunset time | 21:32 | 21:32 | 21:32 |
| Time of first bat | 22:05 (PP45) | 22:20 (PP45) | 22:52 (PP45) |
| Number of emergent bats observed, location and time emerged | None observed | None observed | None observed |
| Approx. Number of bat sightings | 19 (1 x PP55, 15 x PP45, 1 x M 2 x N) | 11 (1 x PP55, 10 x PP45) | 1 (1 x PP45) |
| Species observed | PP55, PP45, M, N | PP55, PP45 | PP45 |

| Bat Surveyor Recordings (Frequency Division and Heterodyne Detectors) | | | |
|---|--------------------------|---------------------------------|----------------|
| 19/07/2021 | Surveyor 1 | Surveyor 2 | Surveyor 3 |
| Sunset time | 21:15 | 21:15 | 21:15 |
| Time of first bat | 22:25 (PP45) | 22:31 (PP45) | 22:29 (PP45) |
| Number of emergent bats observed, location and time emerged | None observed | None observed | None observed |
| Approx. Number of bat sightings | 26 (4 x PP55, 22 x PP45) | 17 (3 x PP55, 12 x PP45, 2 x M) | 10 (10 x PP45) |
| Species observed | PP55, PP45 | PP55, PP45, M | PP45 |

| Bat Surveyor Recordings (Frequency Division and Heterodyne Detectors) | | | |
|---|--------------------------------|--------------------------------|---------------|
| 12/08/2021 | Surveyor 1 | Surveyor 2 | Surveyor 3 |
| Sunset time | 20:46 | 20:46 | 20:46 |
| Time of first bat | 21:19 (N) | 21:31 (PP45) | 21:33 (PP45) |
| Number of emergent bats observed, location and time emerged | None observed | None observed | None observed |
| Approx. Number of bat sightings | 12 (6 x PP55, 3 x PP45, 3 x N) | 16 (5 x PP55, 9 x PP45, 2 x N) | 1 (1 x PP45) |
| Species observed | PP55, PP45, N | PP55, PP45, N | PP45 |

| Bat Surveyor Recordings (Frequency Division and Heterodyne Detectors) | | | |
|---|---------------|---------------|---------------|
| 14/09/2021 | Surveyor 1 | Surveyor 2 | Surveyor 3 |
| Sunset time | 19:28 | 19:28 | 19:28 |
| Time of first bat | 19:51 (N) | 19:50 (N) | 20:25 (PP45) |
| Number of emergent bats observed, location and time emerged | None observed | None observed | None observed |

| | | | |
|---------------------------------|---|--|------------------------|
| Approx. Number of bat sightings | 16 (11 x PP45, 3 x N, 1 x M, 1 x unknown) | 17 (5 x PP55, 8 x PP45, 2 x N, 1 x BLE, 1 x unknown) | 3 (2 x PP45, 1 x PP55) |
| Species observed | PP45, N, M | PP55, PP45, N, BLE | PP45, PP55 |

| Bat Surveyor Recordings (Frequency Division and Heterodyne Detectors) | | | |
|---|------------------|-------------------------|---------------|
| 07/10/21 | Surveyor 1 | Surveyor 2 | Surveyor 3 |
| Sunset time | 18:31 | 18:31 | 18:31 |
| Time of first bat | NA | 19:11 (BLE) | 19:36 (PP45) |
| Number of emergent bats observed, location and time emerged | None observed | None observed | None observed |
| Approx. Number of bat sightings | No bats observed | 2 (1 x BLE, 1 x Myotis) | 2 (2 x PP45) |
| Species observed | | BLE and Myotis | PP45 |

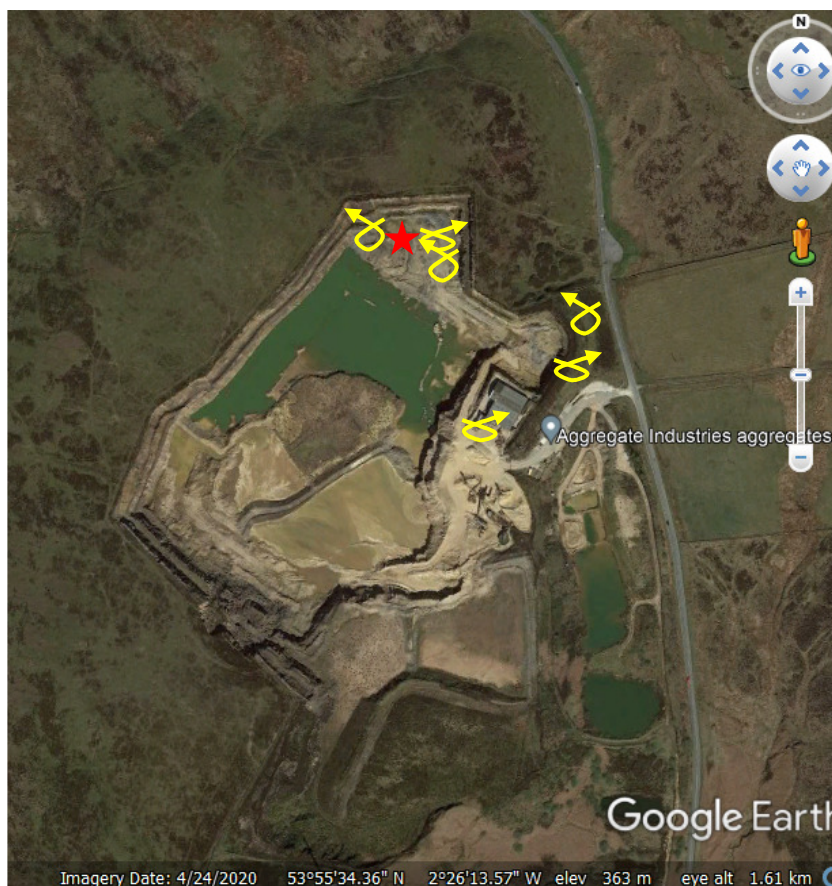


Plate 3 Locations of highest bat activity (red star) and indicative flight activity (yellow arrows).

- 3.15 On the 28th June 2021, the initial bat activity recorded by surveyor 1 was very faint, and heard at some distance from the surveyor. The first bat seen was recorded at 22:41; only two bats were visually recorded by the surveyor, the rest were heard but not seen. The majority of the flight activity was foraging flight. Surveyor 2 recorded the first common pipistrelle bat above the quarry rim, flying over the heather at 22:20. A further 10 bats were recorded, of which eight were rapidly commuting overhead or along the adjacent road edge. Only two bats were observed foraging above or around the quarry edge. All bats recorded by surveyor 2 were pipistrelle bats. Surveyor 3 recorded one common pipistrelle bat at 22:52 in a commuting flight in a northerly direction along the top edge of the quarry. No bats were confirmed to emerge from the rock faces.
- 3.16 On the 19th July 2021, the initial bat activity recorded by surveyor 1 was of two faint calls from bats that were not seen. Foraging activity in front of the surveyor was recorded on

11 occasions between 22:29 and 22:43. Continuous foraging by up to two bats at any one time was recorded between 22:48 and 23:04. Surveyor 2 recorded the first bat (common pipistrelle) at 22:31. A further four foraging bats were seen and thereafter all bats that were heard but not seen. Surveyor 3 recorded the first bat (common pipistrelle) at 22:29 as it flew around the rim of the quarry. All bats observed by surveyor 3 were flying above the rim of the quarry and did not enter the quarry to forage. No bats were confirmed to emerge from the rock faces.

- 3.17 On the 12th August 2021, surveyor 1 recorded the first bat at 21:19 when a noctule flew overhead. A second noctule was heard foraging over the lagoon above the height of the quarry rim at 21:21 for five minutes. The first common pipistrelle was heard foraging (but not seen) at 21:29, followed by several passes by individual soprano pipistrelle bats between 21:30 and 21:52. Foraging by a common pipistrelle bat occurred sporadically throughout the survey. Surveyor 2 recorded the first common pipistrelle bat at 21:31 as it flew to the south of the building. One common pipistrelle foraged for 6 minutes above the cliff to the north east of the surveyor. The remainder of the observations were of bats that were heard but not seen, either as brief passes or foraging. Surveyor 3 recorded one bat, a common pipistrelle at 21:33 as it flew along the rim of the quarry. No bats were confirmed to emerge from the rock faces.
- 3.18 On the 14th September surveyor 1 observed the first bat, a noctule bat, at 19:51, 23 minutes after sunset. The first common pipistrelle bat was observed at 20:08, forty minutes after sunset, which is 20 minutes after the expected time of emergence for pipistrelle bats, indicating that it and subsequent bats may not have emerged from the rock face. A further 14 passes by bats were recorded by surveyor 1, with only three foraging close to the surveyor, the remaining bats were commuting or social calling. Surveyor 2 also recorded noctule bats at the start of the survey, with the rest of the bats being common and soprano pipistrelles, social calling and commuting. A brown long eared bat was recorded by the surveyor at the end of the survey (20:50). Surveyor 3 only recorded three bats, with the first bat recorded approximately 1 hour after sunset, at 20:25. The other two bats were briefly heard but not seen. No bats were confirmed to emerge from the rock faces. More bats were observed social calling than in previous surveys, which is consistent with their behaviour in the autumn, when lekking commences.
- 3.19 On the 7th of October, surveyor 1 recorded no bat activity throughout the duration of the survey. Surveyor 2 recorded the first bat, a BLE, at 19:11, 40 minutes after sunset which is around 20 minutes earlier than the expected emergence time for this species. The second, and final bat, observed by surveyor 1 was a *Myotis* sp. recorded at 19:49. Neither bat was foraging closer to the surveyor. Surveyor 3 recorded two common pipistrelle bats at 19:36 and 19:43 respectively with the earlier bat 1 hour 5 minutes after sunset, well after the expected emergence time for common pipistrelle. Both common pipistrelle bats were rapidly commuting along the top edge of the quarry in a north-westerly direction. No bats were observed emerging from the rock face.

Bird Observations

- 3.20 Two peregrine falcons were observed during each emergence survey. The pair are known to breed within the quarry.

4. Evaluation and Assessment of Potential Impacts

- 4.1 An assessment of effects on bats has been made using the available proposals and survey information and the professional judgement of the project ecologist. This includes a consideration of the relevant legislation (see Appendix 1) and planning guidance.

Known Bat Roosts and Foraging Habitats

- 4.2 It is considered that the proposals will not affect the foraging habitat (scattered trees and lagoons around the quarry) utilised by bats (as seen by surveyors 1 and 2), since the habitats outside the quarry will not be impacted by the proposals to infill the void. Habitats to be lost predominantly comprise bare ground, bare rocks, temporary open water (lagoon within the quarry), and open short perennials and ephemerals, which are considered to be sub-optimal foraging habitats for bats. The proposals are not considered to negatively impact upon other foraging habitats in the wider area. Therefore, further consideration of impacts to these foraging features is not considered necessary.

Bats

- 4.3 Whilst an inspection of the rock faces was not possible due to health and safety reasons, the abundance of cracks and crevices within the rock faces indicate that they are of moderate bat roost potential (assessed against criteria outlined in Appendix 2) for crevice roosting bats such as common and soprano pipistrelle bats, as well as Natterer's and whiskered bats. Whilst the habitat within the site is sub-optimal which reduces its suitability for foraging or roosting bats, the proximity of the site to good foraging habitat, suggests that it might occasionally be used as a foraging resource. Given the lack of commonly occurring roosting opportunities (e.g. houses, buildings and trees) in the local area, roost opportunities within rock faces and caves might be of moderate value to bats. They might also be of importance to bats during the hibernation period; indeed, a number of caves and disused lime kilns within the Bowland Fells are known hibernation sites for bats.
- 4.4 The static detector surveys confirmed intensive use of the quarry by foraging bats during the period in which they were deployed, particularly during the peak maternity season. Species such as common pipistrelle, soprano pipistrelle and *Myotis* sp. bats were all confirmed to be present during the static detector surveys. Common pipistrelle bats were most frequently recorded.
- 4.5 The emergence and activity surveys also confirmed use of the quarry by bats, including bats foraging around the rock faces within the quarry, particularly in the north western corner where the rock faces are south west facing. The surveys also confirmed foraging bats high above/level with the top of the quarry by high flying species such as noctule bats. Species present included common pipistrelle, soprano pipistrelle, *Myotis* sp. and noctule bats. One observation of a brown long eared bat was also made. Emergence was not confirmed during the emergence surveys due to visual restrictions posed by the location.
- 4.6 Pipistrelle bats are known to emerge approximately 20 minutes after sunset, myotis bats emerge up to an hour after sunset and noctule bats often emerge at or before sunset (Collins 2016). The earliest timing of the first pipistrelle bat to emerge was 33 minutes after sunset from the north west corner of the quarry during the first and third emergence surveys. The first bat detected by surveyors at the other locations were between 48 minutes and 1 hour and 58 minutes after sunset, which indicates that the earliest bat either flew in from the north or emerged from the northern rock faces. Noctule bats were often seen first, but as they were observed high above the quarry, commuting or foraging over the top, they were not considered to have emerged from the rock faces. *Myotis* bats were only recorded on two occasions; the first time was approximately one hour after sunset and the second occasion was approximately 1.5 hours after sunset, suggesting a possible emergence by the first myotis bat. Social calls were recorded

more frequently during the September emergence survey, when compared with the earlier emergence surveys, which is consistent with their behaviour during the lekking period. The site was however, considered not to be used intensively during the autumn period (particularly during October), indicating that it is unlikely to be an important lekking site.

- 4.7 Only small numbers of bats were observed at any one time during the emergence surveys, suggesting that if bats are roosting within the rock faces, they are roosting as individuals or in small numbers.
- 4.8 The static recordings from 2021 largely confirmed the findings of the emergence surveys, with the majority of first pipistrelle bat recordings each night being at the time when pipistrelle bats usually emerge from roosts, particularly by the detectors placed at the northern end of the quarry. The timings of emergence, particularly those recorded by detector B in June (before sunset), suggests that bats were emerging from within the quarry rock faces or the adjacent quarry buildings. If these bats had flown in to the quarry from outside, there should have been a lag between the expected emergence time and arrival time/first detection at the quarry. The levels of activity recorded by static A in June and July also support the likelihood of roosting bats within the quarry at this location (south west facing slope).
- 4.9 The static detector recordings from 2020 also suggested that bats were likely roosting within the quarry, because the greatest levels of activity were from the detectors within the quarry and these detectors generally recorded the earliest bats, indicating that the bats may have emerged from the quarry or quarry buildings, foraged in the sheltered quarry first, before flying past the other detectors. The exception to this may be static 4, which was placed close to a building to the south of the quarry. This building may have also had roosting bats since the earliest pipistrelle bats were consistently recorded close to the expected emergence time for pipistrelle bats.
- 4.10 Whilst bats were not observed to emerge from the rock faces during the emergence surveys, the timings of the earliest recorded bats and levels of activity in the northern end of the quarry mean that the possibility of bats roosting within the rock faces cannot be ruled out.
- 4.11 The proposed works will involve infilling the main quarry void with spoil (rock) derived from excavation activities (tunnelling) within the Bowland Fells. Therefore, the rock faces to a maximum height of 355 m will be covered by infill material. As a result, if bats roost within the rock faces between 349 m and 355 m, is it possible that negative impacts to bats and their resting places may occur, including death and injury of bats as well as destruction of a resting place, which could constitute an offence. However, the majority of the rock faces and associated crevices will remain exposed (between 355 m and 365 m on the north rock face, between 351 m and 380 m along the south rock faces, and 351 to 364 m along the western rock faces), as infill material is expected to reach the height of the first or second benches. It is therefore considered that opportunities for bats to roost in the rock faces will remain available on completion of the works.
- 4.12 In the wider area, the proposals are considered unlikely to have a significant impact upon the conservation status of bats, due to the likely small numbers of bats and the rural location of the site. There will not be any loss of linear features or severance of flight lines, as the proposals will not impact upon such features. Other valuable commuting, foraging or roosting habitats are likely to be present and remain undisturbed in the wider environment.
- 4.13 Cliff faces will be left exposed around the north, north western and southern sides of the quarry, with abundant crevices and voids on conclusion of the infill process. Therefore, the conservation status of bats should not be negatively impacted by the restoration of the quarry. The proposed restoration scheme will provide enhanced foraging resources

for bats in the form of grassland, shrubs, heath, and small open water pools. This will likely result in an overall beneficial impact of the proposals upon bats.

Birds

- 4.14 Peregrine falcons were recorded during each emergence survey within the quarry and they are known to have breeding status (M. Breaks, pers. comm.). The proposals therefore have the potential to cause disturbance to nesting peregrine falcon, which is listed as a Schedule 1 species (see Appendix 1).
- 4.15 The peregrine falcons are known to use the quarry regularly and are tolerant of disturbance (visual and noise from work activities), however, infilling the quarry and subsequent loss of rock face and breeding ledge opportunities may result in loss of suitable nesting habitat and could potentially result in killing and injury of the nesting peregrines, eggs and chicks, as well as loss of an active nest if undertaken at an inappropriate time of year. These potential impacts could lead to a breach of UK legislation. It is anticipated that exposed quarry faces with ledges would remain above the level of the infill, as described above, and therefore opportunities for nesting are likely to be retained. Therefore, impacts to peregrines through loss of nesting ledges due to infilling are considered to be negligible.

5. Recommendations, Mitigation and Enhancement

Bats

- 5.1 Whilst the bat surveys did not confirm emergence and roosting activity by bats in the cliff faces of Waddington Fell Quarry, they could also not rule out the possibility of roosting bats. If present, is it considered likely that the cliff faces are used by small numbers of crevice roosting bats. The proposed works, which includes covering the lower cliff faces with infill material, may therefore carry a very low risk of death and injury of small numbers of bats and loss of roost sites. The current survey information indicates that the proposals will not detrimentally affect the conservation status of the species, due to the potentially small numbers of bats utilising the quarry.
- 5.2 As the works are likely to be phased over a long period of time (several years) and the likelihood of the works coinciding with a specific location occupied by a bat is very low, **it is anticipated that it is appropriate for the works to proceed under Reasonable Avoidance Measures (RAMs)**. RAMs are necessary to mitigate the risk of unlawful disturbance, injury or death of bats, to mitigate the risk of damage occurring to roosts, and ensure that opportunities that might be utilised by bats are available on a like for like basis.
- 5.3 It is advised that the following RAMs **MUST** be adhered to throughout the duration of the works. If the scope of the works deviates from the information provided, the project ecologist should be contacted for further advice. If any changes occur to the proposed scheme, these RAMs must be revised to accommodate any changes as appropriate.
- 5.4 Responsible party indicated at end of each item: **AG** – Armstrongs Group (or contractor under the instruction of AG), **BE** – Bowland Ecology.
- Toolbox talk to be provided to all staff and contractors working on site prior to the commencement of any works to ensure that all contractors are made aware of the potential presence of bats and the signs to look for – **BE**
 - An information poster (Appendix C) to be put up in the site cabin for all contractors to refer to – **AG**
 - The works to infill the quarry will be preceded by a survey for bats, to ensure the most up to date information is available to inform areas of highest activity and most likely areas of impacts to bats – **BE**
 - If bats are found, works must cease immediately and the supervising ecologist alerted immediately, who will carefully remove the bat(s) **wearing gloves** and place them in the hibernation box already installed on site – **BE**
 - On completion of the works, an assessment of access points and crevices in the rock face above the level of the infill limit should be undertaken and additional crevices provided if it is deemed that insufficient opportunities are present (details to be agreed with supervising ecologist) – **AG**
 - All works are to be undertaken during daylight hours. No artificial lighting is to be left on overnight – **AG**
 - If changes to the proposed works and/or proposed work schedule occur, the scheme ecologist must be contacted immediately – **AG**.
- 5.5 **If it is not possible to follow the RAMs, the works should be carried out under a licence from Natural England** (under Policy 3) to permit the proposed works to lawfully proceed to provide a derogation from the law and permit the lawful disturbance, or killing and injury of bats.

- 5.6 Natural England Licensing Policy 3 - *Allowing EPS to have access to temporary habitats that will be developed at a later date*, states that “Where development (such as mineral extraction) will temporarily create habitat which is likely to attract EPS, Defra favours proposals which enable works to proceed without the exclusion of EPS, where the conservation status of the local population would not be detrimentally affected. On completion of development such sites must contribute to the conservation status of the local population as much as or more than the land use which preceded development. The measures to achieve this should be set out in a management plan and secured by a legal agreement.”
- 5.7 External lighting, such as security lights, road and track lighting or lighting of the rock faces, is known to have detrimental impacts on the behaviour of bats (Mitchell-Jones 2004). Therefore, any new lighting schemes should be designed in accordance with appropriate guidance (Stone 2013) to minimise the impacts on foraging bats likely to be utilising the habitats. This includes (but not limited to) measures such as;
- Use of low pressure sodium lamps or high pressure sodium instead of mercury or metal halide lamps;
 - Use of lights at night should be avoided; and
 - Lighting should be directed to where it is needed and light spillage avoided, in particular along the rock faces where bats are likely to forage.
- 5.8 Whilst the proposed works will enhance the habitats available to bats in the long term, it is important that bats are not attracted to the working area. Therefore, alternative, artificial bat roosting opportunities should not be provided within the quarry during the proposed infilling works. Artificial roosting boxes may be placed upon trees outside the quarry, however, the abundance of cracks and fissures within the natural cliffs above the quarry is likely to result in these largely being redundant. Measures will therefore need to be put in place to contribute to the conservation status of the local population on completion of the development, which will involve the provision of foraging resources such as water bodies, heath and shrubs/scrub habitat. Bats will also be incorporated into the quarry remediation plan as a conservation target/feature, which will be actioned once works within the quarry cease.

Birds

- 5.9 Management of the impacts of infilling activities upon Schedule 1 nesting birds will be undertaken following a Peregrine Management Plan, written in consultation with a consultant ornithologist or the RSPB. Measures included in the Management Plan would include infilling of the rock faces on which peregrines are nesting outside the nesting season. Any infilling required during the breeding season will be preceded by a pre-works nesting check by an appropriately licenced ornithologist and only undertaken once declared free of nesting activity. In addition, retention of appropriate ledges on the unworked/exposed rock faces, will provide undisturbed nesting opportunities for peregrines.

Re-Survey of the Site

- 5.10 If no works are undertaken on site within 12 months of this survey or if any changes to the proposal timescales are made, a further ecological survey is recommended (because of the mobility of animals and the potential for colonisation of the site).

References

BSI (2013) *BS 42020 Biodiversity. Code of practice for planning and development.*

CIEEM (2017) *Guidelines for Preliminary Ecological Appraisal.* Chartered Institute of Ecology and Environmental Management.

Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd Edition). The Bat Conservation Trust, London.

Mitchell-Jones, A.J. (2004) *Bat Mitigation Guidelines*, Natural England

Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation guidance*

Appendix 1 – Legal Information

This report provides guidance of potential offences as part of the impact assessment. This report does not provide detailed legal advice and for full details of potential offences against protected species the relevant acts should be consulted in their original forms i.e. The Wildlife and Countryside Act, 1981, as amended, The Countryside and Rights of Way Act 2000, The Natural Environment and Rural Communities Act, 2006 and The Conservation of Habitats and Species Regulations 2010.

| Species | Legislation | Offences | Notes on licensing procedures and further advice |
|--|---|--|---|
| Species that are protected by European and national legislation | | | |
| Bats <i>European protected species</i> | Conservation of Habitats and Species Regulations 2010 Reg 41 | Deliberately ¹ capture, injure or kill a bat; Deliberate disturbance ² of bats; Damage or destroy a breeding site or resting place used by a bat. The protection of bat roosts is considered to apply regardless of whether bats are present. | An NE licence in respect of development is required in England. https://www.gov.uk/bats-protection-surveys-and-licences <i>European Protected Species: Mitigation Licensing- How to get a licence</i> (NE 2010) <i>Bat Mitigation Guidelines</i> (English Nature 2004) <i>Bat Workers Manual</i> (JNCC 2004) <i>BS8596:2015 Surveying for bats in trees and woodland</i> (BSI, 2015) |
| | Wildlife and Countryside Act 1981 (as amended) ⁴ S.9 | Intentionally or recklessly ³ obstruct access to any structure or place used for shelter or protection or disturb a bat in such a place. | Licence from NE is required for surveys (scientific purposes) that would involve disturbance of bats or entering a known or suspected roost site. |
| Birds | Conservation of Habitats and Species (Amendment) Regulations 2017 | N/A | Authorities are required to take steps to ensure the preservation, maintenance and re-establishment of a sufficient diversity and area of habitat for wild birds in the United Kingdom, including by means of the upkeep, management and creation of such habitat. This includes activities in relation to town and country planning functions. |

| | | | |
|--|---|--|--|
| | Wildlife and Countryside Act 1981 (as amended) ⁴ S.1 | Intentionally kill, injure or take any wild bird; Intentionally take, damage or destroy the nest of any wild bird while that nest is in use or being built; Intentionally take or destroy the nest or eggs of any wild bird. Special penalties are liable for these offences involving birds on Schedule 1 (e.g. most birds of prey, kingfisher, barn owl, black redstart, little ringed plover). Intentionally or recklessly ³ disturb a Schedule 1 species while it is building a nest or is in, on or near a nest containing eggs or young; intentionally or recklessly disturb dependent young of such a species. | No licences are available to disturb any birds in regard to development. Licences are available in certain circumstances to damage or destroy nests, but these only apply to the list of licensable activities in the Act and do not cover development. General licences are available in respect of 'pest species' but only for certain very specific purposes e.g. public health, public safety, air safety. https://www.gov.uk/wild-birds-protection-surveys-and-licences https://www.gov.uk/prevent-wild-birds-damaging-your-land-farm-or-business |
|--|---|--|--|

¹Deliberate capture or killing is taken to include "accepting the possibility" of such capture or killing. ²Deliberate disturbance of animals includes in particular any disturbance which is likely a) to impair their ability (i) to survive, to breed or reproduce, or to rear or nurture their young, or (ii) in the case of animals of hibernating or migratory species, to hibernate or migrate; or b) to affect significantly the local distribution or abundance of the species to which they belong. Lower levels of disturbance not covered by the Conservation of Habitats and Species Regulations 2010 remain an offence under the Wildlife and Countryside Act 1981 although a defence is available where such actions are the incidental result of a lawful activity that could not reasonably be avoided. Thus deliberate disturbance that does not result in either (a) or (b) above would be classed as a lower level of disturbance. ³The term 'reckless' is defined by the case of Regina versus Caldwell 1982. The prosecution has to show that a person deliberately took an unacceptable risk, or failed to notice or consider an obvious risk. ⁴The Wildlife and Countryside Act (1981) has been updated by various amendments, including the Countryside and Rights of Way Act 2000 and the Natural Environment and Rural Communities Act 2006. A full list of amendments can be found at <http://jncc.defra.gov.uk/page-1377>.

Appendix 2 – Bat Potential Criteria

Bat roost potential and habitat assessment criteria (Collins, 2016).

| Suitability | Description of Roosting Habitat | Commuting & Foraging Habitats |
|-------------|---|---|
| Negligible | Negligible habitat features on site likely to be used by roosting bats | Negligible habitat features on site likely to be used by commuting or foraging bats. |
| Low | <p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitats to be used on a regular basis or by a larger number of bats (i.e. unlikely to be suitable maternity or hibernation).</p> <p>A tree of sufficient size and age to contain potential roosting features but with none seen from the ground, or feature seen with only very limited roosting potential.</p> | Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub. |
| Moderate | A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions, and surrounding habitat but unlikely to support a roost of high conservation status. | Continuous habitat connected to the wider landscape that could be used by bats for commuting, such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging, such as trees, scrub, grassland or water. |
| High | A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis, and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. | Continuous high quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats, such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close and connected to known roosts. |

Appendix 3 – Summary of the static detector recordings in 2020 and 2021

2020 Static Detector Recordings

(PP45 = Common pipistrelle, PP55 = Soprano pipistrelle, M = Myotis, N = Noctule, BLE = Brown long eared)

| Location | Month | Night | BLE | M | N | PP55 social call | PP45 social call | PP social call | PP | Unknown bat | PP55 | PP45 | Total | sunset | First bat (species) | first bat (time) | hours after sunset | |
|------------|-------|------------|-----|---|---|---------------------|---------------------|-------------------|----|----------------|------|-------|-------|----------|------------------------|---------------------|--------------------------|----------|
| Static 1 | June | 22/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 21:45 | PP45 | 01:45:27 | 04:00:27 | |
| | | 23/06/2020 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | 69 | 79 | 21:45 | PP45 | 22:35:40 | 00:50:40 | |
| | | 24/06/2020 | 0 | 1 | 2 | 1 | 7 | 0 | 0 | 0 | 7 | 132 | 150 | 21:45 | N | 22:34:30 | 00:49:30 | |
| | | 25/06/2020 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 15 | 20 | 21:45 | PP45 | 01:10:11 | 03:25:11 | |
| | | 26/06/2020 | 0 | 3 | 0 | 0 | 1 | 0 | 2 | 0 | 2 | 77 | 85 | 21:45 | PP45 | 22:25:56 | 00:40:56 | |
| | | 27/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | |
| | | 28/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | |
| | | 29/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | |
| | | 30/06/2020 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 94 | 96 | 21:44 | PP45 | 22:12:01 | 00:28:01 |
| | | 01/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 39 | 43 | 21:44 | PP45 | 22:13:40 | 00:29:40 |
| | | 02/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 21:43 | PP45 | 22:25:49 | 00:42:49 |
| | | 23/07/2020 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 39 | 43 | 21:21 | PP45 | 21:53:35 | 00:32:35 | |
| | | 24/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 7 | 21:20 | PP45 | 21:38:11 | 00:18:11 | |
| | | 25/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 11 | 21:18 | PP45 | 21:35:54 | 00:17:54 | |
| 26/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 15 | 21:17 | PP45 | 21:56:20 | 00:39:20 | | | |

| | | | | | | | | | | | | | | | | | |
|----------|-----------------|---|---|---|---|---|---|---|---|---|----|-----------|-----------|-------|----------|----------|----------|
| | 27/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 | 21:15 | PP45 | 21:58:26 | 00:43:26 |
| Static 2 | 22/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 21:45 | PP45 | 01:14:37 | 03:29:37 |
| | 23/06/2020 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 45 | 47 | 21:45 | PP45 | 22:52:16 | 01:07:16 | |
| | 24/06/2020 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 34 | 41 | 21:45 | N | 22:34:41 | 00:49:41 | |
| | 25/06/2020 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 8 | 13 | 21:45 | PP45 | 23:15:17 | 01:30:17 | |
| | 26/06/2020 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 24 | 28 | 21:45 | PP45 | 22:25:13 | 00:40:13 | |
| | 27/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | | |
| | June 28/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | | |
| | 30/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 11 | 21:44 | PP45 | 22:19:56 | 00:35:56 | |
| | 01/07/2020 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 11 | 17 | 21:44 | PP45 | 22:29:38 | 00:45:38 | |
| | 02/07/2020 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 6 | 21:43 | PP45 | 22:18:53 | 00:35:53 | |
| Static 2 | 23/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 25 | 21:21 | PP45 | 21:56:34 | 00:35:34 | |
| | 24/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 12 | 21:20 | PP45 | 21:37:30 | 00:17:30 | |
| | July 25/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 48 | 49 | 21:18 | PP45 | 21:37:33 | 00:19:33 | |
| | 26/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 21:17 | PP55 | 22:14:00 | 00:57:00 | |
| | 27/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 3 | 21:15 | PP55 | 22:12:38 | 00:57:38 | |
| Static 3 | 22/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 21:45 | PP45 | 22:38:37 | 00:53:37 | |
| | 23/06/2020 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 29 | 32 | 21:45 | PP45 | 22:43:48 | 00:58:48 | |
| | 24/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 21:45 | PP45 | 23:09:39 | 01:24:39 | |
| | June 25/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 21:45 | PP45 | 01:02:30 | 03:17:30 | |
| | 26/06/2020 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 7 | 21:45 | PP55 | 23:52:08 | 02:07:08 | |
| | 27/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | | |
| | 28/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | | |

| | | | | | | | | | | | | | | | | |
|----------|------------|------------|---|---|---|---|---|---|---|---|-----|-------|-------|----------|----------|----------|
| | 29/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | |
| | 30/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 21:44 | PP45 | 22:19:14 | 00:35:14 | |
| | 01/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 | 21:44 | PP45 | 22:30:25 | 00:46:25 | |
| | 02/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 21:43 | PP55 | 23:05:41 | 01:22:41 | |
| | 23/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:21 | | | | |
| | 24/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 21:20 | PP45 | 21:45:28 | 00:25:28 | |
| July | 25/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:18 | | | | |
| | 26/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 21:17 | PP45 | 22:10:04 | 00:53:04 | |
| | 27/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:15 | | | | |
| Static 4 | 22/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 21:45 | PP45 | 22:31:44 | 00:46:44 | |
| | 23/06/2020 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 5 | 48 | 57 | 21:45 | PP45 | 22:10:42 | 00:25:42 |
| | 24/06/2020 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 119 | 120 | 21:45 | PP45 | 22:22:36 | 00:37:36 |
| | 25/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 8 | 21:45 | PP45 | 22:19:47 | 00:34:47 |
| | 26/06/2020 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51 | 52 | 21:45 | pp45 | 22:18:21 | 00:33:21 |
| | 27/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | |
| | 28/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | |
| | 29/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | |
| | 30/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 7 | 21:44 | PP45 | 21:59:00 | 00:15:00 |
| | 01/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 11 | 21:44 | PP45 | 22:17:25 | 00:33:25 |
| | 02/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 21:43 | PP45 | 22:27:16 | 00:44:16 |
| | July | 23/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 14 | 21:21 | PP45 | 21:40:26 | 00:19:26 |

| | | | | | | | | | | | | | | | | |
|----------|------------|------------|---|----|---|---|---|---|---|-----|-----------|------------|-------|----------|----------|----------|
| | 24/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 21 | 21:20 | PP45 | 21:25:11 | 00:05:11 | |
| | 25/07/2020 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 18 | 21 | 21:18 | PP45 | 21:31:54 | 00:13:54 | |
| | 26/07/2020 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 22 | 23 | 21:17 | PP45 | 21:34:43 | 00:17:43 | |
| | 27/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:15 | PP45 | | | |
| Static 5 | 26/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 31 | 32 | 21:45 | PP45 | 22:45:11 | 01:00:11 | |
| | 27/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | | |
| | 28/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | | |
| | 29/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | | |
| | June | 30/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:44 | | | | |
| | | 01/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 91 | 93 | 21:44 | PP45 | 22:24:39 | 00:40:39 |
| | | 02/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 21:43 | PP45 | 22:23:50 | 00:40:50 |
| | | 23/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:21 | | | |
| | | 24/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:20 | | | |
| | | 25/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:18 | | | |
| | 26/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:17 | | | | |
| | 27/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:15 | | | | |
| Static 6 | 26/06/2020 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 118 | 132 | 251 | 21:45 | PP45 | 22:45:52 | 01:00:52 |
| | 27/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | | |
| | 29/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | | |
| | June | 30/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 36 | 49 | 21:44 | PP45 | 22:23:51 | 00:39:51 |
| | | 01/07/2020 | 0 | 18 | 0 | 6 | 0 | 0 | 0 | 68 | 34 | 126 | 21:44 | PP55 | 22:29:52 | 00:45:52 |

| | | | | | | | | | | | | | | | | |
|----------|------------|---|----|---|---|---|---|---|---|----|----|-----------|-------|------|----------|----------|
| | 02/07/2020 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 34 | 80 | 21:43 | PP45 | 22:27:12 | 00:44:12 |
| | 23/07/2020 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 10 | 32 | 21:21 | PP55 | 22:02:57 | 00:41:57 |
| | 24/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:20 | | | |
| | 26/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 6 | 21:17 | PP45 | 22:11:45 | 00:54:45 |
| July | 26/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:17 | | | |
| | 27/07/2020 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 10 | 21:15 | PP45 | 22:00:52 | 00:45:52 |
| | 27/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:15 | | | |
| | 26/06/2020 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 7 | 12 | 21:45 | N | 23:12:10 | 01:27:10 |
| | 27/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | |
| | 28/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | |
| | 29/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:45 | | | |
| June | 30/06/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:44 | | | |
| | 01/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:44 | | | |
| Static 7 | 02/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 21:43 | PP55 | 23:57:33 | 02:14:33 |
| | 23/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:21 | | | |
| | 24/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:20 | | | |
| | 25/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:18 | | | |
| July | 26/07/2020 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 21:17 | M | 03:04:14 | 05:47:14 |
| | 26/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:17 | | | |
| | 27/07/2020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:15 | | | |

2021 Static Detector Recordings

| Location | Month | Date | BLE | M | N | PP55 social call | PP45 social call | PP social call | PP | PP55 | PP45 | Total | Sunset | First Bat (species) | First Bat (time) | Hours/minutes after sunset |
|------------|------------|------------------|-----|---|---|---------------------|---------------------|-------------------|-----|------|-------|-------|----------|------------------------|---------------------|-------------------------------|
| A | June | 28/06/2021 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 6 | 127 | 134 | 21:44 | PP45 | 22:13:12 | 00:29:12 |
| | | 29/06/2021 | 0 | 1 | 0 | 2 | 11 | 0 | 0 | 16 | 455 | 485 | 21:44 | PP45 | 22:24:04 | 00:40:04 |
| | | 30/06/2021 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 36 | 652 | 730 | 21:44 | PP45 | 22:26:55 | 00:42:55 |
| | | 01/07/2021 | 1 | 3 | 1 | 2 | 23 | 1 | 0 | 48 | 657 | 736 | 21:43 | PP45 | 22:14:07 | 00:31:07 |
| | | 02/07/2021 | 0 | 0 | 0 | 2 | 21 | 1 | 11 | 31 | 524 | 590 | 21:43 | PP45 | 22:18:49 | 00:35:49 |
| | | 03/07/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 21:42 | PP45 | 22:03:01 | 00:21:01 |
| | | 04/07/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 21:42 | | | |
| | August | 12/08/2021 | 0 | 0 | 7 | 0 | 1 | 0 | 26 | 117 | 151 | 302 | 20:45 | N | 21:18:54 | 00:33:54 |
| | | 13/08/2021 | 0 | 2 | 1 | 0 | 2 | 0 | 28 | 148 | 181 | 362 | 20:42 | PP45 | 21:17:05 | 00:35:05 |
| | | 14/08/2021 | 0 | 0 | 1 | 0 | 2 | 0 | 32 | 125 | 160 | 320 | 20:40 | PP55 | 21:05:16 | 00:25:16 |
| | | 15/08/2021 | 0 | 0 | 0 | 3 | 32 | 0 | 45 | 154 | 234 | 468 | 20:38 | PP55 | 21:16:00 | 00:38:00 |
| | | 16/08/2021 | 0 | 0 | 0 | 0 | 35 | 0 | 36 | 132 | 203 | 406 | 20:36 | PP55 | 21:06:04 | 00:30:04 |
| | | 17/08/2021 | 0 | 0 | 0 | 0 | 2 | 0 | 69 | 96 | 167 | 334 | 20:34 | PP45 | 20:59:40 | 00:25:40 |
| | | 18/08/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 56 | 79 | 158 | 20:32 | PP45 | 21:03:57 | 00:31:57 |
| | 19/08/2021 | 3 | 1 | 0 | 0 | 3 | 1 | 112 | 132 | 252 | 504 | 20:29 | PP45 | 21:01:42 | 00:32:42 | |
| | September | 14/09/2021 | 1 | 2 | 8 | 1 | 11 | 0 | 0 | 28 | 130 | 181 | 19:22 | Noctule | 19:51:16 | 00:29:16 |
| | | 15/09/2021 | 1 | 9 | 0 | 0 | 30 | 0 | 4 | 42 | 276 | 362 | 19:20 | PP45 | 19:50:08 | 00:30:08 |
| | | 16/09/2021 | 3 | 5 | 0 | 2 | 3 | 1 | 5 | 10 | 223 | 252 | 19:17 | PP45 | 19:46:22 | 00:29:22 |
| | | 17/09/2021 | 1 | 3 | 0 | 0 | 40 | 0 | 4 | 5 | 425 | 478 | 19:15 | PP45 | 19:37:40 | 00:22:40 |
| | | 18/09/2021 | 1 | 5 | 0 | 0 | 33 | 0 | 1 | 14 | 303 | 357 | 19:12 | PP45 | 19:36:08 | 00:24:08 |
| | | 19/09/2021 | 2 | 0 | 0 | 3 | 9 | 0 | 0 | 67 | 99 | 180 | 19:10 | PP55 | 19:50:37 | 00:40:37 |
| 20/09/2021 | | 2 | 1 | 3 | 0 | 30 | 0 | 1 | 10 | 191 | 238 | 19:08 | PP45 | 19:31:37 | 00:23:37 | |
| 21/09/2021 | 0 | 2 | 0 | 0 | 9 | 0 | 0 | 14 | 144 | 169 | 19:15 | PP45 | 19:30:05 | 00:15:05 | | |
| October | 07/10/2021 | No bats recorded | | | | | | | | | | | 18:32 | | | |

| | | | | | | | | | | | | | | | | | |
|---|------------|------------|------------|---|---|---|---|---|----|-----------|----|-----------|-----------|----------|----------|----------|----------|
| | 08/10/2021 | | | | | | | | | | | 18:28 | | | | | |
| | 09/10/2021 | | | | | | | | | | | 18:25 | | | | | |
| | 10/10/2021 | | | | | | | | | | | 18:23 | | | | | |
| | 11/10/2021 | | | | | | | | | | | 18:21 | | | | | |
| | 12/10/2021 | | | | | | | | | | | 18:18 | | | | | |
| B | June | 28/06/2021 | 0 | 0 | | | | 0 | 17 | 17 | | 21:44 | PP45 | 21:14:17 | -30 | | |
| | | 29/06/2021 | 3 | 0 | | | | 0 | 21 | 24 | | 21:44 | PP45 | 21:09:59 | -35 | | |
| | | 30/06/2021 | 0 | 0 | | | | 1 | 44 | 45 | | 21:44 | PP45 | 21:12:12 | -32 | | |
| | | 01/07/2021 | 2 | 1 | | | | 1 | 82 | 86 | | 21:43 | PP45 | 21:10:08 | -33 | | |
| | | 02/07/2021 | 0 | 0 | | | | 1 | 51 | 52 | | 21:43 | PP45 | 21:05:56 | -38 | | |
| | | 03/07/2021 | 0 | 0 | | | | 0 | 0 | 0 | | 21:42 | | | | | |
| | | 04/07/2021 | 0 | 0 | | | | 0 | 0 | 0 | | 21:42 | | | | | |
| | | August | 12/08/2021 | | | | | | | | | | 20:45 | | | | |
| | | | 13/08/2021 | | | | | | | | | | 20:42 | | | | |
| | | | 14/08/2021 | | | | | | | | | | 20:40 | | | | |
| | | | 15/08/2021 | | | | | | | | | | 20:38 | | | | |
| | | | 16/08/2021 | | | | | | | | | | 20:36 | | | | |
| | | | 17/08/2021 | | | | | | | | | | 20:34 | | | | |
| | | | 18/08/2021 | | | | | | | | | | 20:32 | | | | |
| | | | 19/08/2021 | | | | | | | | | | 20:29 | | | | |
| | | September | 14/09/2021 | 3 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 19 | 27 | 19:22 | PP45 | 20:00:13 | 00:38:13 |
| | | | 15/09/2021 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 2 | 23 | 30 | 19:20 | PP45 | 19:57:11 | 00:37:11 |
| | | | 16/09/2021 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 22 | 27 | 19:17 | PP45 | 20:02:39 | 00:45:39 |
| | | | 17/09/2021 | 5 | 2 | 2 | 0 | 1 | 0 | 0 | 4 | 26 | 40 | 19:15 | PP45 | 19:39:06 | 00:24:06 |
| | | | 18/09/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 7 | 9 | 19:12 | PP45 | 19:51:30 | 00:39:30 |
| | | | 19/09/2021 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 18 | 23 | 19:10 | PP45 | 19:47:13 | 00:37:13 |
| | | 20/09/2021 | 1 | 8 | 0 | 0 | 3 | 0 | 0 | 0 | 12 | 24 | 19:08 | PP45 | 19:37:11 | 00:29:11 | |
| | | 21/09/2021 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 24 | 27 | 19:15 | PP45 | 19:35:22 | 00:20:22 | |

| | | | | | | | | | | | | | | | |
|-------------|------------|------------------|---|---|---|---|----|----|-----------|----------|-----------|----------|----------|----------|----------|
| October | 07/10/2021 | No bats recorded | | | | | | | | 18:32 | | | | | |
| | 08/10/2021 | No bats recorded | | | | | | | | 18:28 | | | | | |
| | 09/10/2021 | No bats recorded | | | | | | | | 18:25 | | | | | |
| | 10/10/2021 | No bats recorded | | | | | | | | 18:23 | | | | | |
| | 11/10/2021 | No bats recorded | | | | | | | | 18:21 | | | | | |
| | 12/10/2021 | No bats recorded | | | | | | | | 18:18 | | | | | |
| | June | 28/06/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 | 21:44 | PP45 | 22:41:25 | 00:57:25 | |
| 29/06/2021 | | 0 | 1 | 0 | 0 | 0 | 0 | 29 | 30 | 21:44 | PP45 | 22:28:33 | 00:44:33 | | |
| 30/06/2021 | | 0 | 1 | 1 | 0 | 0 | 26 | 46 | 74 | 21:44 | PP45 | 22:31:49 | 00:47:49 | | |
| 01/07/2021 | | 1 | 0 | 0 | 0 | 0 | 1 | 95 | 97 | 21:43 | PP45 | 22:12:25 | 00:29:25 | | |
| 02/07/2021 | | 0 | 0 | 0 | 0 | 2 | 1 | 34 | 37 | 21:43 | PP45 | 22:20:02 | 00:37:02 | | |
| 03/07/2021 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:42 | | | | | |
| 04/07/2021 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21:42 | | | | | |
| C August | 12/08/2021 | 0 | 0 | 1 | 0 | 0 | 3 | 2 | 6 | 20:45 | N | 19:26:21 | -79 | | |
| | 13/08/2021 | 1 | 6 | 0 | 0 | 0 | 1 | 2 | 10 | 20:42 | PP45 | 21:02:52 | 00:20:52 | | |
| | 14/08/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20:40 | | | | | |
| | 15/08/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20:38 | | | | | |
| | 16/08/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20:36 | | | | | |
| | 17/08/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20:34 | | | | | |
| | 18/08/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20:32 | | | | | |
| | 19/08/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20:29 | | | | | |
| September | 14/09/2021 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 15 | 19 | 19:22 | PP45 | 20:03:39 | 00:41:39 |
| | 15/09/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 7 | 19:20 | PP45 | 20:35:00 | 01:15:00 |
| | 16/09/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 19:17 | PP45 | 20:38:58 | 01:21:58 |
| | 17/09/2021 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 8 | 19:15 | PP55 | 20:04:07 | 00:49:07 |
| | 18/09/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 6 | 19:12 | PP55 | 19:59:52 | 00:47:52 |
| | 19/09/2021 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19:10 | | - | |
| | 20/09/2021 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 19:08 | PP55 | 19:52:03 | 00:44:03 |

| | | | | | | | | | | | | | | | | |
|---------|------------|---|---|---|---|---|---|---|---|---|---|---|-------|---------|----------|----------|
| | 21/09/2021 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 19:15 | Myotis | 21:13:02 | 01:58:02 |
| | 07/10/2021 | | | | | | | | | | | | 18:32 | | | |
| | 08/10/2021 | | 1 | | | | | 2 | 1 | | | 4 | 18:28 | Noctule | 20:10:29 | 01:42:29 |
| October | 09/10/2021 | | | | | | | | | | | | 18:25 | | | |
| | 10/10/2021 | | | | | | | | | | | | 18:23 | | | |
| | 11/10/2021 | | | | | | | | | | | | 18:21 | | | |
| | 12/10/2021 | | | | | | | | | | | | 18:18 | | | |

Appendix 4 – Summary of weather & sunset times static detector surveys

| Year | Date | Sunset time | Precipitation | Temp (oC) | Wind (Bft Scale) |
|------------|------------|-------------------|--|-----------|------------------|
| 2020 | 22/06/2020 | 21:45 | Dry | 17 | 2-3 SW |
| | 23/06/2020 | 21:45 | Dry | 19 | 2 N |
| | 24/06/2020 | 21:45 | Dry | 22 | 2 N |
| | 25/06/2020 | 21:45 | Dry | 24 | 2 SE |
| | 26/06/2020 | 21:45 | Dry | 16 | 2 NW |
| | 27/06/2020 | 21:44 | Dry | 14 | 5 SW |
| | 28/06/2020 | 21:44 | Heavy Rain | 13 | 5 SW |
| | 29/06/2020 | 21:44 | Showers | 14 | 5 W |
| | 30/06/2020 | 21:44 | Dry turning to rain Dry turning to light rain | 14 | 1 SE |
| | 01/07/2020 | 21:43 | rain | 15 | 2 W |
| | 02/07/2020 | 21:43 | Dry turning to rain | 14 | 3 W |
| | 23/07/2020 | 21:21 | Drizzle | 16 | 2 NW |
| | 24/07/2020 | 21:19 | Light Rain | 17 | 2 SW |
| | 25/07/2020 | 21:18 | Dry | 16 | 3 W |
| | 26/07/2020 | 21:16 | Dry | 16 | 3 SW |
| | 27/07/2020 | 21:15 | Scattered showers | 15 | 4 W |
| | 2021 | 28/06/2021 | 21:44 | Dry | 18 |
| 29/06/2021 | | 21:44 | Dry | 18 | 2 N |
| 30/06/2021 | | 21:44 | Dry | 18 | 2 NW |
| 01/07/2021 | | 21:43 | Dry | 15 | 2 W |
| 02/07/2021 | | 21:43 | Dry | 19 | 2 NW |
| 03/07/2021 | | 21:42 | Scattered showers | 20 | 2 SW |
| 04/07/2021 | | 21:42 | Dry | 17 | 3 W |
| 12/08/2021 | | 20:45 | Dry | 18 | 2 N |
| 13/08/2021 | | 20:42 | Dry | 19 | 3 NW |
| 14/08/2021 | | 20:40 | Dry | 19 | 3 W |
| 15/08/2021 | | 20:38 | Dry | 19 | 3 NW |
| 16/08/2021 | | 20:36 | Dry | 21 | 3 NW |
| 17/08/2021 | | 20:34 | Dry | 22 | 2 W |
| 18/08/2021 | | 20:32 | Dry | 21 | 2 N |
| 19/08/2021 | | 20:29 | Dry | 23 | 2 N |
| 14/09/2021 | | 19:22 | Dry | 11 | 3 N |
| 15/09/2021 | | 19:20 | Dry | 12 | 2 NW |
| 16/09/2021 | | 19:17 | Dry | 16 | 2 SE |
| 17/09/2021 | | 19:15 | Scattered showers | 18 | 3 SE |
| 18/09/2021 | 19:12 | Dry | 15 | 3 SE | |
| 19/09/2021 | 19:10 | Scattered showers | 15 | 2 E | |
| 20/09/2021 | 19:08 | Dry | 13 | 2 SE | |

| | | | | |
|------------|-------|---------|----|---------|
| 21/09/2021 | 19:15 | Dry | 15 | 2 W |
| 07/10/2021 | 18:32 | Dry | 18 | 14 NE |
| 08/10/2021 | 18:28 | Dry | 19 | No wind |
| 09/10/2021 | 18:25 | Drizzle | 15 | 16 E |
| 10/10/2021 | 18:23 | Dry | 14 | 32 E |
| 11/10/2021 | 18:21 | Dry | 14 | 13 SE |
| 12/10/2021 | 18:18 | Dry | 15 | 8 SE |

Appendix 5 – Bat Awareness Poster for the Construction Industry

BATS



Information, legal responsibilities and best practice for the construction industry

Legal Protection

All UK Bat species are protected by European and UK law, in practical terms this means it is an offence to:

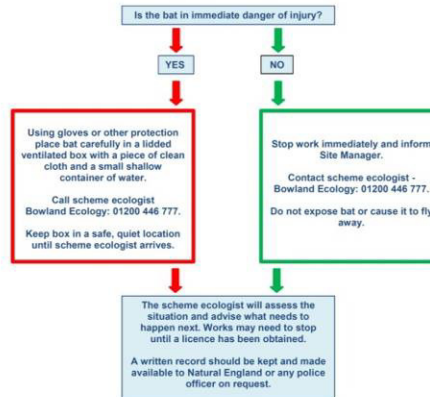
- Deliberately capture, injure or kill a bat;
- Deliberately disturb bats;
- Damage or destroy a breeding site or resting place (even if bats are not occupying the roost at the time);
- Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb a bat in such a place;
- Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat.

Penalties on conviction: the maximum fine is £5,000 per incident or per bat (some roosts contain several hundred bats), up to six months in prison, and forfeiture of items used to commit the offence, e.g. vehicles, plant, machinery.

Defences include:

1. Tending/caring for a bat solely for the purpose of restoring it to health and subsequent release.
2. Mercy killing where there is no reasonable hope of recovery (provided that person did not cause the injury in the first place – in which case the illegal act has already taken place).

Found a bat during unsupervised works?



Field signs of bat presence:

- Live or dead bats: the smallest UK bat species, the pipistrelle is only 3.5-4.5cm long.
- Droppings: bat droppings look like mouse droppings but will crumble between your fingers (they are dry and made entirely of insects).
- Feeding remains: piles of butterfly/moth wings are often left below bat feeding perches.



Places that bats may use in buildings



Schematic from www.bats.org.uk

Bats can roost in the following places:

- The top of gable end or dividing wall;
- The top of chimney breasts;
- Ridge and hip beams and other roof beams;
- Mortise and tension joints;
- All beams/ceilings/pipework (free hanging bats);
- The junction of roof timbers, especially where ridge and hip beams meet;
- Behind purlins;
- Between tiles and the roof lining;
- Under flat felt roofs;
- In trees (cracks/holes/ivy cladding) ;
- Under barge boards;
- In cavity walls;
- In cracks in stone or concrete;
- Behind peeling paint/wall coverings;
- Gaps behind window and door frames;
- Between window panes and timber boarding.

Why wear gloves?

There is a small risk that some bats carry a rabies virus – European Bat Lyssavirus. The purpose of wearing gloves is to reduce the chance of being bitten, as the virus is transmitted via bat saliva. Thick leather gloves are appropriate for removing a bat from imminent danger but these should be clean.



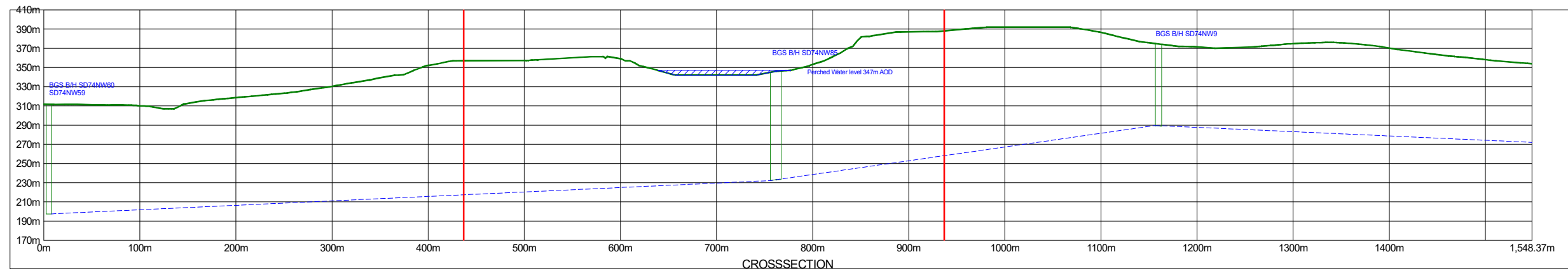
In the event that you are bitten, wash the wound, gently but thoroughly, with soap and water. Speak to a health professional immediately, advising them that you have been bitten by a bat.

References:

- Bat Conservation Trust. August 2016. Why wear gloves when handling bats?
- BCT Bat Surveys for Professional Ecologists, Good Practice Guidelines, 3rd Edition, 2016

version 1 August 2017

Appendix 4 – Groundwater Cross-Section



| | | | | | |
|---|------------|--------------------|-----------|-------------------|---|
|  | Client | Plan Title | Drawn | Inferred | |
| | Armstrongs | Groundwater | M Leivers | Groundwater Level |  |
| | Aggregates | Cross-Section Plan | Date | Extent of Quarry |  |
| | | | Nov 2021 | | |
| | | | Plan No. | | |

Appendix 5 – BGS Borehole Data



British
Geological
Survey

Version 2.0.6.4

BGS ID: 26326 : BGS Reference: SD74NW10

British National Grid (27700) : 371500,447400

[Report an issue with this borehole](#)

<<

< Prev

Page 1 of 5 ▼

Next >

>>

SD 74 NW/10
For Institute use only

N. 13932

RECORD OF WELL

68 / 110

EXACT SITE OF WELL

At Waddington Fell Quarry

Town or Village ~~at~~ Cullercooke

County Lancs

Six-inch County Sheet YOLKS 105 SW

Six-inch National Grid sheet and reference SD 715 474

For

State whether owner, tenant, builder, contractor, consultant, etc.:-

Address (if different from above)

*DELETE AS NECESSARY

Level of ground surface above sea level (O.D.) ft (m)

If well top is not at ground level, state how far above* below: ft (m)

SHAFT ft (m); diameter ft (m);

HEADINGS (please attach details—dimensions and directions)

BORE 300 ft (91.44 m); diameter: at top 8 in (203.2 mm); at bottom in (cm)

Full details of permanent lining tubes (position, length, diameter, plain, slotted, etc.)

8.5' x 5" i.d. Perm. plain casing
(25.90m x 127mm)

TEST CONDITIONS

Water struck at depths of ft (m) below well top

Rest level of water 192 ft (58.52 m) above* below well top. Suction at ft (m)

Yield on 14 hours* test pumping at 1000 galls (1.2628 m³) per hour with depression to 222 ft (67.66 m) below well top. Recovery to rest level in mins* hours

Capacity of pump g.p.h. (m³/h)

Date of measurements August 1974

NORMAL CONDITIONS

DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:

Make and/or type Motive power

Capacity galls (m³) per hour. Suction at ft (m)

below well top. Amount pumped galls (m³) per day. Estimated consumption galls (m³) per week

Well made by Farrods Ltd Ripon Date of sinking 1974

ADDITIONAL NOTES ANALYSIS (please attach copy if available)

LOG OF STRATA OVERLEAF

INSTITUTE OF GEOLOGICAL SCIENCES, WATER DEPARTMENT, SOUTH KENSINGTON, LONDON, S.W.7.

Received from Farrods Ltd
Date 27.8.74
Observation well
Recorder
E.R. log
Site marked on
1" map
6" map
(use symbol)
Copy to
Date



| | | | |
|---|--|--|--|
| CENTRAL WATER PLANNING UNIT WELL RECORD | | I.G.S. REF. NO. SD 74 / 20 B | |
| | | N.W.W.A. LICENCE NO. 26/71/3.13/7 | |
| 1. WELL IDENTITY | | NATIONAL GRID REFERENCE 7067 4821 | |
| Well at Knowlmore Estate | | I.G.S. REF. NO. | |
| Town..... | | RIVER AUTHORITY..... | |
| County..... | | HYDROMETRIC AREA..... | |
| Owner of well..... | | SUB-CATCHMENT..... | |
| Well made by..... | | Date of sinking..... | |
| Information from NWWA | | Date received 25. 11. 79 | |
| ADDITIONAL NOTES: Spring App. 375 | | | |



British Geological Survey

British Geological Survey

British Geological Survey



British
Geological
Survey

Version 2.0.6.4

BGS ID: 26401 : BGS Reference: SD74NW85

British National Grid (27700) : 371870,447800

[Report an issue with this borehole](#)

<<

< Prev

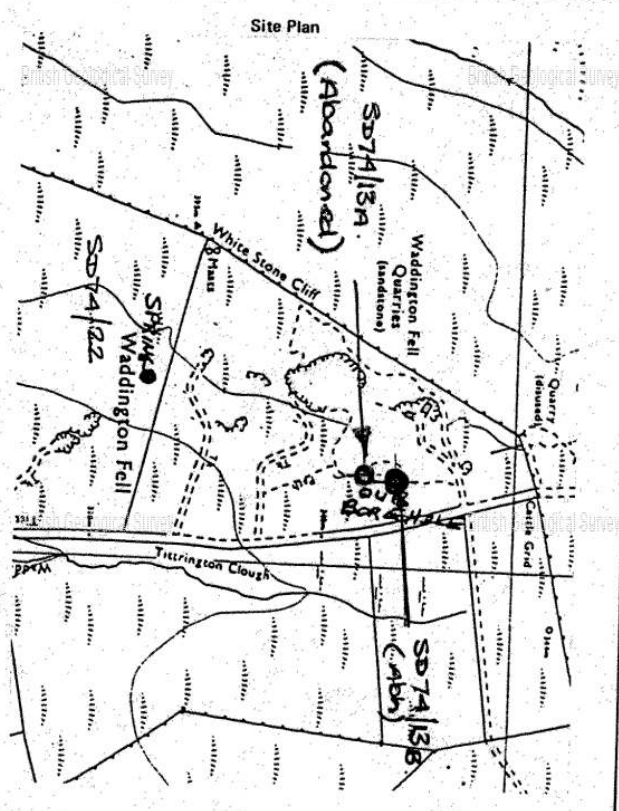
Page 1 of 1 ▼

Next >

>>

North West Central.

| | | | | | | | |
|---|------|--|----|---------------------------------------|--|--------------------------------------|------|
| Name of site WADDINGTON FELL QUARRY - Abstraction Borehole. | | | | WRB No. 68 SD74/13B. SD74NU | | | |
| Owner | | Licence no. Appn no. 4789 Cancelled | | Nat. grid ref. SD 7187 4780 | | | |
| Occupier | | IGS ref. no. | | Status Licensed Borehole | | | |
| Ground level | | m OD | | ft. OD | | Aquifer Mullstone Grit Series | |
| Level of well top | | m OD | | ft. OD | | Code | |
| Rest water level | | m bwt | | ft. bwt | | Summary of geological section | |
| (Date) | | m OD | | ft. OD | | Thickness | |
| Construction: Method | | Date | | | | Depth 121.92 | |
| | | | | | | <i>notified by N.W.</i> | |
| Depth bwt | Dia. | Linings (below well top) | | | | Dia. | Type |
| | | From | To | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Abstraction rates | | Type of pump | | | | | |
| gph PWL | | Chem./bact. anal. | | YES/NO | | | |
| gpd | | Well driller | | | | | |
| If insufficient space has been allowed, continue in 'Notes' overleaf. | | | | 1/5/79/207 | | | |



Notes

Borehole drilled to replace SD74/13A, which was abandoned (low yield?) in 1974 (consent 131)

- consent 535 issued in 1983 to test pump @ higher rate. (new mono-pump installed).



| | | | | | | | |
|---|------|---|----|--------------------------------------|------|-------------------------------|--|
| Name of site meorcock Inn | | | | W R B No. SD 74 22 | | | |
| Owner | | Licence no. 26/71/309/31 Appn no. 1009 | | Net. grid ref. SD 7168 : 4742 | | | |
| Occupier | | IGS ref. no. | | Status Spr. | | | |
| Ground level | | m OD | | ft. OD | | Aquifer | |
| Level of well top | | m OD | | ft. OD | | Code | |
| Rest water level | | m bwt | | ft. bwt | | Summary of geological section | |
| (Date) | | m OD | | ft. OD | | Thickness | |
| | | | | | | Depth | |
| Construction: Method | | | | Date | | | |
| Depth bwt | Dia. | Linings (below well top) | | | | | |
| | | From | To | Dia. | Type | | |
| Abstraction rates | | Type of pump | | | | | |
| gph PWL | | Chem./bact. anal. | | YES/NO | | | |
| gpd | | Well driller | | | | | |
| If insufficient space has been allowed, continue in 'Notes' overleaf. | | | | | | | |
| KJS 21.11.87. | | | | | | 1/6/79/207 | |



| | | | |
|--|--|---|--|
| CENTRAL WATER PLANNING UNIT WELL RECORD | | M.F.S. REF. NO. SD 74/20A | |
| | | N.W.W.A. LICENCE NO. 26/71/3.13/6. | |
| 1. WELL IDENTITY | | NATIONAL GRID REFERENCE 7073 4420 | |
| Well at Knockmore Lake | | I.G.S. REF. No. | |
| | | RIVER AUTHORITY..... | |
| Town..... | | HYDROMETRIC AREA..... | |
| County..... | | SUB-CATCHMENT..... | |
| Owner of well..... | | | |
| Well made by..... | | Date of sinking..... | |
| Information from N.W.W.A. | | Date received 25.11.79 | |
| ADDITIONAL NOTES: Spring | | | |

British Geological Survey

British Geological Survey

British Geological Survey

Appendix 6 – Restoration Drawing 1980/07

Restoration blasting:
A combination of restoration blasting is proposed to the northern shale faces between the 347m AOD bench and the quarry floor. The shale faces would need ripping and the sandstone below would need blasting. The aim is to create a varied topography within the final faces that promotes the colonisation of a wider range of native species. This is achieved through a varied structure of buttresses, rock walls and scree slopes. In some areas a "rollover" will be achieved which is a complete scree slopes in place of the faces. Restoration blasting is designed to achieve an uneven rock face and a rock fall of mixed sizes, as would be found in a natural scree slope, rather than the uniform sized pieces planned in a production blast. A similar effect would be pursued by ripping.

The final face profile of the blast will be agreed with the planning authority at a site specific meeting held prior to the final blast. At this meeting the final design will be agreed by picking out likely buttresses and areas for rock scree.

Finally silt will be tipped this area to ensure that there are fines within the scree to facilitate plant growth.

Bench restoration:
Benches to receive 150mm of silt which will be spread to grade into existing levels create a substrate suitable for encouraging varied natural regeneration. A rock trap bund will be placed at outside edge of the bench.

Final face profiles:
The final face profiles are as indicated on the plan. No new face heights will exceed 15 metres in height with 5 metre wide benches. These faces and bench profiles aim to leave the quarry in a safe and stable condition.

Drainage and treatment of silt traps, lagoons and water areas.
Once the sand processing plant is no longer used, water processing will cease. The lagoons currently exist to filter out the silt which is a by-product of the sand processing plant. Due to the high levels of local rainfall, it is anticipated that silt lagoons 4 to 6 will remain wet in the long term, but the amount of water will be subject to seasonal variation.

Silt lagoon 1 received the translocated heath-grassland turves as part of the northern extension and these are establishing successfully.

It is proposed that lagoons 4 to 8 will remain untreated. These lagoons are within the fenced quarry area, are no more than 3 metres deep and have shallow edges so do not present a significant safety hazard. They are not visible from the Fell Road or any sensitive viewpoints, being screened by the rising land to the east and west.

Silt lagoons 12 and 13 will be drained to allow a top crust to form. The remaining silt will be settled within the quarry floor. This will be dried out and used to cover the floor creating a varied micro-topography as illustrated. As detailed these areas will be left untreated for natural regeneration, given the successful regeneration of acid heath-grassland on disturbed areas elsewhere within the site, and the site's proximity to the Waddington Fell Biological Heritage Site.

The site is not significantly influenced by the local water table. However, the base of deposit lies on shale, which is largely concurrent with the quarry floor. When pumping ceases a water body is expected to form to the approximate level indicated on the drawing. This would fluctuate seasonally.

Soils, Planting and Seeding.
There are no soils or soil-making materials on site. No further tree or shrub planting is proposed, reflecting the local landscape character. Similarly no further seeding is proposed as part of the restoration scheme. This site provides an opportunity for natural regeneration, being well-hidden from the surrounding landscape and lying directly adjacent to the Waddington Fell Biological Heritage Site. There is a precedent of successful natural regeneration on disturbed areas throughout the site.

Management and Maintenance
This is detailed in the Aftercare Scheme submitted pursuant to Condition 33.

Final Details
This scheme sets the strategy and fundamental design principles but may be subject to refinement. These refinements would be considered in detail at each annual review meeting.

Removal of plant and structures:
All plant machinery, buildings, structures and erections will be removed off site. Ground level foundations will be pecked or broken up to facilitate drainage and covered with approx 300 mm depth of silt, married into surrounding levels.

Track / hardstanding treatment:
Where hatched all haul roads, subsidiary site roads and hard standing areas will be treated by being broken up or pecked to facilitate drainage and spread with approx 300mm depth of silt, married in to surrounding levels.

Remaining silt within quarry floor to create smooth flowing contours to replicate gradients and landform patterns found within the surrounding landscape. Material is to be pushed against the existing rockfaces to break up their uniformity and their angularity and create batters with varying heights and slope gradients and also encourage varied natural regeneration.

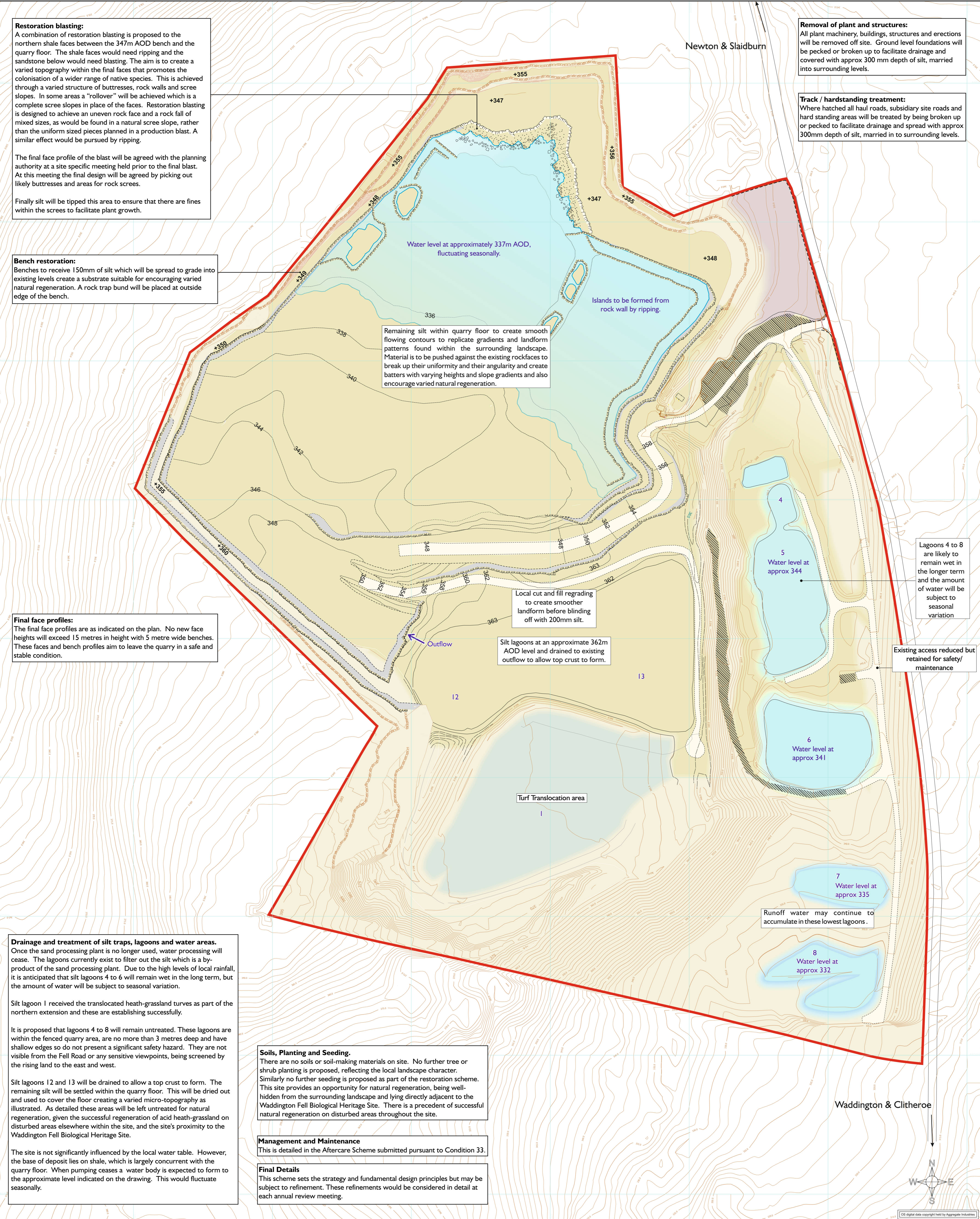
Local cut and fill regrading to create smoother landform before blinding off with 200mm silt.

Silt lagoons at an approximate 362m AOD level and drained to existing outflow to allow top crust to form.

Lagoons 4 to 8 are likely to remain wet in the longer term and the amount of water will be subject to seasonal variation

Existing access reduced but retained for safety/maintenance

Runoff water may continue to accumulate in these lowest lagoons.



LEGEND

| | | | | | |
|--|---|--|--|--|---------------------------------|
| | Planning consent boundary | | Existing heath - grassland mosaic undisturbed | | Existing contours |
| | Existing faces | | Natural regeneration to disturbed areas. | | Proposed indicative contours |
| | Proposed faces | | Track/hardstanding treatment area | | Proposed indicative spot levels |
| | Proposed restoration blasting/scree slopes | | Track/hardstanding quarry floor to be retained & managed | | +360 |
| | Existing heath - grassland mosaic - naturally regenerated | | Existing drystone wall | | 8 |
| | Existing heath - grassland mosaic turf - translocated or seeded | | | | |

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Waddington & Clitheroe

WADDINGTON FELL
 RESTORATION SCHEME
 1980/07
 Scale 1:1,250 @ A1 Date DECEMBER 2011

Appendix 7 – Sanderson Highways Report

Technical Note

| | | | |
|--------------|-------------------------------|-------------|---------------------|
| Project: | Waddington Fell Quarry | Project No: | 300461-TN-01 |
| Subject: | Transport Study | | |
| Prepared by: | Brett Littlewood | Date: | 11.11.2021 |
| Checked by: | Karen Smith | Date: | 11.11.2021 |

Sanderson Associates (Consulting Engineers) Ltd has been appointed by Armstrongs Aggregates Ltd to provide highways consultancy services in relation to their planning application ref: LCC/2021/0015 at Waddington Fell Quarry (WFQ), Slaidburn Road, Waddington for a “revised and enhanced quarry restoration scheme incorporating tunnel arisings from the Haweswater Aqueduct Resilience Programme (HARP) namely the Bowland and Marl Hill tunnel sections”

The local planning and highway authority Lancashire County Council (LCC) have provided consultation on the application dated 30/04/2021.

- The existing access arrangements are not adequate for the proposal that will see significant HGV movements to and from the north. Our initial review of ordnance survey maps suggests that the layout, turning radii and width of the existing access cannot accommodate HGV movements in and out of the Quarry simultaneously. These movements must be accommodated to ensure that HGVs are not waiting on the carriageway to access the Quarry, especially during the simultaneous tunnel bores. An improvement scheme at the access, widening the Quarry entrance and improving turning radii to the north is necessary. When the improvement scheme is developed, we would expect to see the site access layout with the swept path analysis and visibility splays.*
- We require a breakdown of the proposed movement values given in this application. This will allow us to understand, within the figures:*
 - What are the current and expected ongoing quarry traffic movements (current permission expires December 22, but the Restoration Cross Sections drawing shows sections of stone that is to be removed)?*
 - How many of the movements are specific to the HARP and its associated tunnel arisings?*
 - What, if any, in these figures are for additional traffic that would have been part of restoration works and would therefore be traffic towards the south and principle network (A59)?*

Note: in parallel to this request, we will require more detailed breakdown and understanding of the figures currently provided by United Utilities (UU) in regard to the HARP scheme, to ensure that the figures provided by UU and the figures provided by this applicant correspond.

- Clearly, accommodating the significant uplift in HGV movements associated with the Quarry restoration proposal (including the HARP tunnel arisings) is a matter of ongoing discussion and will be the subject of wider mitigation, road condition monitoring and maintenance, which is expected to be subject to Grampian conditions linked to the HARP project.*
- Discussion around the detail and wording of the necessary conditions associated with both proposals.*

1. Access Arrangements

A proposed highway improvement scheme has been developed in order to allow the simultaneous movement of HGV's in / out of the Quarry entrance and to efficiently accommodate the swept path of HGV movements to / from the north of the site.

Drawing 300461-001 Rev A at **Appendix A** illustrates a preliminary 2D design and includes swept path analysis of a 12m rigid vehicle accessing and egressing the junction in both directions. The drawing demonstrates that vehicles would not need to wait within the highway to access the site.

With regards to visibility, Sanderson Associates conducted a site visit on 03/11/2021 to undertake a manual radar speed survey of vehicles approaching the site access in both directions.

Vehicles speeds were recorded as they entered the available visibility splay. Any vehicles considered not to be in free-flow (i.e. held up by another vehicle or involved in giving way at the nearby cattle grid) were discounted from the survey.

The survey period was 13:00 – 15:45 and the weather conditions were fine and dry throughout.

A total of 49 northbound speed readings and 56 southbound speed readings were recorded.

A full copy of the speed data is included at **Appendix B** and a summary of the results are provided below:

Table 1 – Speed Summary

| Direction of Travel | Direction of visibility | 85th Percentile Speed (mph) | Stopping Sight Distance (m) |
|---------------------|-------------------------|-----------------------------|-----------------------------|
| | | Adj. for Wet Weather | |
| Northbound | Right Out | 40.8 | 101.6 |
| Southbound | Left Out | 34.6 | 54.4 |

The stopping sight distances have been calculated using Manual for Streets 2 (MfS2) calculations with the parameters adjusted to Design Manual for Roads and Bridges (DMRB) standards where recorded 85th percentile speeds exceed 60kph (37.3mph).

The stopping sight distance calculations also account for the average gradient of each approach to the site access. The gradients have been confirmed using topographical survey data as +2% for the northbound approach and -2.6% for the southbound approach.

Drawing 300461-001 Rev A shows that the required stopping sight distances can be achieved from the centre of the proposed site access from an x-distance of 2.4m.

It is acknowledged that the sample of speeds recorded is relatively modest (due to the moderate level of traffic flow along Slaidburn Road) and therefore the results of the survey may not be considered as robust.

Notwithstanding the above, it should be noted that this is an existing operational access and the proposed improvements shall not result in any negative impacts to visibility from the access.

With reference to the [Crashmap](#) database, there have been no recorded incidents of any injury severity at or in proximity to the access since 1999, when Crashmap records began.

It is therefore considered that whether the existing visibility splays meet the recommended standards or not, there is no evidence to suggest that there are any highway safety issues associated with the existing access.

The conclusions drawn above are supported by Manual for Streets 2 (paragraph 10.4.2) which states that;

“It has often been assumed that a failure to provide visibility at priority junctions in accordance with the values recommended in MfS1 or DMRB (as appropriate) will result in an increased risk of injury collisions. Research carried out by TMS Consultancy for MfS2 has found no evidence of this”.

Paragraph 10.5.9 goes on to state that;

“The Y distance should be based on the recommended SSD values. However, based on the research referred to above, unless there is local evidence to the contrary, a reduction in visibility below recommended levels will not necessarily lead to a significant problem.”

2. Trip Generations

Approved Generations

The site has extant permission under planning ref: 03/06/0095 for the extraction of sandstone and restoration to biodiverse habitats by 2023. Condition 19 of the site's approval states:

“a) The average number of heavy goods vehicles leaving the site, in any calendar year shall be no more than 60 in any one working day; and

b) Notwithstanding a) above, no more than 85 heavy goods vehicles shall leave the site in any one working day

Proposed Generations

The proposed amendments to the site's restoration scheme do not necessitate any changes to the current mineral extraction operations or day-to-day ancillary mineral processing / handing operations.

The proposals seek to diversify and improve the final habitats and landforms at WFQ upon restoration through the importation of suitable engineering material from the HARP Bowland and Marl Hill Section's tunnel arisings to create topographically diverse landforms.

The HARP Bowland and Marl Hill tunnel will be excavated in close proximity to WFQ (<3km) from which the arisings will be brought to surface at 3 No. local UU compounds before being loaded into HGVs and brought to site for emplacement.

It is proposed to, temporarily, increase HGVs leaving the site to a maximum of 175 in any one day with an average daily limit of 105. These uplifted figures are only anticipated to be necessary for a one-year period (during the simultaneous TR3 & TR4 tunnel drives) after which the limits would reduce to 100 and 65 respectively for the remainder of WFQ's permitted restoration period.

In terms of hourly trip generations, a comparison between the existing and proposed scenarios is provided overleaf. It should be noted that the values detailed in Table 3 robustly assume that every departure trip is also accompanied by an arrival trip.

Table 2 – Working Days / Hours

| Working Days | Nº |
|--------------------------------|------------|
| Weekdays (excl. Bank Holidays) | 255 |
| Saturdays | 52 |
| Total Working Days | 307 |

| Working Hours | Nº |
|----------------------------------|---------------|
| Weekday: 07:00 - 18:30 (11.5hrs) | 2932.5 |
| Saturday: 07:00 - 13:00 (6hrs) | 312 |
| Total Hours of Operation | 3244.5 |

| | |
|----------------------------|--------------|
| Average Daily Hours | 10.57 |
|----------------------------|--------------|

Table 3 – Vehicle Trip Comparison

| | Approved Trip Generations (Two-way) | Proposed Trip Generations (Year 1) | Proposed Trip Generations (Year 2+) |
|--------------------------|-------------------------------------|------------------------------------|-------------------------------------|
| Average Daily Limit | 120 | 210 | 130 |
| Average Trips per hour | 11 | 20 | 12 |
| Minutes per vehicle trip | 5 | 3 | 5 |
| Maximum Daily Limit | 170 | 350 | 200 |
| Maximum Trips per hour | 16 | 33 | 19 |
| Minutes per vehicle trip | 4 | 2 | 3 |

From the information in Table 3, it can be seen that the approved threshold for WFQ operations equate to an average frequency of 1 vehicle trip every 5 minutes and a maximum of 1 vehicle trip every 5 minutes.

In the proposed Year 1 scenario, the predicted frequency of vehicle trips would be in the order of 1 every 3 minutes (average) and 1 every 2 minutes (maximum).

For the remainder of the restoration period the predicted generations would equate to an average frequency of 1 vehicle trip every 5 minutes and a maximum of 1 vehicle trip every 3 minutes. This represents only a modest increase in the maximum trip frequency potential when compared against the sites approved potential.

Traffic Impact

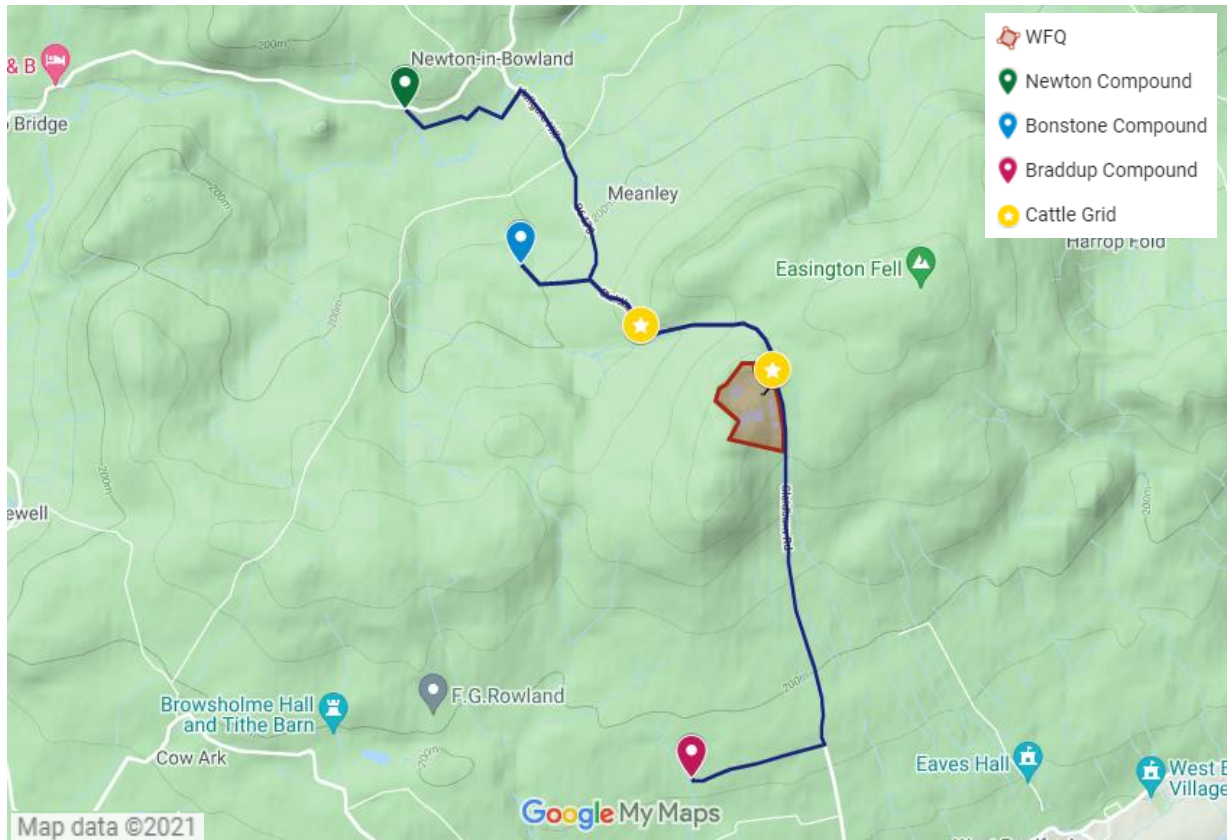
WFQ and the HARP Bowland and Marl Hill tunnel compounds are located on (or immediately adjacent to) the B6478 (Slaidburn Road) which is a single carriageway, national speed limit, highway connecting the villages of Newton in Bowland to the north and Waddington to the south.

The length of the B6478 to be used in the delivery of tunnel arisings to WFQ is some 6.5km. It should be noted that no towns or villages are passed along the length of the B6478 to be utilised.

There are cattle-grids at GR: SD 70848 48402 & SD 71875 48052 which are the only points along the identified route where road users may have to yield to oncoming traffic.

Figure 1 shows the location of the proposed 3 N^o tunnel compounds and the proposed HGV routing between WFQ and each respective site.

Figure 1 – Location of Compounds and Vehicle Routing



The routing strategy attached clearly demonstrates how all nearby towns and villages can be avoided by utilising WFQ as the receptor for HARP Bowland and Marl Hill section tunnel arisings.

Summary

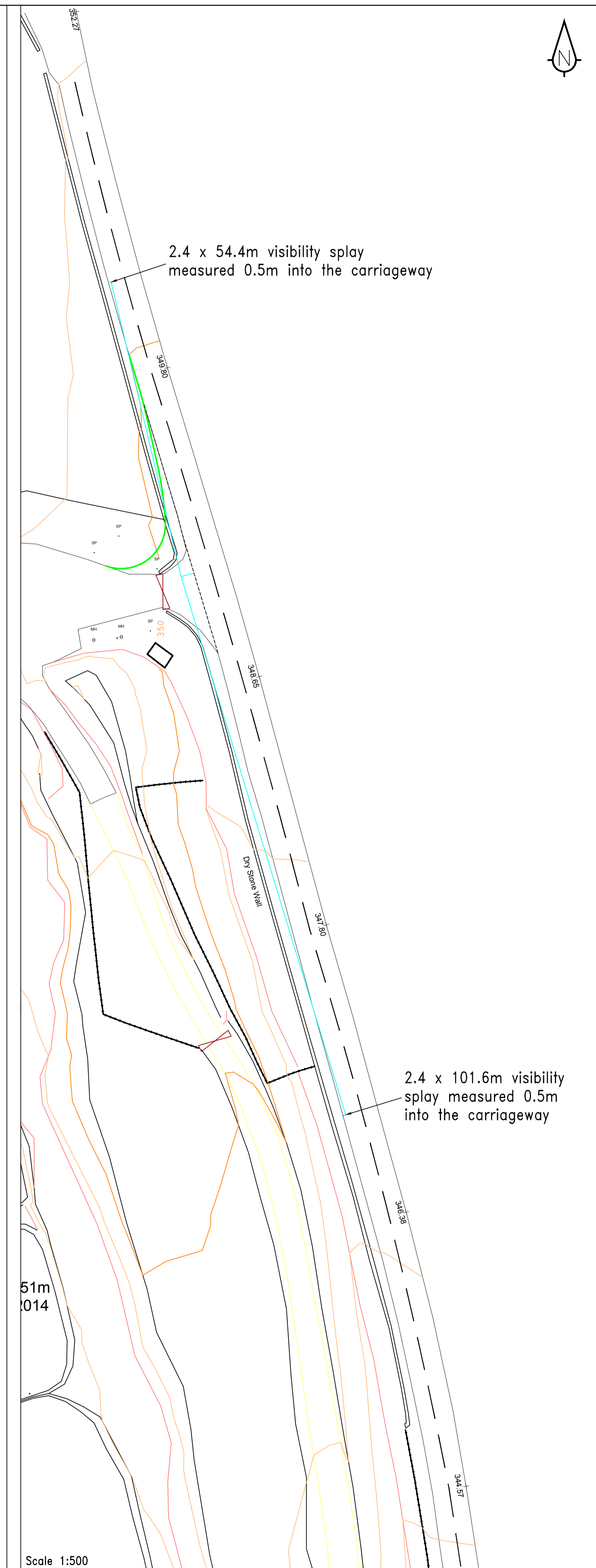
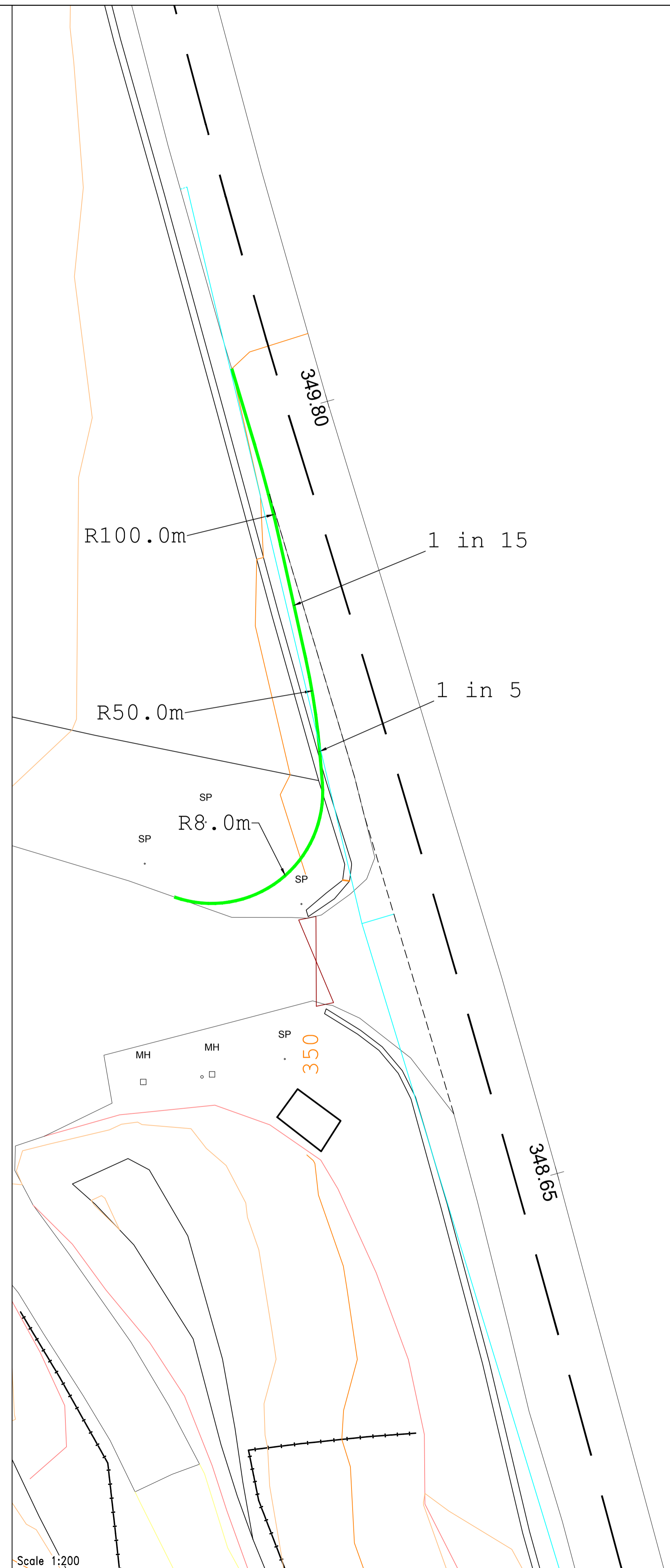
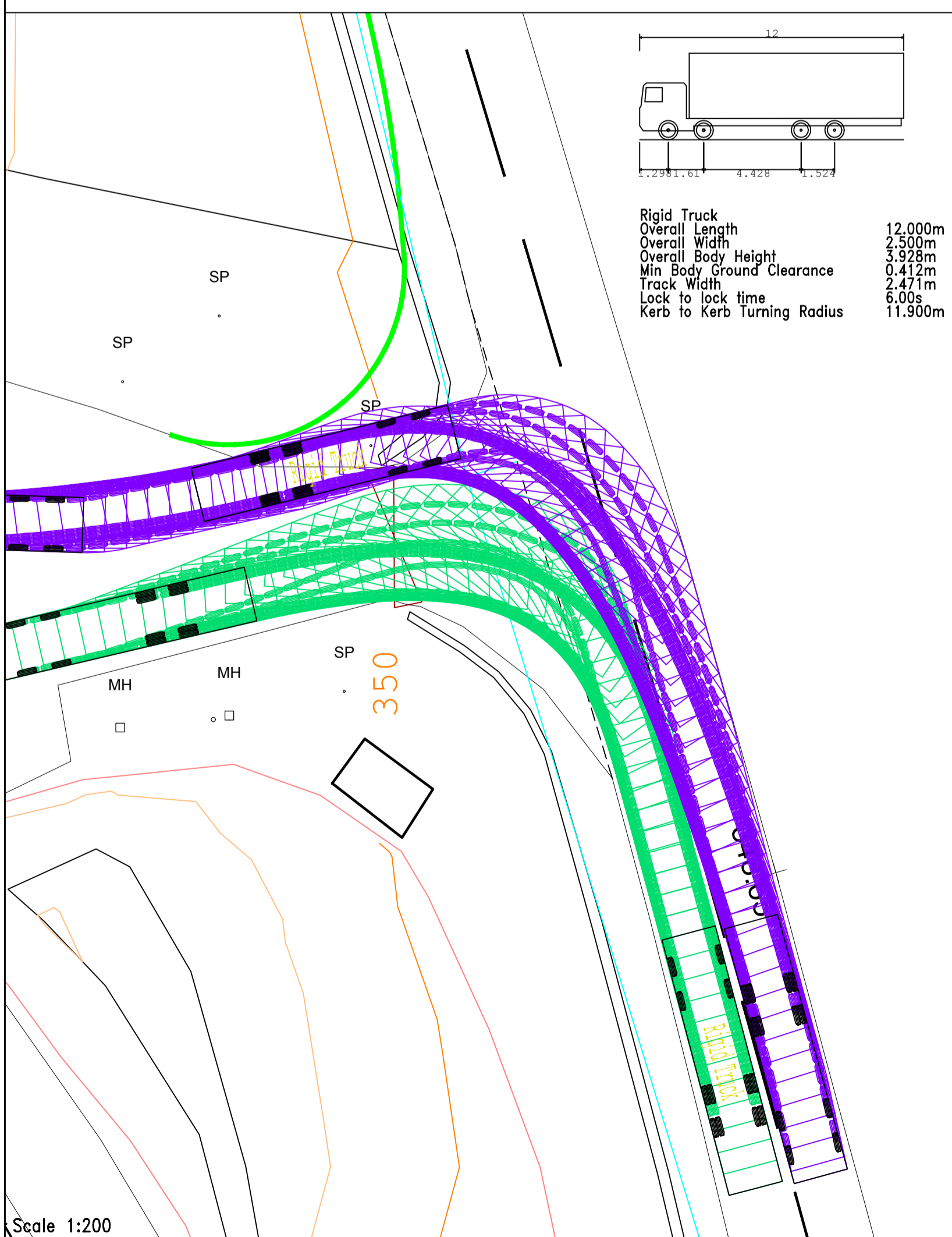
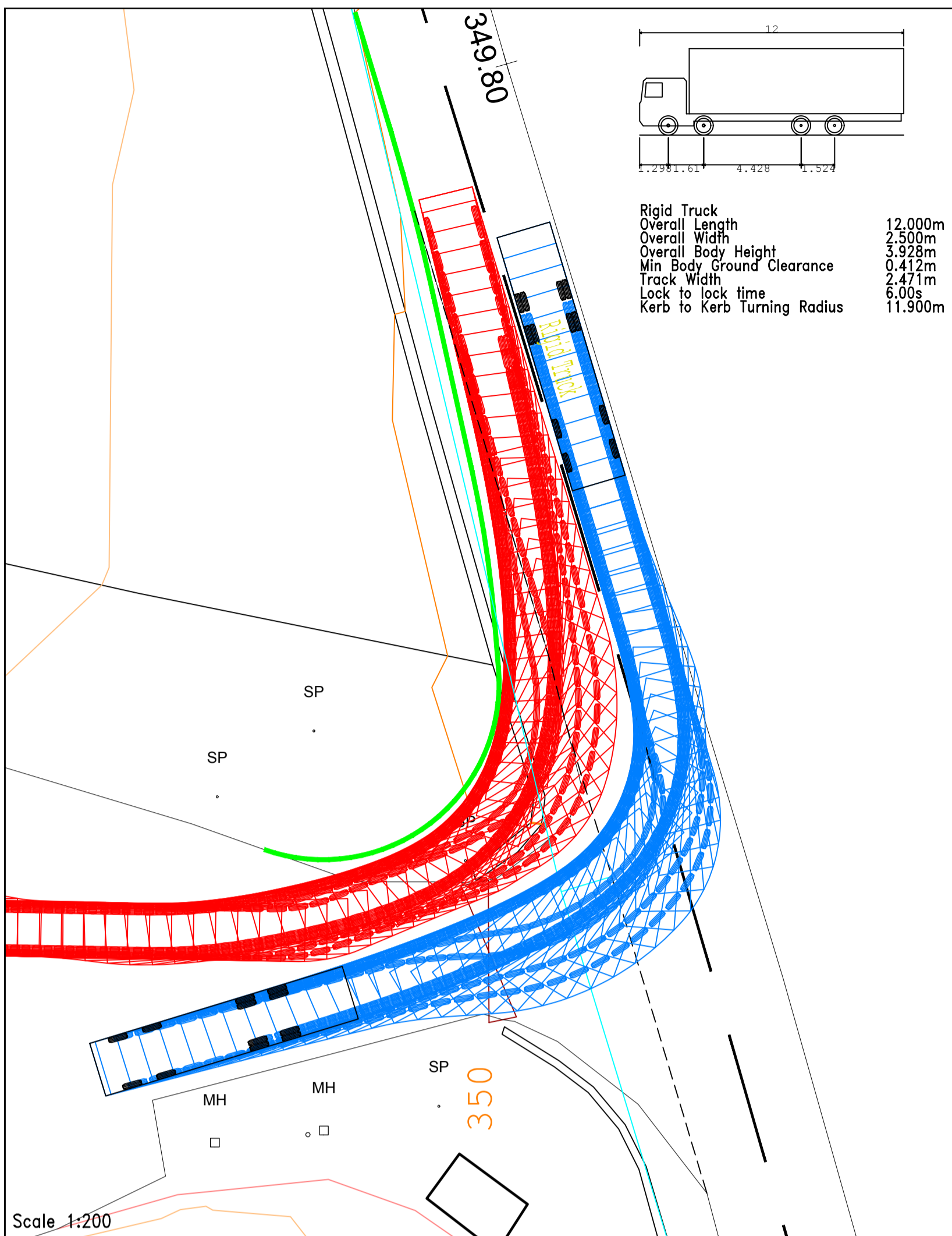
A proposed access improvement scheme has been developed to accommodate the simultaneous movement of HGVs in to / out of the WFQ access and to effectively accommodate the swept path of vehicles travelling to / from the north of the site.

The predicted increase in traffic flows resulting from the HARP scheme are unlikely to be discernible in comparison to the site's existing traffic generation potential, with the exception of during Year 1, where the average frequency of vehicle movements generated by the site during operational hours will increase from 1 vehicle every 5 minutes to 1 vehicle every 3 minutes.

The predicted intensification of use is unlikely to have an adverse impact on the local road network in terms of either capacity or safety and therefore, in the context of National Planning Policy Framework paragraph 111, should not be prevented on highways grounds.

Appendix A

Drawing 300461-001 Rev A



• Sanderson Associates (Consulting Engineers) Ltd ("the consultant"), has not checked or verified, and shall have no liability whatsoever for any inaccuracies which may be attributable to any data, reports, base plans and drawings provided by the client, or purchased by the consultant on the client's behalf, that may have been utilised within this drawing.
 • The consultant shall not be liable for the use by any person of any document for any purpose other than that for which the same were provided by the consultant.
 • No liability whatsoever is accepted by the consultant for any error or omissions.
 • The consultant accepts no liability for any vehicle specification errors within the vehicle track software used and / or its vehicle libraries.

| A | Revised Access Arrangement | BL | 11.10.21 | AA |
|-----|----------------------------|-------|----------|---------|
| Rev | Amendment | Drawn | Date | Checked |

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Client
Armstrongs Aggregates Limited

Project Title
Waddington Fell Quarry

Drawing Title
Proposed Access Improvements
and Vehicle Swept Paths

| | | | |
|--------------|------------|-------------|----|
| Scale | As Shown | Drawn By | AA |
| Drawing Size | A1 | Checked By | BL |
| Date | 02/11/2021 | Approved By | BL |

| | | | |
|----------------|------------|-----|---|
| Drawing Number | 300461-001 | Rev | A |
|----------------|------------|-----|---|



Appendix B

Speed Survey Data



SPEED SURVEY

Location Waddington Fell
Direction of Travel Northbound
Direction of Visibility Right Out

Project Number 300461
Date of Survey 03/11/21
Start Time 13:00
Finish Time 15:45

| Speed | No. of Readings | Speed | No. of Readings | Speed | No. of Readings | Speed | No. of Readings |
|-------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|
| 1 | | 26 | | 51 | | 76 | |
| 2 | | 27 | 1 | 52 | 1 | 77 | |
| 3 | | 28 | | 53 | | 78 | |
| 4 | | 29 | 1 | 54 | | 79 | |
| 5 | | 30 | | 55 | | 80 | |
| 6 | | 31 | | 56 | | 81 | |
| 7 | | 32 | 4 | 57 | | 82 | |
| 8 | | 33 | 1 | 58 | | 83 | |
| 9 | | 34 | 4 | 59 | | 84 | |
| 10 | | 35 | 4 | 60 | | 85 | |
| 11 | | 36 | 6 | 61 | | 86 | |
| 12 | | 37 | 3 | 62 | | 87 | |
| 13 | | 38 | 4 | 63 | | 88 | |
| 14 | | 39 | 4 | 64 | | 89 | |
| 15 | | 40 | 5 | 65 | | 90 | |
| 16 | | 41 | | 66 | | 91 | |
| 17 | | 42 | | 67 | | 92 | |
| 18 | | 43 | 2 | 68 | | 93 | |
| 19 | | 44 | 4 | 69 | | 94 | |
| 20 | | 45 | 3 | 70 | | 95 | |
| 21 | | 46 | | 71 | | 96 | |
| 22 | | 47 | | 72 | | 97 | |
| 23 | 1 | 48 | 1 | 73 | | 98 | |
| 24 | | 49 | | 74 | | 99 | |
| 25 | | 50 | | 75 | | 100 | |

Number of Readings = 49

Dual C'way Y/N?

Mean Speed = 37.714286

Single C'way Y/N?

Standard Deviation = 5.3619026

Wet Road Surface Y/N?

85th %ile Speed = 43.274579

85th %ile Wet Weather Speed = 40.789579 <<<<

Note: Insert Y or N in boxes against carriageway type and road surface condition and then use 85 percentile speed as marked with <<<<.



SPEED SURVEY

Location Waddington Fell
Direction of Travel Southbound
Direction of Visibility Left Out

Project Number 300461
Date of Survey 03/11/21
Start Time 13:00
Finish Time 15:45

| Speed | No. of Readings | Speed | No. of Readings | Speed | No. of Readings | Speed | No. of Readings |
|-------|-----------------|-------|-----------------|-------|-----------------|-------|-----------------|
| 1 | | 26 | | 51 | | 76 | |
| 2 | | 27 | 4 | 52 | | 77 | |
| 3 | | 28 | 1 | 53 | | 78 | |
| 4 | | 29 | 3 | 54 | | 79 | |
| 5 | | 30 | 2 | 55 | | 80 | |
| 6 | | 31 | 5 | 56 | | 81 | |
| 7 | | 32 | 4 | 57 | | 82 | |
| 8 | | 33 | 6 | 58 | | 83 | |
| 9 | | 34 | 1 | 59 | | 84 | |
| 10 | | 35 | | 60 | | 85 | |
| 11 | | 36 | 1 | 61 | | 86 | |
| 12 | | 37 | | 62 | | 87 | |
| 13 | | 38 | | 63 | | 88 | |
| 14 | 1 | 39 | 3 | 64 | | 89 | |
| 15 | | 40 | 1 | 65 | | 90 | |
| 16 | 1 | 41 | 1 | 66 | | 91 | |
| 17 | | 42 | 1 | 67 | | 92 | |
| 18 | | 43 | 1 | 68 | | 93 | |
| 19 | 1 | 44 | 1 | 69 | | 94 | |
| 20 | 2 | 45 | | 70 | | 95 | |
| 21 | 4 | 46 | | 71 | | 96 | |
| 22 | | 47 | | 72 | | 97 | |
| 23 | | 48 | | 73 | | 98 | |
| 24 | 6 | 49 | 1 | 74 | | 99 | |
| 25 | 5 | 50 | | 75 | | 100 | |

Number of Readings = 56

Dual C'way Y/N?

Mean Speed = 29.5

Single C'way Y/N?

Standard Deviation = 7.2963254

Wet Road Surface Y/N?

85th %ile Speed = 37.066289

85th %ile Wet Weather Speed = 34.581289 <<<<

Note: Insert Y or N in boxes against carriageway type and road surface condition and then use 85 percentile speed as marked with <<<<.

Contact Details

Enquiries

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