



**STEPHENSON  
HALLIDAY**

Planning, Landscape & Environment  
an **RSK** company

# MAES Y DROELL QUARRY EXTRACTION OF INDUSTRIAL SAND

Environmental Statement  
Volume II

## **Chapter 14: Cumulative Effects and Interactions**

Silica Sand Mold Limited

Prepared by Stephenson Halliday Limited

# Chapter 14: Cumulative Effects and Interactions

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## 14 CUMULATIVE EFFECTS AND INTERACTIONS

### 14.1 Introduction

- 14.1.1 This Chapter considers the potential for cumulative and combined effects associated with the Proposed Development at Maes y Droell Quarry.
- 14.1.2 For the purposes of this assessment:
- Intra-project (combined) effects are effects arising where impacts from different environmental topics associated with the Proposed Development affect the same receptor or receptor group.
  - Inter-project (cumulative) effects are effects arising where impacts from the Proposed Development combine with those of other existing, permitted or reasonably foreseeable developments.
- 14.1.3 The assessment has been informed by the findings of **ES Volume II, Chapters 6 to 13** of this Environmental Statement (ES) and focuses on those receptors and environmental topics where there is potential for interactions between effects or where effects may combine to result in additional significant environmental effects. The approach is proportionate and reflects the scale and nature of the Proposed Development and the conclusions of the technical assessments.

### 14.2 Assessment Methodology

- 14.2.1 There is no prescribed methodology for undertaking cumulative and combined effects assessments across multiple environmental disciplines. The assessment has therefore relied on professional judgement and review of the conclusions of the individual topic chapters.
- 14.2.2 The assessment has considered:
- the significance of residual effects identified within each technical chapter;
  - receptors affected by more than one environmental topic;
  - effects occurring during extraction, processing, restoration and aftercare phases;
  - nearby developments capable of giving rise to cumulative environmental effects; and,
  - whether interactions between effects could result in environmental effects of greater significance than those identified within the individual assessments.
- 14.2.3 The assessment is informed by the embedded mitigation and operational controls incorporated into the Proposed Development and assumes that these measures are implemented throughout the life of the quarry.

## 14.3 Intra-Project (Combined) Effects

### Introduction

14.3.1 A review of the technical assessments forming this Environmental Statement indicates that most environmental effects associated with the Proposed Development are localised and topic specific. Nevertheless, certain receptors have the potential to experience effects from more than one environmental discipline simultaneously during the operational life of the quarry.

14.3.2 Table 14-1 summarises the principal combined effects considered.

**Table 14-1 Summary of Potential Combined Effects**

| Receptor Group                                             | Relevant Topics                                     | Principal Effects Identified in Topic Assessments                                                                                    | Potential Combined Effect                                                   | Significance                                                                                               |
|------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Nearby residential receptors                               | Landscape and Visual, Noise, Air Quality, Transport | Localised visual effects during extraction; limited traffic noise effects at specific receptors; air quality effects not significant | Combined perception of quarry activity, vehicle movements and visual change | Not Significant                                                                                            |
| Public Rights of Way users and recreational receptors      | Landscape and Visual, Noise, Air Quality            | Significant visual effects close to active quarry phases; air quality and noise effects not significant                              | Combined experience of visual change and operational activity               | Not Significant                                                                                            |
| Clwydian Range and Dee Valley National Landscape receptors | Landscape and Visual, Ecology                       | Temporary landscape and visual effects during extraction; no significant ecological effects                                          | Combined influence on landscape character and recreational experience       | Not Significant, beyond effects identified in <b>ES Volume II, Chapter 9: Landscape and Visual Effects</b> |
| Ecological receptors                                       | Ecology, Hydrology and Hydrogeology, Air Quality    | Temporary habitat impacts mitigated through restoration; no significant water or air quality effects                                 | Interaction between habitat, water environment and operational activities   | Not Significant                                                                                            |
| Heritage assets                                            | Cultural Heritage, Landscape and Visual             | Minor adverse archaeological effects; no significant effects on asset setting                                                        | Interaction between archaeological loss and landscape change                | Not Significant                                                                                            |
| Local communities and                                      | Socio-Economics,                                    | Beneficial socio-economic effects;                                                                                                   | Economic benefits experienced                                               | Not Significant                                                                                            |

economic  
receptors

Transport,  
Noise

localised operational  
disturbance

alongside  
temporary  
environmental  
effects

Overall,  
beneficial  
effects

## Residential Receptors

- 14.3.3 The greatest potential for combined effects occurs at residential receptors located close to the Site boundary and transport route.
- 14.3.4 These receptors may experience:
- temporary visual effects resulting from mineral extraction activity;
  - operational activity associated with quarrying and restoration;
  - traffic-associated noise; and,
  - temporary dust-generating activities.
- 14.3.5 The Landscape and Visual Impact Assessment (**ES Volume III, Appendix 9: Landscape and Visual Impact Assessment**) identifies significant visual effects during extraction for receptors immediately adjacent to the Site and within close proximity of quarry operations.
- 14.3.6 The Noise Assessment (**ES Volume III, Appendix 6.1: Noise Assessment**) identifies a significant adverse effect associated with worst-case traffic noise at a limited number of receptors close to Road Link 2, although operational quarry noise effects are not significant following mitigation.
- 14.3.7 The Air Quality Assessment (**ES Volume III, Appendix 7.1: Minerals Dust and Air Quality Assessment**) concludes that dust and air quality effects would not be significant following implementation of mitigation measures including phased extraction, wheel washing facilities, dust suppression and a Dust Management Plan.
- 14.3.8 Accordingly, whilst certain receptors may experience visual, noise and operational effects simultaneously, these effects do not combine in a manner that would give rise to a materially greater environmental effect than those identified within the individual assessments. No additional significant combined effects are predicted.

## Public Rights of Way and Recreational Receptors

- 14.3.9 Users of Public Rights of Way, the local bridleway network, open access land and recreational routes may experience a combination of:
- visual effects associated with quarrying activities;
  - temporary changes in local landscape character;
  - operational activity and associated movements; and

- limited temporary disturbance from quarry operations.

- 14.3.10 The Landscape and Visual Impact Assessment identifies the most notable effects for receptors adjacent to the Site and along Public Rights of Way crossing or adjoining operational phases.
- 14.3.11 However, neither the Noise Assessment nor the Air Quality Assessment identifies significant effects for such receptors.
- 14.3.12 Consequently, the principal combined effect remains the landscape and visual effect reported separately within **ES Volume II, Chapter 9: Landscape and Visual Effects** and no additional significant combined effects are predicted.

## Ecological and Water Environment Receptors

- 14.3.13 The Ecological Impact Assessment (**ES Volume III, Appendix 11.1: Ecological Impact Assessment (EcIA)**) identifies temporary habitat losses during extraction but concludes that significant residual ecological effects would not arise following implementation of habitat retention, species mitigation and progressive restoration measures.
- 14.3.14 The Hydrogeological Assessment (**ES Volume III, Appendix 12.1: Hydrogeological Impact Assessment**) concludes that no significant effects upon groundwater, surface waters, private water supplies or water-dependent ecological receptors would occur. Quarrying would remain above the groundwater table throughout the operational life of the development.
- 14.3.15 As a result, no significant combined ecological, hydrological or hydrogeological effects are predicted.

## Cultural Heritage Receptors

- 14.3.16 The Cultural Heritage Assessment (**ES Volume III, Appendix 8.1: Cultural Heritage Assessment**) identifies limited archaeological potential within certain parts of the Site and concludes that residual effects would be minor adverse following implementation of archaeological mitigation measures. There are no significant effects on the setting of designated heritage assets.
- 14.3.17 Although some areas subject to archaeological investigation also experience landscape change during extraction, the interaction between these effects is not considered capable of generating additional significant environmental effects.

## Community and Socio-Economic Receptors

- 14.3.18 The Community and Socio-Economic Assessment (**ES Volume II, Chapter 13: Community and Socio-Economic Considerations**) concludes that the Proposed Development would generate beneficial effects through direct employment, indirect employment, support for specialist industrial supply chains and provision of nationally important industrial sand resources.
- 14.3.19 Whilst some residents may experience temporary disturbance associated with quarry operations and traffic movements, these effects have been considered and mitigated through

the relevant technical assessments. The overall socio-economic effect remains beneficial, and no significant combined effects are predicted.

## 14.4 Inter-Project (Cumulative) Effects

### Introduction

- 14.4.1 The principal nearby development with potential for cumulative interaction is Graig Quarry, located approximately 800–1,000 metres west of the Site. This existing quarry has been considered within the baseline conditions and topic assessments where relevant.
- 14.4.2 Graig Quarry, located near Llanarmon-yn-Iâl approximately 800 metres at its closest approach to the Proposed Development. It is an existing limestone quarry operated for the extraction and processing of Carboniferous Limestone for aggregate production. The quarry has been worked since the 1940s and remains a safeguarded mineral resource within Denbighshire.
- 14.4.3 The quarry benefits from planning permission to continue extracting existing reserves until August 2028, with a separate application having sought access to approximately 4.4 million tonnes of additional limestone reserves and an extension of operational life by around 25 years.
- 14.4.4 Given its proximity to the Proposed Development and the potential for overlapping periods of construction, operation and restoration activity, Graig Quarry has been considered within the cumulative effects assessment.
- 14.4.5 Potential cumulative effects may arise through:
- **Noise and Vibration:** Concurrent quarrying, processing, blasting, crushing and haulage activities, together with construction activities associated with the Proposed Development, may contribute to increased noise levels at sensitive receptors where both developments are audible.
  - **Air Quality and Dust:** Quarry extraction, mineral processing, stockpiling and vehicle movements have the potential to generate dust and particulate emissions. In combination with construction activities associated with the Proposed Development, there is the potential for temporary cumulative dust effects, particularly during dry and windy conditions.
  - **Landscape and Visual Effects:** Both developments have the potential to influence the character of the local landscape and views experienced by receptors. Cumulative effects may arise where the quarry and Proposed Development are visible within the same view or contribute jointly to perceptions of industrial activity within the landscape.
  - **Traffic and Transport:** Combined HGV movements associated with quarry operations and the Proposed Development may increase traffic flows on sections of the local highway network used by both developments, particularly where routes converge onto the principal road network. This could result in temporary cumulative effects on severance, driver delay, pedestrian amenity and road safety.

- **Ecology and Biodiversity:** Depending on the location of ecological receptors and habitat networks, there is potential for cumulative disturbance effects arising from increased activity, vehicle movements, noise and lighting. The significance of such effects would depend on the degree of spatial and temporal overlap between the developments.
- **Socio-Economic Effects:** Both the quarry and Proposed Development contribute to local employment, expenditure and supply-chain opportunities. Cumulatively, these activities may result in beneficial economic effects at a local and regional level.

14.4.6 These matters have therefore been considered within the relevant technical assessments presented in this ES and in this Chapter.

14.4.7 A review of available planning information has not identified any other consented or reasonably foreseeable developments capable of generating significant cumulative effects in combination with the Proposed Development.

## Air Quality

14.4.8 **ES Volume II, Chapter 7: Air Quality** specifically considered the potential for cumulative effects with Graig Quarry.

14.4.9 The assessment concludes that operational dust effects and particulate concentrations would remain below relevant assessment criteria and air quality objectives. Furthermore, sensitive receptors are not located within the applicable screening distances of both quarry operations simultaneously.

14.4.10 No significant cumulative air quality effects are therefore predicted.

## Noise

14.4.11 The Noise Assessment (**ES Volume III, Appendix 6.1: Noise Assessment**) considered the potential for cumulative operational effects arising from both quarry operations.

14.4.12 Given the separation distance between the two sites, local topography and the localised nature of operational quarry noise, the assessment concludes that significant cumulative noise effects are unlikely.

14.4.13 No significant cumulative noise effects are predicted.

## Landscape and Visual Effects

14.4.14 Evidence of quarrying activity forms part of the existing landscape baseline.

14.4.15 The Landscape and Visual Impact Assessment (**ES Volume III, Appendix 9: Landscape and Visual Impact Assessment**) recognises the influence of existing quarrying activities within the wider landscape but concludes that the effects associated with the Proposed Development remain localised. Distance, vegetation and intervening landform substantially limit the extent to which both quarry sites are perceived together.

14.4.16 No significant additional cumulative landscape or visual effects are predicted.

## Transport

- 14.4.17 The principal receptors likely to be affected by traffic associated with the development include:
- Residents along the unclassified road between Graianrhyd and Eryrys.
  - Residents and road users along the B5430 Graianrhyd Road.
  - Users of Bridleway 17, which crosses the quarry site and links Eryrys Road and Tyn-y-wern Road.
  - Bus users and operators of the local bus service using the unclassified road.
  - Users of the wider local highway network including the B5430, A5104 and A494 corridors.
- 14.4.18 Traffic surveys undertaken in May 2025 indicate relatively low existing traffic volumes on the unclassified road adjacent to the site, with daily two-way flows typically around 220-240 vehicles per day, including approximately 60-70 HGV/PSV movements per day.
- 14.4.19 Traffic volumes on the B5430 are higher, with daily two-way flows generally between 750 and 900 vehicles per day, including approximately 160-180 HGV/PSV movements per day.
- 14.4.20 The Transport Assessment identifies that the B5430 provides connections eastwards to the A5104 and westwards towards the A494. It is therefore locally an important route in the context of the highway network. This local highway network currently accommodates quarry-related traffic associated with existing mineral operations and these movements form part of the baseline conditions used in the Transport Assessment.
- 14.4.21 The Transport Assessment concludes that the local highway network is capable of accommodating traffic generated by the Proposed Development and predicts no significant residual transport effects. A review of five years of collision data identified no recorded personal injury accidents on the study roads or at the B5430/unclassified road junction. The assessment therefore concludes that there are no existing highway safety issues in the vicinity of the site.
- 14.4.22 No significant cumulative transport effects are therefore predicted.

## Ecology, Hydrology and Heritage

- 14.4.23 No existing or approved developments have been identified that would materially affect the conclusions of the Ecology, Hydrology and Hydrogeology, or Cultural Heritage assessments. The assessments conclude that significant residual effects would not arise and there is no evidence that effects from other developments would alter those findings.
- 14.4.24 No significant cumulative ecological, hydrological or heritage effects are predicted.

## 14.5 Summary and Conclusions

- 14.5.1 This Chapter has considered both intra-project and inter-project cumulative effects associated with the Proposed Development.
- 14.5.2 The review of the technical assessments demonstrates that the principal environmental effects of the Proposed Development comprise temporary landscape and visual effects during extraction and a limited traffic-noise effect impacting specific receptors under worst-case operational assumptions.
- 14.5.3 These effects have been considered alongside all other environmental topics and are not considered to combine in a manner that would result in additional significant environmental effects.
- 14.5.4 The operation of Graig Quarry has also been considered within individual topic assessments and does not materially alter the conclusions reached within **ES Volume II, Chapters 6 to 13**.
- 14.5.5 Taking account of the embedded mitigation and operational controls incorporated into the Proposed Development, no significant intra-project or inter-project cumulative effects are predicted beyond those already reported within the individual technical assessments. The overall conclusions of the Environmental Statement therefore remain unchanged.