16.0 MITIGATION & MONITORING

The chapters contained within this EIAR have been ordered in a grouped format by their relevant topic. This chapter summarises all mitigation measures proposed in order to provide a comprehensive overview of the full range of mitigation measures discussed within each chapter.

Paragraph 2(d) of Schedule 6 to the *Planning and Development Regulations 2001* (as amended), provides that the following information must be contained in an EIAR:

> *"a description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of an analysis after completion of the development), explaining the extent to which significant adverse effects on the environment are avoided, prevented, reduced or offset during both the construction and operational phases of the development;"*

16.1 Examination of Alternatives

16.1.1 Alternative Mitigation Measures

The mitigation measures outlined in this EIAR, where appropriate, have been developed by competent experts relevant to the aspect of the environment under consideration and represent best practice with a view to avoiding or otherwise minimising potential impacts on the environment.

There are no predicted residual impacts once mitigation measures have been successfully applied and as such alternative mitigation is not considered necessary.

16.2 Population & Human Health

No mitigation measures are deemed necessary other than those outlined elsewhere in this EIAR.

16.3 Biodiversity

16.3.1 Avoidance, Mitigation & Enhancement Measures

The quarry currently has in place an extensive infrastructure and management system to contain and/or treat potential pollutants and to ensure that emissions are within the strict license limits set down by the EPA in The Licence(P0487-07). Environmental management systems are regularly audited and proven to be effective. Opportunities for ecological enhancement measures as part of the Restoration Plan have been identified. Breedon have previously commissioned and implemented a Biodiversity Plan (Openfield Ecology 2009) and a Bat Management Plan (Keeley 2018) (See Appendices 16.1 & 16.2). All mitigation identified in other Chapters of the EIAR will be fully implemented, including those elements designed to control run-off and to prevent any pollution of soil, surface, or groundwater.

16.3.2 Designated Conservation Sites

A Screening for AA was prepared to consider if there were any likely significant effects on any Natura 2000 site(s). It is objectively concluded that no significant adverse impacts arising from the proposed development are likely to occur in relation to the relevant Natura 2000 sites *i.e.* River Boyne and River Blackwater SAC (002299) and the River Boyne and River Blackwater SPA (004232), or indeed any other Natura 2000 site in the wider area.

16.3.3 Habitats and Flora

Any pooled water within the application site will be regularly checked for the presence of amphibians. If Frogs, Newts or spawn/larvae are present these will be translocated under licence to suitable receptor sites within the landholding.

16.3.4 Mammals

- A mammal survey will be carried out upon closure by a suitably qualified ecologist to identify any protected mammals that may be present and to provide advice on the appropriate actions prior to the commencement of the Restoration Plan.
- An ecological biodiversity audit of the quarry site will be completed by a suitably qualified ecologist in the late operational phase, or prior to the commencement of major restoration works. Findings of this study will be used to update any biodiversity management commitments and to produce site-specific biodiversity enhancement measures for the benefit of non-volant mammals, bats and birds, including water birds and raptors.
- An ultrasonic detector survey was conducted on site with two detectors being placed on site. The first was placed between the 28th of February until the 8th of April 2022.The second was placed between the 28th of February until the 30th of March 2022. It is considered that there are no features within the application site that are attractive for use by roosting bats.
- It is therefore not considered necessary to provide additional mitigation measures to protect any bat species.

16.3.5 Birds

- Prior to the commencement of blasting on site during the spring/summer months, a survey will be carried out to establish the presence/absence of breeding Peregrine Falcon. If breeding Peregrine Falcon are present in the vicinity of the proposed blast location, the ecologist or environmental manager will prepare a Peregrine Falcon Management Plan and advice on an appropriate protocol for management of potential disturbance and displacement of breeding Peregrine.

  In the longer term the previously permitted Restoration Plan for the quarry, including the application site, after quarry operations have ceased will lead to a likely moderate positive effect on the birds present within the application site.

16.3.6 General Environmental Measures

- Breedon will ensure, during the period from 1 November to 30 April, that the discharge to waters from the site shall not cause the unaffected temperatures in the Kinnegad River at the edge of the mixing zone to be raised by more than 1.5°C.
- Breedon will ensure that all operations on-site shall be carried out in a manner such that air emissions, including dust emissions, and/or odours do not result in significant impairment of, or significant interference with amenities or the environment beyond the site boundary
- All edible and putrescible wastes will be stored and disposed of in an appropriate manner.
- Industry standard Environmental control measures relating to soil management and water management, will be implemented to minimise the risk of impact surface water and groundwater in the area. For example, the use of bunded storage of fuels and regular inspection and maintenance of vehicles on-site will minimise the risk of any spillages of fuel and other hydrocarbons. All vehicles on-site will be equipped with spill-kits and all site personnel will be trained in their correct use.
- Surface water quality of discharges to the Kinnegad River from the settlement lagoon will be monitored on a continuous basis along with monthly, weekly and daily readings as required.
- During weather conditions which favour the dispersion of dust, the licensee shall ensure that a procedure for the control of windblown dust and dust from the movement of machinery shall be operated and maintained by the license.

16.3.7 Monitoring

- Walkovers of the site will be carried out by an Ecologist to monitor the development process in Years 1 & 5 of operation of the extended quarry to ensure that the measures outlined above are effective and being implemented correctly. Survey reports will be prepared and submitted for the attention of Meath County Council.
    - The presence of any invasive species will be mapped, and the Ecologist will provide advice on appropriate biosecurity and eradication measures.
    - A site wildlife log will be maintained by the site manager, with any records or sightings of protected species noted. In particular, there will be vigilance for the potential occurrence of Peregrine Falcon at the quarry site. Should the presence of roosting, or nesting Peregrine be recorded on-site, advice will be sought from a suitably qualified ecologist. In the event of breeding Peregrine Falcon being present at the quarry the environmental manager will inform local NPWS of the presence of a nesting pair and the breeding activity will be monitored by an ecologist through to the conclusion of the nesting period.
    - The bat-boxes will also be inspected in Year 5 of operation.

16.4 Soils and Geology

16.4.1 Mitigation Measures

The following is an outline of the mitigation measures proposed.

Soil and Subsoil Removal and Management of Stockpiles

- There is no measure to mitigate against loss of bedrock. The amount to be extracted is considered a minor portion of the overall limestone quarry. Overburden has already been removed from the application area.

Fuel and Chemical Handling

- There will be no storage of fuels or hydrocarbons on the application site. Fuelling and lubrication of machinery and transport vehicles is carried out be a trained, dedicated, operative and control measures exist as standard in the overall quarry, and cement factory, IE licensed site.

With the implementation of the above mitigation measures the residual impacts on the land, soil and geological environment during the operational and restoration stages are assessed to be permanent and significant

16.5 Water (Hydrology / Hydrogeology)

16.5.1 Mitigation Measures

- The blasting protocols to be employed are regulated and controlled by industry standards. Breedon uses Kemex emulsion explosives across all sites. In the EIAR Hydro-G presented a sequence of calculations to estimate N-residue in discharge waters due to blasting. The results of the calculations show that the simulated resultant concentrations for Nitrogen species' residues are very low and satisfy the relevant Environmental Quality Standards by at least an order of magnitude. The risk of impact to local water quality is imperceptible.

- All rainfall-runoff generated on the application site will drain towards the existing limestone sump. These waters are pumped via the balancing pond to the settlement lagoons prior to being discharged to the Kinnegad River. Discharge quality is monitored under an existing EPA IE & IPPC Licence P0487-07. An extensive network of water management systems are already in place and already serve the proposed application area.

- There will be no bulk fuels stored on the application site itself. Refuelling of fixed and semi-mobile plant (e.g. crusher) is by dedicated and trained personnel using a mobile bunded (double-skinned) bowser. Procedures are in place to ensure refuelling is carried out above drip trays. Potentially contaminating substances (e.g. lubricants) and hazardous wastes such as waste oil are stored in designated, lockable containers. All waste containers (including all ancillary equipment such as vent pipes and refuelling hoses) are stored within a secondary containment system (e.g. a bund for static tanks or a drip tray for mobile stores and drums). Bunds are in place and are capable of storing 110% of tank capacity, plus a minimum 30 mm rainwater allowance where the bund is uncovered. Bunds and drip trays to be visually monitored on a regular basis.

- The designated lubrication storage areas will be in a designated area, not within 30 m of drainage ditches or surface waters.

- Runoff generated from rainfall landing on the application area already drains to the limestone quarry sump. The most permeable zone in the Waulsortian Limestones is the weathered zone close to surface, typically in the upper 3 m. This layer has already been removed during previous activities. Hence proposed development works will not introduce any additional shallow subsurface flow from this layer, above that which already occurs. Beneath the application area, almost the entire depth to the proposed floor level of 10 mOD is homogenous limestone of very low permeability. Hence proposed works are unlikely to introduce notable volumes of additional bedrock groundwater. There is some water close to the floor of the application area but this does not persist in depth or sustained pumping. The proposed works have potential to push some small drawdown effects further northwest. However, the point of contact between the Waulsortian Limestones and the Tober Colleen Shales, in that north-westerly direction, appears to form a partial groundwater flow barrier. Hence this is not likely to be a significant impact.

- There will be no net loss or gain in the GWB system because volume intercepted and managed at the site represents, by calculated water balance, 2.3% of the regional groundwater volume. In any case, any waters intercepted at the site are returned to the place they were originally going, which is the Kinnegad River. This maintains the hydromorphological and hydrogeological regime. The site's EI & IPPC licence contains the discharge licence for water and this is the Mitigation Measure.

- Discharge waters pass through a sequence of existing settlement ponds which are in good condition. These serve to clarify pumped quarry waters prior to them leaving site.The quarry sump and settlement lagoon system have sufficient volumetric capacity to accommodate all waters for the required residence time. Discharge will be of a quality that will not have a detrimental impact on surface water quality in terms of suspended solids.

- Particulate matter captured in settlement ponds to be transferred to bunds.

- A wheel wash facility exists near the site offices and the roads have a dedicated trailed water tanker.

- The wheelwash is to be maintained in accordance with manufacturer's specifications.

- All discharges arising indirectly from the application site shall pass through the existing, appropriately sized hydrocarbon interceptors.

- Oil that accumulates within hydrocarbon interceptors shall be regularly removed by an appropriately licensed contractor.

- The hydrocarbon interceptors shall be appropriately maintained in accordance with the manufacturer's specifications.

- The existing quarry sump is adequately sized to accommodate an extreme rainfall event.

- The hydrological impact assessment (flood risk assessment) determined that there is sufficient capacity for the Kinnegad River to accommodate discharge waters from the quarry without any increase in flood risk.

- A flowmeter is fitted on the discharge line to measure and log discharge rates.

- All discharges shall be as per the current IE license in terms of flowrate and quality.

- The potential impact to the area of peat bog to the south of the site was assessed as part of the 1998 and 2009 applications. Site investigation works in 1998 revealed the peat substrate to be underlain by 4 – 7m of low boulder clay. This subsoil remains in situ beneath the peat. Its low permeability means that it acts as a confining layer, resulting in a perched water table within the peats. This perched groundwater within the peats is not in hydraulic connectivity with groundwater stored in the limestone bedrock aquifer. Thus, drainage of water stored in the peats will not be accelerated by reduction of groundwater levels in the quarry sump, and the resultant increase in drawdown extents.

- Pre-development groundwater conditions in the limestone aquifer were considered to be confined due to the cover of low permeability boulder clay. As a result of interim works the limestone aquifer is now unconfined at the quarry, with current groundwater levels in the sump being ~53mOD, which is approximately 27m below original land's surface.

- With respect to the peat bog to the south the only source of water is direct rainfall (acidic). The low permeability of the peat means that large amounts of rainfall water are stored within the organic substrate, which provides the supporting conditions for growth. The peat bog is not supplied with groundwater from the underlying limestone bedrock aquifer (alkaline).

- Cement is manufactured in a dedicated building. There is no storage of use outdoors and no release of waters from the plant that have potential to contain cement.

- Regular visual monitoring of the terrace sump, balancing pond and settlement lagoons will continue as per requirements of IE license to ensure no visual oil or fuel contamination is present.

- Biannual monitoring of on-site wells will continue as per requirements of IE license.

- Materials such as concrete can be crushed and recycled for use as an aggregate in the construction industry.

- Site restoration will take place on a phased basis as extraction is completed in defined areas of the site.

- In the final restoration of boundaries with adjoining lands levels will be graded to harmonise with the surrounding landscape.

- Perimeter silt fence to be installed at the toe of any overburden stockpiles.

- Interceptor drains 500 mm wide and 500 mm deep will be excavated around the toe slope of any soil. Silt fences to be installed within the interceptor drains. Interceptor drains will divert captured runoff back in towards the site where runoff will enter the settlement lagoons. These will clarify any runoff waters prior to them leaving the site.

- Restored areas to be vegetated to enhance stability.

- Post-completion groundwater levels will return to pre-development levels (c. 80 mO), thereby partially filling any voids. These voids may be left as open waterbodies for recreational or ecological benefits.

- All runoff generated on potentially at-risk areas pass through hydrocarbon interceptors prior to leaving the site.

- The outlet of each interceptor is be fitted with a shutoff valve to facilitate manual containment of a significant spill. A contained spillage will be disposed of appropriately by a licensed contractor.

- Potentially harmful chemicals stored on site (e.g. lubricants) to be stored under cover on bund trays.

- Site monitoring data confirms that the site has the ability to retain extreme storm events.

16.6 Air and Climate

The results of the comprehensive dust deposition monitoring programme carried out at the site since July 2000 clearly show that the existing site activities do not exert an adverse impact as average dust deposition rates are substantially lower than the limits specified in the IED Licence. Table 9.4.2 shows the average dust deposition levels at locations around the Breedon Cement site. The average monthly dust deposition rate measured in the area during the period January 2018 to May 2022 was 7.5 mg/m2-day or 5% of the limit value of 130 – 240 mg/m2-day. The dust deposition monitoring programme continues to show that site activities do not result in unacceptable fugitive dust emissions extending beyond site boundaries and that best management practices at the site are effective in minimising fugitive dust emissions even during the drier summer months when the potential for fugitive dust emissions is at a maximum

In order to mitigate against air quality effects at receptors, Best Practice Measures will be adopted. Comprehensive environmental management and monitoring programme is in place at the existing licensed facility and this programme will continue to be implemented and will be enhanced when opportunities are identified.

16.7 Noise and Vibration

There will be no change in the existing permitted activities in terms of material extraction or throughput and no change in the cement manufacturing activity or production output as a result of the proposed development. Therefore, there will be no change in the magnitude of the noise and vibration impacts. As shown in section 10.4 the existing facility operates within the terms specified in the IE Licence and no significant adverse impact arises as a result of those permitted activities.

In order to mitigate against noise and vibration impacts at receptors, Best Practice Measures will be adopted. A comprehensive environmental management and monitoring programme is

in place at the existing licensed facility and this programme will continue to be implemented and will be enhanced when opportunities are identified.

British Standard 5228-1:2009+A1:2014 –Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1: Noise (BS 5228-1) is a commonly used Standard to assess the potential noise impacts associated with the construction phase of a project. This Standard states that noise complaints related to new industrial/commercial noise sources are more likely to arise as the difference between the industrial noise source and the existing background noise increases. Practical noise reduction measures are detailed in BS 5228-1 and these measures can be implemented in order to reduce the overall noise emissions from a construction site.

16.8 Landscape and Visual Impact

16.8.1 Mitigation Measures

The main mitigation measure employed in this instance is through 'mitigation by avoidance'. The siting of the proposed extraction area is entirely contained within the existing quarrying facility, which is located in a robust and well-contained rural area that also avails of both terrain and hedgerow screening such that the scheme will not be prominent within the surrounding landscape. In this respect, the proposed development is not perceived to impose itself on the existing landscape pattern

16.8.2 Decommissioning & Restoration

Breedon Quarry, including the application area, will be restored once extraction activities have ceased. The Restoration Plan for the quarry was submitted as part of the original planning permission (98/2026, PL17.111198), with an updated version for the permitted extension to the existing limestone quarry in 2009 (TA/900603). See Figure 6.2 for the Restoration Plan Layout originally included with the TA/900603 planning application.

Following the completion of quarrying operations, the water table within the quarry voids, including the application site, will be allowed to return to near rockhead level with several sections of ‘cliff’ faces above water level, up to 9m. The sloping rock faces and quarry works area will be re-graded with soil and seeded with grass and planted with woodland. Existing berms will be planted with woodland. The existing settlement ponds will be re-shaped with shallow banks.

In the longer term the restoration and landscaping measures outlined in the already permitted Restoration Plan will lead to a likely positive effect on biodiversity by enhancing and creating higher value habitats within the quarry

16.9 Traffic

16.9.1 Prevention and Mitigation Measures

Table 12.11 in chapter 12 presents the expected traffic generation associated with the proposed development in the worst-case scenario, presented for both LVs and HVs and based on the following: -

- 120 no. employees are directly employed at the site.

- Staff members work in shifts, and it is assumed that 75% (90 no.) would enter/exit the site during the 12-hour period when the traffic surveys were recorded.
- 90 no. subcontractors were assumed to enter the site during the 12-hour period when the traffic surveys were recorded.
- 10 no. miscellaneous LV trips occur per day. Miscellaneous trips include trips in relation to inspections, maintenance, visitors, etc.

As the site is currently operational, and this application is in relation to the deepening of the existing quarry, construction works will not be necessary. The development will not involve a construction phase and therefore impacts associated with construction will be negligible.

The combined background and development traffic volumes, outlined in Table 12.17 in each of the assessment years is less than the LOS D capacity of 5,000 AADT for a Type 3 Single Carriageway. It is considered, therefore, that the R446 will operate within capacity for each of the assessment years. Therefore, the operational phase of the proposal will have a negligible impact on the local road network.

Proposed mitigation is outlined as follows:

Road Safety

Site Access

- The site is accessed via a priority-controlled T-Junction on the L8021 local road. The site access road is approximately 1.1km in length and connects the L8021 with the site office and carpark. The L8021 continues northeast of the site access towards Kinnegad in one direction and southwest where it meets the Castlejordan Road in the other direction. The site access road has a posted speed limit of 50kph and includes a short radius horizontal curve immediately upstream of the junction with the L8021.

- Within the site access junction there is a physical splitter island separating entering and exiting vehicles. A blue 'Keep Left' arrow sign is provided within the island facing drivers entering the site. A Stop sign is provided upstream of the junction. Reboundable pencil bollards are provided from the island extending into the access road and through the horizontal curve to further delineate the opposing traffic lanes.

- All HGV site traffic turns left onto the L8021 when exiting the development and turns right from the L8021 when entering the site. Traffic exiting the site is therefore unopposed and thus will result in a reduced risk of collisions at the site access. 'Heavy Vehicles Crossing' warning signs are provided on the L8021 on the approach to the site access in both directions.

Sightlines

- The site is accessed from the L8021 Local Road and this road has a posted speed limit of 80kph.

- The visibility splays at the site access were assessed in accordance with the criteria contained in TII Publications document DN-GEO-03060 "Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade-separated and compact grade-separated junctions)". For a speed limit of 80kph, this requires

unobstructed visibility of 160m from a distance of 3.0m back from the edge of the major road.

- An assessment of the sightlines, which included a visual assessment on site (see Figure 12.17), determined that the site access achieves these requirements to the south however, to the north, the adjacent boundary hedge partially restricts visibility in this direction. However, closer to the edge of the carriageway, full visibility is achievable to the north. All HGV traffic turns left when exiting the development which requires exiting drivers to wait for a gap in northbound traffic only, approaching from their right. As the full required visibility is achievable in this direction it is considered that the available visibility from the site access is adequate. The AADT on the L8021 is also low which indicates that frequent gaps in main road traffic will be available for exiting vehicles.

- Nevertheless, the boundary hedge to the north of the site access, within the applicant's landholdings, will be cutback to maximise visibility in this direction. Appendix 12.3 graphically shows the visibility splays at the Site Access.

Parking

- There are a sufficient number of car parking spaces provided at the site to accommodate the 210 staff members (direct employees and subcontractors). It is not expected that all employees will be on site at the same time due to shift work at the site. The parking provision will also cater for any miscellaneous trips which may occur in relation to the operations at the site.

16.9.2 Monitoring

Construction Phase

None required.

Operational Phase

The implementation and performance of traffic management and haul route management measures and initiatives including any ongoing revisions or new initiatives will be monitored and evaluated throughout the Operational Phase.

16.10 Archaeology

16.10.1 Mitigation Measures

The proposed development is located at Kinnegad Quarry within the townland of Killaskillen Parish of Ballyboggan and Barony of Upper Moyfenrath, County Meath. The application site has already been subject to permitted quarrying associated with the Breedon Cement works. There are no archaeological sites within the proposed development area or within 500m of it. The closest recorded monument consists of a hearth located c. 589m southeast of the proposed development area. There are no specific sites of cultural heritage interest recorded within the proposed development area or study area.

It has been concluded that no mitigation is required in this regard.

16.10.2 Monitoring

No monitoring is required

16.11 Waste and Material Assets

16.11.1 Prevention and Mitigation Measures

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

Construction Phase

There will be no new or additional waste generated as a result of the current proposal. Since there is no construction waste and no construction phase, there is no requirement for remedial or mitigation measures and none are proposed.

Operational Stage

There will be no new or additional waste generated as a result of the proposal. There is therefore no requirement for remedial or mitigation measures. All waste will continue to be handled in accordance with existing waste management procedures and in accordance with the conditions of the company's IE Licence.

16.12 Interactions

16.12.1 Mitigation And Monitoring Measures

It is not proposed that any mitigation or monitoring will be undertaken specifically in relation to cumulative impacts.