Northside Quarry

A report by Unidentified Futures Org.

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Table of Contents

Executive Summary

Analysis of the proposed Northside Quarry development (22/01909/CCMEIA) reveals significant concerns across multiple ecological and environmental dimensions. The proposal to extract dolerite presents substantial risks to protected species and habitats. It will also generate considerable carbon emissions, with viable lower-impact alternatives existing.

Key Findings:

1. Protected Species Impact:
    - Presence of internationally significant white-clawed crayfish population (IUCN Endangered).
    - 17 protected bird species identified (9 Red-listed, 8 Amber-listed).
    - 8 red-listed plant species present.
    - Critical bat commuting corridor at risk.
2. Irreplaceable Habitats:
    - Established waxcap grassland with no viable translocation options.
    - Purple Moor Grass and Rush Pastures (Habitat of Principal Importance).
    - Significant hydrological concerns for habitat maintenance.
3. Carbon Impact:[1]
    - Total projected emissions: 54,547 tonnes CO2e.
    - Soil carbon loss: 22,888 tonnes CO2e.
    - Would require 956,965 trees to offset emissions.
4. Alternative Solutions Available:
    - Existing quarries have 48 million tonnes of surplus capacity.[2]
    - Using existing quarries would reduce emissions by 43.3%.
    - Low-carbon alternatives showing promising trial results.

Critical Concerns:

1. Assessment Inadequacies:

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[1] See Methodology for details.

[2] 'Northumberland Joint Local Aggregates Assessment' (Northumberland County Council, 2023), https://www.northumberland.gov.uk/NorthumberlandCountyCouncil/media/Planning-and-Building/planning%20policy/Studies%20and%20Evidence%20Reports/Minerals%20Waste%20Studies/3.%20LAA/Joint-Local-Aggregate-Assessment-2021-January-2023.pdf.

- Multiple protected species overlooked.
- Single-visit surveys instead of required multi-year monitoring.
- Insufficient expertise in specialist species identification.
- Incomplete assessment of connected habitats.

2. Legal Compliance Issues:
    - Potential breaches of European protected species legislation.
    - Conflicts with Biodiversity Net Gain requirements.
    - Inconsistency with NPPF biodiversity conservation priorities.
    - Failure to meet statutory assessment requirements.
3. Risk Factors:
    - Unproven mitigation strategies.
    - Permanent habitat loss potential.
    - Water quality threats to endangered species.
    - Cumulative environmental impacts.

Recommendations:

1. Immediate Actions Required:
    - Suspend development permissions pending comprehensive surveys.
    - Commission extended ecological assessments.
    - Explore identified alternative sites and solutions.
    - Review compliance with environmental legislation.
2. Alternative Pathways:
    - Prioritise existing quarry utilisation.
    - Integrate recycled aggregate options.
    - Investigate innovative low-carbon solutions.
    - Develop robust monitoring protocols.

The evidence strongly indicates that the proposed development presents unacceptable risks to protected species and irreplaceable habitats, while viable alternatives exist that would significantly reduce both ecological and carbon impacts. The combination of inadequate assessment methodology and availability of lower-impact alternatives suggests that the current proposal requires substantial revision to meet environmental protection standards.

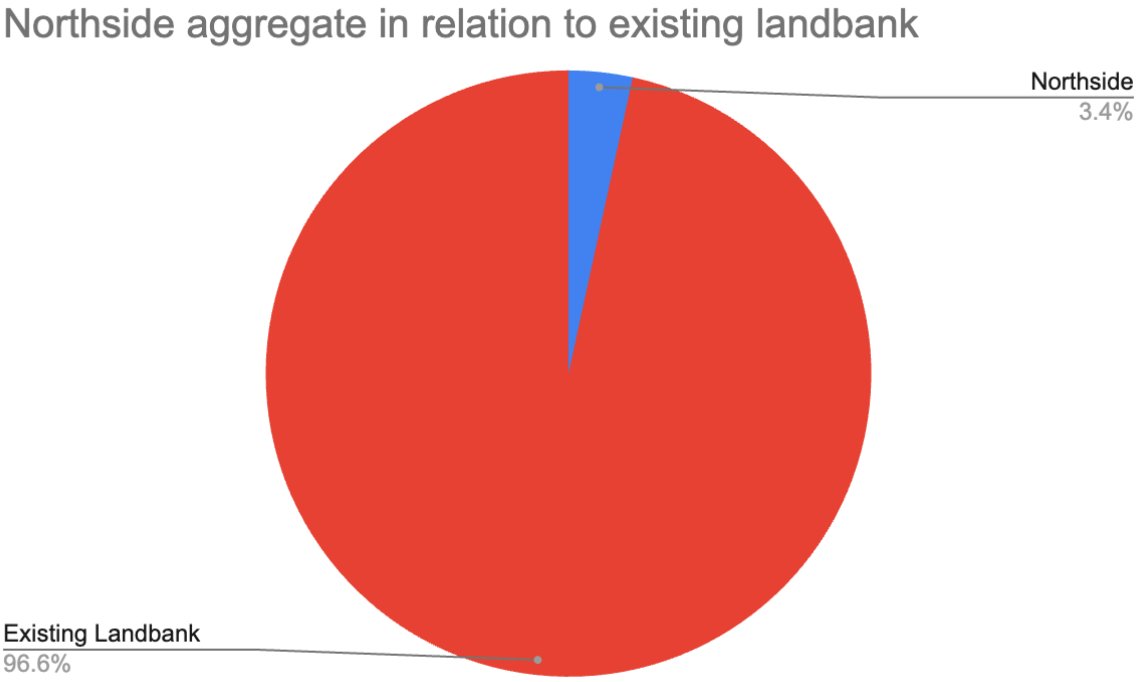
Alternative Scenarios Analysis: Lower Carbon Pathways

Assessment of Available Options

Our analysis reveals three viable alternatives that would significantly reduce both carbon emissions and biodiversity impacts, while meeting regional aggregate demands.

1. Existing Quarry Utilisation

- Current surplus capacity: 48 million tonnes (Northumberland LAA, 2023).[3]
- Carbon reduction: 24,208 tonnes CO2e (43.3% reduction).
- Total emissions: 31,659 tonnes CO2e.
- Avoids all biodiversity impacts associated with new site development.
- Utilises existing infrastructure and disturbed land.
- Northside represents a marginal increase of 3% of total capacity.



[3] 'Northumberland Joint Local Aggregates Assessment'.

Figure 1: Northside translates to a marginal increase in total supply of aggregate, making little difference to an existing surplus.

2. Recycled Aggregate Integration

- Additional 10% emissions reduction beyond existing quarry scenario.[4]
- Total emissions: 28,493.1 tonnes CO2e.
- Promotes circular economy principles.
- Reduces landfill pressure.
- Aligns with national waste reduction targets.

3. Innovative Low-Carbon Solutions

- Emerging technology led by regional businesses.
- Trialled by Highways England.[5]
- Growing adoption by local authorities.[6]
- Potential for near-complete emissions avoidance.
- Creates opportunities for local green jobs.

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[4]Santolini, Enrica, Marco Bovo, Alberto Barbaresi, Daniele Torreggiani, and Patrizia Tassinari. 'LCA of Virgin and Recycled Materials to Assess the Sustainability of Paved Surfaces in Agricultural Environment'. *Journal of Cleaner Production* 393 (20 March 2023): 136291. https://doi.org/10.1016/j.jclepro.2023.136291.

[5] Highways, National. 'New Carbon-Negative Aggregate Could Help National Highways on Road to Net Zero - National Highways'. National Highways, 24 July 2024. Worldwide. https://nationalhighways.co.uk/new-carbon-negative-aggregate-could-help-national-highways-on-road-to-net-zero/.

[6]Durham County Council. 'The Road to Net Zero'. Accessed 1 November 2024. https://www.durham.gov.uk/article/31201/The-road-to-net-zero.

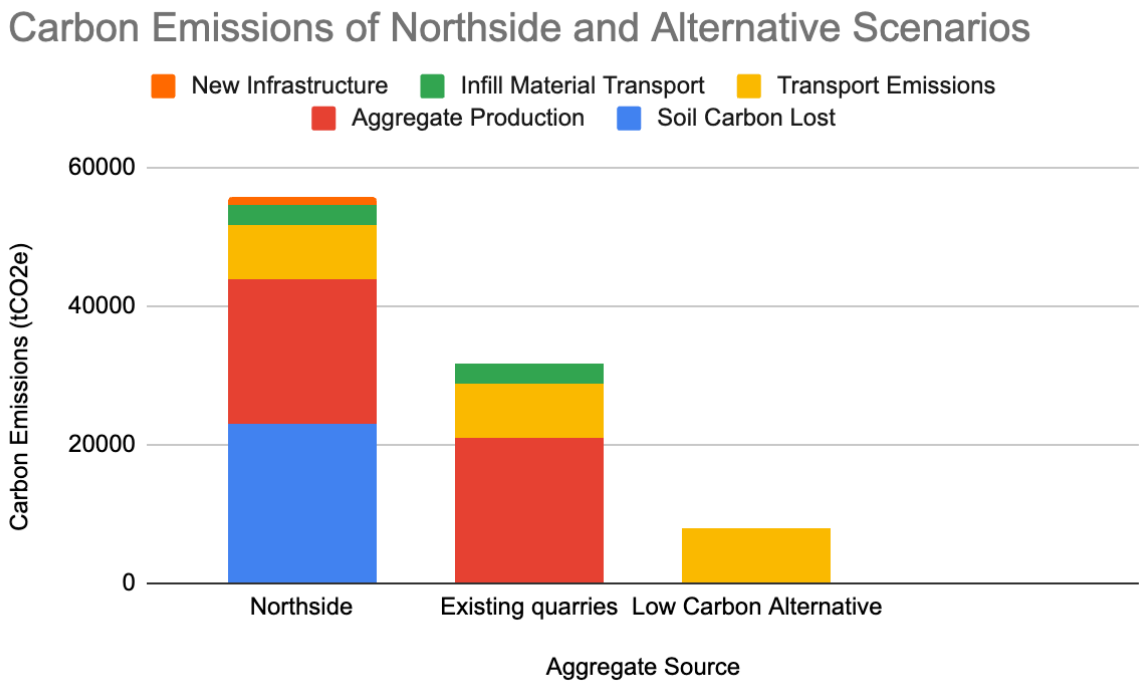

Figure 2: The loss of soil carbon represents a substantial section of the carbon cost of Northside. Transport was assumed to remain equal across the three scenarios.

Market Readiness Assessment

All alternatives are immediately available:

- Existing quarries have confirmed excess capacity.
- Recycled aggregate infrastructure is already in place.
- Low-carbon alternatives available for purchase.[7]

Policy Alignment

These alternatives align with:

- Local Authority carbon reduction targets.
- National net-zero commitments.
- Circular economy objectives.
- Regional economic development goals.

[7] 'Now Available to Purchase: LCM's Groundbreaking Carbon-Negative Aggregate | Low Carbon Materials'. Accessed 1 November 2024. https://www.lowcarbonmaterials.com/blog/now-available-to-purchase-lcms-groundbreaking-carbon-negative-aggregate.

Biodiversity

Protected Species Impact Assessment

Overview

This assessment examines the ecological impacts of the proposed development on legally protected species and critical habitats. Of particular concern are two significant features: an internationally important population of endangered white-clawed crayfish and irreplaceable waxcap grassland habitat. The following sections provide detailed analysis of these key ecological assets, supported by comprehensive species surveys and habitat assessments.

Legal and Policy Framework

The assessment is conducted within the context of:

- Environment Act 2021.[8]
- National Planning Policy Framework (NPPF) biodiversity conservation requirements.[9]
- UK Biodiversity Framework.[10]
- IUCN Red List classifications.
- Wildlife and Countryside Act 1981.[11]

Focus of Detailed Assessment

The following sections provide comprehensive analysis of two critical ecological features:

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[8] 'Environment Act 2021' (King's Printer of Acts of Parliament), accessed 1 November 2024, https://www.legislation.gov.uk/ukpga/2021/30/part/1/chapter/1/crossheading/policy-statement-on-environmental-principles.

[9] 'National Planning Policy Framework - 15. Conserving and Enhancing the Natural Environment - Guidance - GOV.UK', accessed 1 November 2024, https://www.gov.uk/guidance/national-planning-policy-framework/15-conserving-and-enhancing-the-natural-environment.

[10] 'UK Biodiversity Framework'. Peterborough: JNCC, 2024.

[11] 'Wildlife and Countryside Act 1981'. Text. Statute Law Database. Accessed 1 November 2024. https://www.legislation.gov.uk/ukpga/1981/69/contents.

1. White-clawed Crayfish population in the River Wansbeck.
2. Waxcap Grassland habitat.

These features represent some of the most significant ecological assets at risk from the proposed development, combining both international importance and high vulnerability to development impacts. The assessment examines current status, development impacts, methodological concerns, and recommended mitigation measures for each.

White-clawed Crayfish (Austropotamobius pallipes) Impact Assessment

Conservation Status and Significance

The white-clawed crayfish (*Austropotamobius pallipes*) is classified as Endangered on the IUCN Red List, with populations experiencing significant decline across its range.[12] The River Wansbeck supports an internationally significant population of this species, making the site of exceptional conservation importance.[13]

Critical Analysis of Development Impact

Water Quality Concerns

The proposed development presents multiple risks to water quality in the River Wansbeck through wastewater discharge. Both the IUCN[14] and UK government guidance[15] identify several critical threats to white-clawed crayfish populations:

- Industrial effluent discharge.
- Altered water flow regimes.
- Increased sedimentation.
- Reduced oxygen levels.
- Pollution events.

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[12] Francesa Gherardi et al., 'IUCN Red List of Threatened Species: Austropotamobius Pallipes', *IUCN Red List of Threatened Species*, 14 April 2010, https://www.iucnredlist.org/en.

[13] 'Investigations into Deaths of Native Species in Northumberland', GOV.UK, accessed 1 November 2024, https://www.gov.uk/government/news/investigations-into-deaths-of-native-species-in-northumberland.

[14] Gherardi et al., 'IUCN Red List of Threatened Species'.

[15] 'White-Clawed Crayfish: Advice for Making Planning Decisions', GOV.UK, 26 October 2023, https://www.gov.uk/guidance/white-clawed-crayfish-advice-for-making-planning-decisions.

Inadequacies in Impact Assessment

Methodological Deficiencies

1. The proposal fails to meet Environment Agency requirements for:
    - Comprehensive survey of connected watercourses.
    - Detailed downstream impact assessment.
    - Quantitative analysis of population risks.
2. Technical expertise concerns:
    - Assessment conducted by geotechnical rather than ecological specialists.
    - Heavy reliance on literature review rather than site-specific data.
    - Absence of empirical evidence supporting mitigation efficacy.

Scientific Evidence Gaps

The current evidence base is insufficient to demonstrate the development's safety for the crayfish population:

1. Synergistic Effects:
    - Haddaway et al. emphasise the necessity of considering chemical conditions holistically.[16]
    - Current assessment fails to analyse combined effects of multiple water quality changes.
    - No consideration of interaction between existing and new environmental stressors.
2. Cumulative Impact:
    - Rosewarne et al. identify suspended solids as a significant environmental stressor.[17]
    - Existing agricultural and sewage pollution already impact the river system.
    - Additional stressors may exceed population resilience thresholds.

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[16] N. R. Haddaway et al., 'Water Chemistry and Endangered White-Clawed Crayfish: A Literature Review and Field Study of Water Chemistry Association in Austropotamobius Pallipes', *Knowledge and Management of Aquatic Ecosystems*, no. 416 (2015): 01, https://doi.org/10.1051/kmae/2014037.

[17] Paula J. Rosewarne et al., 'Muddied Waters: Suspended Sediment Impacts on Gill Structure and Aerobic Scope in an Endangered Native and an Invasive Freshwater Crayfish', *Hydrobiologia* 722, no. 1 (January 2014): 61–74, https://doi.org/10.1007/s10750-013-1675-6.

    - No assessment of cumulative effects provided.
    - Recent deaths of crayfish in the river suggest a current lack of resilience to additional stressors.[18]
3. Evidence Limitations:
    - Current scientific literature (Haddaway et al.) indicates insufficient evidence regarding Total Suspended Solids (TSS) and siltation impacts.[19]
    - Knowledge gaps regarding water quality parameters required for population survival.
    - Absence of long-term monitoring data for similar developments.
    - Failure to consider overall resilience of ecosystem.

Legal and Policy Framework

Precautionary Principle[20]

The Environment Act 2021 establishes the precautionary principle as a key consideration in environmental decision-making. Given the:

- International importance of the population.
- Documented threats to the species.
- Significant evidence gaps.
- Irreversible nature of potential impacts.

The precautionary principle strongly indicates that development approval would be premature without comprehensive risk assessment and mitigation strategies.

Recommendations

1. **Enhanced Assessment Requirements**:

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[18] 'Investigations into Deaths of Native Species in Northumberland', GOV.UK, accessed 1 November 2024, https://www.gov.uk/government/news/investigations-into-deaths-of-native-species-in-northumberland.

[19] Haddaway et al., 'Water Chemistry and Endangered White-Clawed Crayfish'

[20] 'Environment Act 2021'.

    - Comprehensive population survey of connected watercourses.
    - Detailed modelling of water quality impacts.
    - Analysis of cumulative and synergistic effects.
    - Long-term monitoring program design.
2. **Additional Safeguards**:
    - Quantitative water quality parameters.
    - Continuous monitoring systems.
    - Emergency response protocols.
    - Legally binding mitigation measures.
3. **Expert Review**:
    - Independent ecological assessment.
    - Peer review of methodology.
    - Stakeholder consultation.
    - Best practice guidance development.

Conclusion

The current application presents substantial risks to an internationally important population of endangered white-clawed crayfish. The evidence base is insufficient to demonstrate that the development will not harm this protected species. Given the species' endangered status and the significance of the River Wansbeck population, approval without comprehensive assessment and robust safeguards would contravene both scientific best practice and legal obligations under the precautionary principle.

Waxcap Grassland

Executive Summary

Our analysis reveals significant concerns regarding the proposed aggregate quarry development on an established waxcap grassland site. The current environmental assessment severely understates the site's ecological importance and relies on unproven mitigation strategies that risk permanent loss of irreplaceable habitat.

Key Findings

Inadequate Site Assessment

Our research has identified critical flaws in the current environmental survey methodology:

- Reliance on a single-visit survey conducted in 2022 (an exceptionally dry year), despite established Natural England recommending multiple surveys.[21]
- Exclusion of waterlogged areas from the survey, despite these being prime habitat for several specialist waxcap species.[22]
- Independent field observations indicating fruiting bodies across a substantially larger area than acknowledged in the official survey.
- Insufficient documentation of surveyor credentials and expertise in specialist fungi identification.

Scientific Evidence Against Translocation

Current research[23] strongly indicates that waxcap grassland translocation is not a viable mitigation strategy:

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[21]Evans, Shelley, 'Waxcap-Grasslands - an Assessment of English Sites' (Natural England, 2011), https://publications.naturalengland.org.uk/publication/131003.

[22] Evans, Shelley, 'Waxcap-Grasslands - an Assessment of English Sites'.

[23]GW Griffith and AP Detheridge, 'eDNA Analysis of Fungal Populations in Waxcap Fungi from Soil Samples Collected at Severalls Hospital Site before and after Sward Translocation.' (Aberystwyth University, 2022), https://www.aber.ac.uk/waxcap/downloads/Griffith22-SeverallHospitalWaxcapTranslocationReport-SouthernEcologicalSolutionsLtd.pdf.

- Multiple attempted translocations have failed to maintain original species diversity.
- The complex mycorrhizal networks essential to waxcap communities cannot be reliably recreated.
- Recent research documents consistent failures in translocation attempts.

Regulatory Considerations

The proposed development faces significant challenges under current environmental legislation:

- Conflicts with Biodiversity Net Gain (BNG) requirements under the Environment Act 2021.
- Contradicts the precautionary principle embedded in UK environmental law.
- Fails to meet Joint Nature Conservation Committee (JNCC) guidelines for habitat protection.
- Inconsistent with National Planning Policy Framework (NPPF) biodiversity conservation priorities.

Scientific Context

Research indicates that comprehensive waxcap grassland surveys require:

- 3-20 years of monitoring to establish accurate species diversity.[24]
- Multiple visits throughout suitable growing conditions.[25]
- Expertise in identifying specialist species including *Hygrocybe helobia*, *H. coccineocrenata*, and *H. substrangulata.*[26]
- Assessment of both dry and waterlogged areas, which support different species assemblages.[27]

Recommendations

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[24] 'Waxcap Grasslands' (Magnificent Meadows), accessed 1 November 2024, http://magnificentmeadows.org.uk/assets/pdfs/Waxcap_Grassland.pdf.

[25] Evans, Shelley, 'Waxcap-Grasslands - an Assessment of English Sites'.

[26] Evans, Shelley, 'Waxcap-Grasslands - an Assessment of English Sites'.

[27] Evans, Shelley, 'Waxcap-Grasslands - an Assessment of English Sites'.

1. **Immediate Action Required**: Suspend development permissions pending comprehensive multi-year surveys.
2. **Enhanced Assessment**: Commission extended surveys by recognized mycological experts.
3. **Alternative Solutions**: Explore alternative sites without significant waxcap grassland presence.
4. **Policy Alignment**: Ensure full compliance with BNG requirements and NPPF guidelines.

Conclusion

The current development proposal presents an unacceptable risk to a valuable and irreplaceable habitat. The combination of inadequate assessment and reliance on unproven mitigation strategies fails to meet both scientific and regulatory standards for environmental protection.

Additional Ecological Assessment Errors

Overview

Our analysis reveals substantial deficiencies in the ecological assessment methodology across multiple species groups. The current environmental assessment significantly understates the site's biodiversity value through incomplete surveys and oversight of protected species, potentially compromising legal compliance and conservation obligations.

Key Findings

Bat Habitat Assessment Deficiencies

- Critical omission of a key bat commuting corridor along the tree-lined former coachroad.
- Failure to assess connectivity to significant bat habitats at Kirkharle, Wallington and Kirkwhelpington.
- Legal obligations for protected species potentially compromised.
- Impact assessment gaps regarding traffic, noise, and dust effects on bat movement.

Vascular Plant Survey Inadequacies

- Significant underreporting of red-listed species.
- Only two of eight present red-listed species are highlighted in documentation.
- Current survey fails to reflect the true conservation value of site.
- Comprehensive species list reveals higher biodiversity value than reported.

Bird Survey Methodology Failures

- Critical omission of red-listed species including curlew and lapwing.
- Conflict between local observations and official survey results.
- National Biodiversity Network data indicates presence of 17 red and amber listed species.
- Substantial evidence from multiple sources contradicting official findings.

Regulatory Implications

- Potential breach of European protected species legislation regarding bats.

- Failure to meet statutory requirements for protected species assessment.
- Incomplete data compromising accurate biodiversity impact assessment.
- Inconsistency with national planning policy framework requirements.

Methodological Concerns

- Insufficient scope of bat corridor assessment.
- Inadequate recognition of red-listed plant species.
- Incomplete bird survey methodology.
- Failure to incorporate existing biodiversity records.
- Limited integration of local ecological knowledge.

Recommendations

- **Comprehensive Reassessment**: Commission new surveys addressing identified gaps.
- **Extended Scope**: Include full assessment of bat commuting routes.
- **Data Integration**: Incorporate existing records and local observations.
- **Protected Species**: Complete full protected species assessment.
- **Methodology Review**: Implement more rigorous survey protocols.

Conclusion

The ecological assessment demonstrates systematic undervaluation of the site's biodiversity significance. Multiple protected and red-listed species have been overlooked or inadequately assessed, raising serious concerns about the validity of the current environmental impact evaluation and its compliance with statutory requirements

Summary and Conclusion

The proposed Northside Quarry development should not proceed for the following reasons:

1. **Unacceptable Environmental Risk**: The development threatens an internationally significant population of endangered white-clawed crayfish and multiple protected species, while destroying irreplaceable habitats including rare waxcap grassland.
2. **Inadequate Assessment**: The current environmental impact assessment contains significant methodological flaws and fails to meet statutory requirements for protected species surveys.
3. **Available Alternatives**: Viable, lower-impact alternatives exist that could meet regional aggregate demands while significantly reducing both carbon emissions and biodiversity impacts.
4. **Limited Strategic Value**: The development would only represent a 3% increase in the total aggregate landbank, making its benefits disproportionate to its environmental costs.
5. **Legal Compliance Issues**: The proposal likely conflicts with multiple environmental protection laws and regulations, including European protected species legislation and Biodiversity Net Gain requirements.

Given these findings, combined with the availability of lower-impact alternatives and the proposal's limited strategic importance, the development cannot be justified on either environmental or economic grounds. The precautionary principle and current environmental legislation require that this application be refused.

Methodology

Carbon Impact Assessment Calculations

1. Soil Carbon Loss Calculations

1.1 Direct Soil Carbon Displacement

- Base calculation: 87 tonnes carbon per hectare × 28.7 hectares = 2,496.9 tonnes[28]
- Conversion to CO2e: 2,496.9 × 3.67 = 9,163.6 tonnes CO2e
- +60% carbon to depth of 1m[29] *Soil depth ranges between 2 and 12m on the site, but a conservative figure of 1m was used*.
- Final calculation: 22,888 tonnes CO2e

1.2 Methodology Limitations

- Excludes vegetative carbon
- Does not account for fungal pathway carbon storage of waxcap grassland[30]
- Damp, peaty soil (found on some of the Northside site) stores far higher levels of carbon[31]

[28] Gregg, R, Elias, J.L., Alonso, I, Crosher, I. E., Muto, P, and Morecroft, M.D. 'Carbon Storage and Sequestration by Habitat: A Review of the Evidence'. Natural England, 2021. https://publications.naturalengland.org.uk/publication/5419124441481216.

[29] 'Grasslands As A Carbon Store'. Plantlife, 2023. https://www.plantlife.org.uk/wp-content/uploads/2023/08/Grasslands-as-a-Carbon-Store.pdf.

[30] Hawkins, Heidi-Jayne, Rachael I. M. Cargill, Michael E. Van Nuland, Stephen C. Hagen, Katie J. Field, Merlin Sheldrake, Nadejda A. Soudzilovskaia, and E. Toby Kiers. 'Mycorrhizal Mycelium as a Global Carbon Pool'. *Current Biology* 33, no. 11 (5 June 2023): R560–73. https://doi.org/10.1016/j.cub.2023.02.027.

[31] Gregg, R, Elias, J.L., Alonso, I, Crosher, I. E., Muto, P, and Morecroft, M.D. 'Carbon Storage and Sequestration by Habitat: A Review of the Evidence'. Natural England, 2021. https://publications.naturalengland.org.uk/publication/5419124441481216.

2. Aggregate Production Emissions

2.1 Primary Production

- Total aggregate volume: 2.8 million tonnes
- Emissions factor: 0.00747 tonnes CO2e per tonne[32]
- Calculation: 2.8 million × 0.00747 = 20,916 tonnes CO2e

2.2 Alternative Scenarios Emissions

- Existing quarries: -43.3% (infrastructure already in place, no soil carbon lost)
- Recycled aggregate:Additional -10% reduction
- Low-carbon alternatives: -100%[33]

3. Transport Emissions Calculations

3.1 Primary Transport

- Journey distance: 47km
- Total material: 2.8 million tonnes
- Calculation: 8,000.04 tonnes CO2e[34]

3.2 Infill Material Transport

- Volume: 800,000 cubic metres
- Density conversion: 1.2 tonnes per cubic metre[35]

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[32] Jones, C. and Hammond, G. 'Inventory of Carbon and Energy', 2019. https://circularecology.com/embodied-carbon-footprint-database.html.

[33] 'Products | Low Carbon Materials - Helping the Construction Sector Reach Net Zero'. Accessed 1 November 2024. https://www.lowcarbonmaterials.com/osto.

[34] 'CO2-CALCULATOR'. Accessed 1 November 2024. https://www.carboncare.org/en/co2-emissions-calculator.

[35] 'Conversion Factors for Calculation of Weight to Volume for Use When Completing Template 3 | Sustainability Exchange'. Accessed 1 November 2024. https://www.sustainabilityexchange.ac.uk/conversion_factors_for_calculation_of_weight_to_vo.

- Journey distance: 47km (Birtley to Kirkwhelpington - unclear where the infill material will originate, but likely to be near North East Concrete)
- Calculation: 2,742.87 tonnes CO2e[36]

4. Tree Offset Calculations

- Required offset: 54,547 tonnes CO2e
- Equivalent to 956,965 trees[37]

5. Data Quality Assessment

5.1 Confidence Levels

- High confidence (±5%)
    - Transport distances
    - Aggregate volumes
    - Soil area calculations
- Medium confidence (±15%):
    - Emissions factors
    - Carbon sequestration rates
- Lower confidence (±25%):
    - Deep soil carbon content
    - Future technology performance

5.1 Confidence Levels

- Transport emissions: ±10% variation based on route optimization
- Soil carbon: >100% possible underestimate (due to soil depth of 2-12m)

[36] 'CO2-CALCULATOR'. Accessed 1 November 2024. https://www.carboncare.org/en/co2-emissions-calculator.

[37] US EPA, OAR. 'Greenhouse Gas Equivalencies Calculator'. Data and Tools, 28 August 2015. https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

Biodiversity Appendix

List of species

The following is a full list of red and amber listed birds threatened by this development, in addition to a record of red listed plants present on the site.

Species	Conservation Status[38]
Skylark (Alauda arvensis)	Red (Birds of Conservation Concern 5)
Curlew (Numenius arquata)	Red (Birds of Conservation Concern 5), Priority Species, Near Threatened (IUCN), Reported by locals, Recordings/video submitted
Lapwing (Vanellus vanellus)	Red (Birds of Conservation Concern 5), Priority Species, Near Threatened (IUCN)
Linnet (Linaria cannabina)	Red (Birds of Conservation Concern 5), Protected, Priority Species
Fieldfare (Turdus pilaris)	Red (Birds of Conservation Concern 5), Protected, Record from NBN
Greenfinch (Chloris chloris)	Red (Birds of Conservation Concern 5), Protected, Record from NBN

[38] Data on conservation status taken from BTO.org. Records taken from objections submitted online, direct observation in the field by UFO operatives and National Biodiversity Network Atlas.

Swift (Apus Apus)	Red (Birds of Conservation Concern 5), Record from NBN
House Martin (Delichon urbicum)	Red (Birds of Conservation Concern 5), Record from NBN
Grey Partridge (Perdix perdix)	Red (Birds of Conservation Concern 5), Record from NBN

Species	Conservation Status[39]
Tawny Owl (Strix aluco)	Amber (Birds of Conservation Concern 5), Record from NBN
Whitethroat (Sylvia Communis)	Amber (Birds of Conservation Concern 5)
Snipe (Gallego Gallego)	Amber (Birds of Conservation Concern 5), Protected
Meadow Pipit (Anthus pratensis)	Amber (Birds of Conservation Concern 5)

[39] Data on conservation status taken from BTO.org. Records taken from objections submitted online, direct observation in the field by UFO operatives and National Biodiversity Network Atlas.

Kestrel (Falco tinnunculus)	Amber (Birds of Conservation Concern 5)
Reed Bunting (Emberiza schoeniclus)	Amber (Birds of Conservation Concern 5), Record from NBN
Wheatear (Oenanthe oenanthe)	Amber (Birds of Conservation Concern 5), Record from NBN
Wren (Troglodytes troglodytes)	Amber (Birds of Conservation Concern 5), Record from NBN

Species[40]	Conservation Status[41]
Marsh Cinquefoil (Comarum palustre)	Near Threatened (England Red List)
Tormentil (Potentilla erecta)	Near Threatened (England Red List)

[40] Records taken from the Ecological Assessment Appendices and Preliminary Ecological Assessment submitted as part of the application.

[41] Taken from Stroh, P.A., Leach, S.J., August, T.A., Walker, K.J., Pearman, D.A., Rumsey, F.J., Harrower, C.A., et al. *Vascular Plant Red List for England*. Botanical Society of Britain & Ireland, 2014. https://bsbi.org/wp-content/uploads/dlm_uploads/England_Red_List_1.pdf.

Marsh Grass of Parnassus (Parnassia palustris)	Vulnerable (England Red List)
Lesser Spearwort (Ranunculus flammula)	Vulnerable (England Red List)
Marsh Valerian (Valeriana dioica)	Near Threatened (England Red List)
Common Harebell (Campanula rotundifolia)	Near Threatened (England Red List)
Devil's-bit Scabious (Succisa pratensis)	Near Threatened (England Red List)
Valerian (Valeriana officinalis)	Near Threatened (England Red List)

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