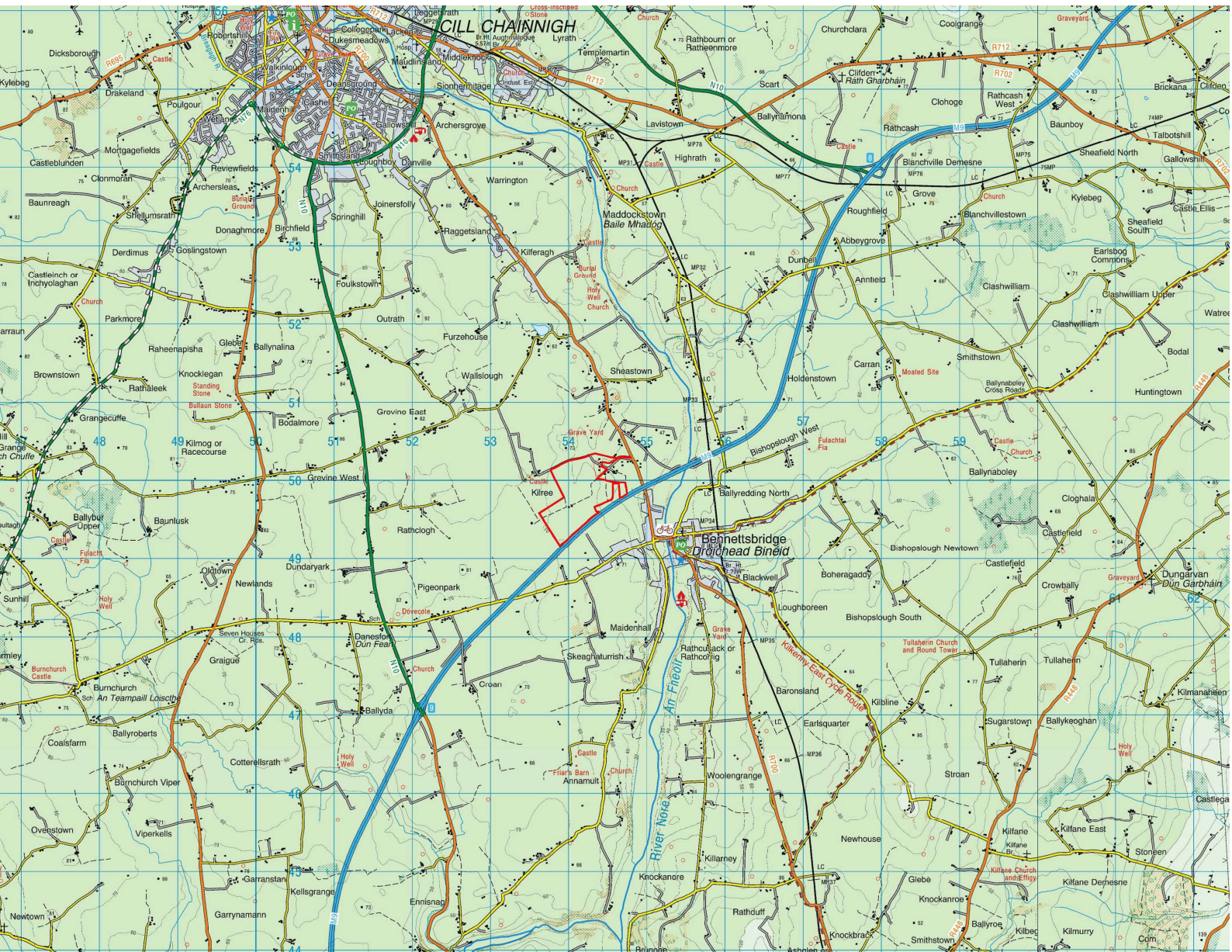


CHAPTER 4

ALTERNATIVES

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CHAPTER 4: Alternatives

Introduction

- 4.1 The proposed development will take place within an overall application area of approximately 61 hectares and will consist of the following:
- The continued extraction of rock — including periodic blasting to fragment the rock prior to excavation — from the existing permitted quarry area (Plan File Ref. No. 18/858) beyond the current permission expiry date;
 - The continued use of existing quarry infrastructure (including crushing, screening and lime processing plant), existing pre-cast manufacturing facility (including associated ancillary works for manufacturing of concrete products), batching of lime products, workshop, canteen, toilet facilities, weighbridges, wheelwash, fuel storage area and switch room, settlement lagoons, haul roads, ESB substation, plant and product storage areas and all other ancillary facilities as permitted under Plan File Ref. No. 18/858;
 - The continued use of site offices authorised under Plan File Ref. No. 20/891;
 - A lateral extension of the existing limestone quarry, within an area of approx. 24.5 Ha., comprising:
 - approximately 18.2 hectares of extraction, including blasting, over 2 no. c 19 metre high benches to a final floor level ranging from 25 to 30m OD; and
 - overburden storage areas and landscaped screening berms (6.3 Ha).
 - To access the extension lands rock will be extracted - including by controlled blasting - from under:
 - approx. 1.4 hectare of land that is currently under landscaping measures authorised under Plan File Ref. No. 18/858;
 - approx. 2.1 hectare of land that is currently in use as an access ramp authorised under Plan File Ref. No. 18/858.
 - The removal of topsoil and overburden, construction of landscaped screening berms, and provision of an overburden storage area;
 - Demolition of an existing farmyard and associated buildings and structures, permitted under Plan File Ref. No. 15/595, and removal of approximately 6.81 hectares of commercial forestry within the proposed extension area to allow for the proposed quarry development;
 - All associated ancillary site facilities/works, including surface water management, internal haul roads, phased restoration, and landscaping.
- 4.2 The applicant is seeking a 25-year permission for extraction and associated activities, with an additional 2 years for final site restoration.

EIA Directive

- 4.3 Annex IV of the amended EIA Directive, 2014/52/EU, requires a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.
- 4.4 This chapter recognises and fulfils this requirement in respect of the Proposed Development.

- 4.5 In this context, the consideration of reasonable alternatives and design evolution has been undertaken with the aim of avoiding and / or reducing adverse environmental effects (following the mitigation hierarchy of avoid, reduce, and, if possible, remedy), while maintaining operational efficiency and cost – effectiveness, and considering other relevant matters such as land and planning policy.
- 4.6 This chapter provides an analysis of alternatives which have been considered for this proposed development in terms of the following:
- ‘Do Nothing’ Scenario;
 - Alternative Sources of Aggregates;
 - Alternative Locations;
 - Alternative Designs / Layouts;
 - Alternative Processes.

Need For the Development

- 4.7 This section examines the demand for aggregates, specifically high calcium limestone aggregates, in Kilkenny and Ireland. The aim is to provide a comprehensive understanding of the existing demand for these aggregates, demonstrating the need for the development of new sources.
- 4.8 The demand for construction aggregates, particularly limestone, has been steadily increasing in Kilkenny and throughout Ireland. This growth is driven not only by the expansion of regional infrastructure projects but also by the increasing demand from the agricultural sector for lime products used to neutralise soil acidity and enhance crop yields.
- 4.9 Bennettsbridge and the surrounding southeast regions—including Kilkenny, Carlow, Waterford, and Wexford—are experiencing a steady demand for high-quality agricultural lime products, essential for neutralising soil acidity and enhancing crop yields. This demand is further supported by increasing infrastructure projects that require limestone aggregates and some aggregates are used in the asphalt plant on site operated by Breedon Group. Key drivers include:
- The ongoing arable farming and dairy production in the region that require high quality lime products.
 - Increasing demand from infrastructure projects, which continues to support the use of quality limestone aggregates.
- 4.10 Limestone is a core material for these developments. The continued use and extension of the existing quarry will secure the long-term availability of limestone for both aggregate, concrete, lime and asphalt production, ensuring the delivery of construction projects and high quality agricultural land.
- 4.11 Transporting limestone from distant locations increases environmental impacts, including higher carbon emissions and fuel consumption. The continuation of use and extension of the local quarry will:
- Reduce transportation distances, directly lowering emissions from heavy goods vehicles.
 - Align with national sustainability objectives, contributing to Ireland’s commitment to reducing its carbon footprint and managing natural resources responsibly.
- 4.12 By securing a high-quality limestone deposit that has underpinned construction and farming across the south-east for more than four decades, the extension sustains a proven regionally important source of aggregate, concrete constituents, agricultural lime and asphalt stone. Maintaining this local supply avoids the environmental and economic costs of hauling equivalent materials long distances, thereby supporting both the county’s growth targets and national decarbonisation objectives.

Construction Aggregates

- 4.13 The construction industry in Ireland has experienced significant growth in recent years, contributing to the demand for construction aggregates.
- 4.14 In 2019, the construction sector contributed €9.5 billion to Ireland's economy in terms of Gross Value Added (GVA), representing around 2.8% of Ireland's total GVA, which stood at approximately €340.5 billion that year. By 2023, the sector's contribution grew to €12.7 billion, against a backdrop of a national GVA of €482.3 billion, underscoring the ongoing demand for housing, infrastructure, and commercial developments across the country.
- 4.15 The Summer Economic Statement 2025 lifts National Development Plan capital ceilings for 2026-2030, channelling extra funds into water, energy grids, transport corridors and serviced land for housing. These projects will require a steady supply of locally sourced aggregates.
- 4.16 Housing is the flagship priority: Government now targets 41 000 new homes a year, underpinned by an additional €40 billion for 2025-2029 and a matching sum for the following five-year span. Combined with national retrofit and climate programmes, this ensures sustained, high-volume demand for Bennettsbridge limestone.
- 4.17 Commercial and industrial projects, such as energy related projects, office buildings, retail centres, manufacturing facilities, and warehouses, require substantial amounts of construction aggregates. For instance, the construction of Data Centre Parks in Ireland is estimated to require around 4.6 million tonnes of aggregates over the next decade (Irish Concrete Federation).
- 4.18 The public sector invests in various projects, including schools, hospitals, government buildings, and public infrastructure. For instance, the National Development Plan allocates significant funds for public infrastructure projects like public transport, education, healthcare, and social housing. These projects generate substantial demand for construction aggregates.
- 4.19 The transportation sector relies heavily on road construction and maintenance to ensure efficient connectivity. In Ireland, the government has allocated €10.6 billion for national road projects from 2022 to 2027 (Department of Transport, Ireland). Construction aggregates and asphalt are essential components for road building and maintenance.

Project Ireland 2040

- 4.20 Project Ireland 2040 is a long-term national planning framework that sets out the strategic vision for Ireland's future development. It aims to shape sustainable growth and improve quality of life by focusing on balanced regional development, social infrastructure, and economic progress.
- 4.21 Project Ireland 2040 recognises the need for housing construction to address the housing shortage and accommodate population growth. It sets a target of building 550,000 new homes by 2040, which translates to an average of 33,000 new homes annually. The construction of these homes requires a steady supply of construction aggregates for various applications such as foundations and concrete production.
- 4.22 The project emphasises the importance of infrastructure development to support economic growth and improve connectivity. Investments are planned for road networks, public transport systems, utilities, and social infrastructure. These infrastructure projects require significant quantities of construction aggregates to meet the demand for concrete, road surfacing, and foundation construction.
- 4.23 Project Ireland 2040 aims to achieve balanced regional development by promoting investment and employment opportunities outside major urban centres.
- 4.24 Project Ireland 2040 recognises the importance of sustainable resource management, including the responsible extraction of construction aggregates. Further development of an existing permitted limestone quarry in Kilkenny aligns with this goal, as it allows for the local sourcing of construction

aggregates, reducing the environmental impact associated with long-distance transportation and preserving existing resources in other regions.

- 4.25 Given the increasing demand for construction aggregates in Kilkenny and the wider region, there is a potential supply and demand gap. Existing sources may face limitations due to depleting reserves or transportation constraints. Further development at this existing limestone quarry would help bridge this gap, ensuring a reliable supply of construction aggregates to meet the demands of Project Ireland 2040 and support ongoing construction activities in the region.

Agricultural Lime Products

- 4.26 Agricultural lime products play a critical role in maintaining soil health and enhancing crop productivity across Ireland. High-calcium limestone, with its proven effectiveness in neutralising soil acidity, is increasingly sought after by farmers in regions such as Kilkenny, Carlow, Waterford, and Wexford.
- 4.27 The application of agricultural lime contributes significantly to sustainable farming practices by improving soil structure, promoting nutrient availability, and optimising pH levels. These benefits support increased crop yields and overall farm productivity, ensuring that arable and dairy farming operations remain competitive in a challenging agricultural market.
- 4.28 Although the demand for agricultural lime products has traditionally been steady, ongoing efforts to enhance soil management and the adoption of sustainable agricultural techniques are expected to reinforce this demand. The local availability of high-quality lime from Bennettsbridge Limestone not only meets current requirements but also supports long-term agricultural productivity.

Kilkenny County Development Plan (CDP) 2021-2027

- 4.29 The Kilkenny County Development Plan for the period 2021-2027 recognises the importance of the extractive industry within the county:

Section 7.5

'There are numerous sand and gravel and stone resources within the County currently in operation. The Council recognises the importance of extractive industries to the local and national economy as valuable sources of raw material for industry in general and the construction industry in particular and as an important source of employment.'

The 'Do Nothing' Scenario

- 4.30 If no further extraction works within the planning application area are carried out, the existing permitted quarry and processing infrastructure will complete its current extraction activities and be restored to natural habitat after-uses.
- 4.31 Such a shutdown would create a gap in the local market for agricultural and construction materials, including aggregates for concrete and bituminous materials, and lime products. The loss of a reliable, local supplier could lead to increased costs and delays for construction projects in the region, ultimately affecting the delivery of key infrastructure and development initiatives. Additionally, the environmental benefits of sourcing materials locally, such as reduced transportation emissions, would be lost.
- 4.32 In this scenario, the cessation of quarrying activities would have economic and environmental consequences, making it clear that the continued development of the existing quarry and continued use of processing infrastructure is a logical and sustainable option to support both local industry and the wider construction market.

Alternative Sources of Aggregates

4.33 There are several alternatives to sourcing traditional limestone for construction aggregates. These alternatives aim to reduce environmental impacts, optimise resource utilisation, and promote sustainable practices. Some alternatives include:

- **Recycled Aggregates:** Utilising recycled aggregates from construction and demolition waste can help reduce the need for extracting virgin limestone. Concrete and asphalt can be crushed and processed into reusable aggregates for various construction applications. The EPA's National End-of-Waste Decision for recycled aggregates provides a framework for using these materials in compliance with environmental standards, promoting a circular economy in the construction sector. Even if all available construction and demolition (C&D) waste were fully recycled for use as aggregate, it would likely only account for 2-3% of the national demand for aggregates. This would still leave a significant shortfall in supply to meet the ongoing demand for high-quality limestone aggregates, particularly for infrastructure and large-scale construction projects.
- **Recycled Concrete Aggregates (RCA):** RCA is derived from the demolition of structures and involves crushing and screening concrete. While it is useful in many construction applications, its end use is limited compared to the superior properties of virgin limestone aggregates.
- **Recycled Asphalt Pavement (RAP):** RAP involves crushing and reusing old asphalt pavement in new construction projects. This process saves natural resources and reduces waste disposal costs, though it is generally more applicable for road construction than limestone replacement.
- **Manufactured Aggregates:** In some cases, aggregates can be manufactured from industrial byproducts such as slag or fly ash, providing a sustainable alternative. However, these materials often require significant processing and may not offer the same quality as natural limestone.
- **Marine-Derived Aggregates:** In some countries, aggregates are sourced from marine dredging operations. Although this is not currently feasible in Ireland due to regulatory restrictions, marine aggregates are a potential future alternative.

4.34 While these alternatives offer opportunities to reduce reliance on limestone extraction, fully replacing limestone quarries is neither feasible nor practical due to the following reasons:

- **Quality and Suitability:** Limestone is a naturally occurring material with unique characteristics, making it particularly suitable for construction applications such as concrete production and road base layers. Recycled or alternative aggregates often differ in quality and may require additional processing to meet required standards.

Alternative Locations

4.35 The current planning application is for the continued operation and extension of an existing established quarry at Kilree, Bennettsbridge, Co. Kilkenny.

4.36 When considering alternative locations for quarrying, it is essential to acknowledge that minerals can only be extracted where they naturally occur, as they are a "tied resource." Limestone aggregates, like many other minerals, are generally of low unit value, with transportation being the most significant cost. As a result, most quarries tend to operate within a radius of approximately 25-30 km of their target market. The quarry site benefits from being strategically located near the M9 and within close proximity to key areas: within 0.8km northwest of the village of Bennettsbridge and approximately 7km south of Kilkenny City centre. The site is approximately 32km southwest of Carlow Town 38km north of Waterford, and 44km east of Enniscorthy (refer to EIAR Figure 1.1).

- 4.37 It is generally preferable, from a planning perspective, to allow for the extension of existing mineral workings rather than opening new quarries on 'greenfield' sites. The need for and the economic benefits of stone and aggregate extraction are established in national guidelines, regional policy and the County Development Plan. Extending the existing quarry, that has been subject to previous Environmental Impact Assessments, offers lower development costs due to the availability of an operational quarry face, the presence of existing infrastructure and greater assurance of environmental management, as the site is covered by existing licences, monitoring networks and mitigation systems that have been proven through previous EIARs.
- 4.38 The Applicant has considered the following alternatives:
- Deepening the extraction area within the current permitted quarry zone;
 - Expanding operations into lands north of the existing quarry extraction area, which do not currently have planning permission for quarrying, and completing the restoration of the established quarry;
 - Developing a new 'greenfield' quarry elsewhere in Kilkenny to serve established clients and markets.
- 4.39 At present, there are no suitable alternative replacement quarry locations available to the Applicant in County Kilkenny. It is generally accepted that developing a new 'greenfield' quarry, from site selection to planning, land acquisition, and preparation, through to the commencement of extraction, can take between 5 and 10 years.
- 4.40 Extending the existing quarry offers several planning benefits, including:
- Avoiding the extraction of additional materials from other quarries in the county, which could lead to faster depletion of their resources and potentially increase the intensity of operations at those sites;
 - Preventing the need for a new 'greenfield' quarry elsewhere in the county where no prior extractive activities exist;
 - Reducing the need for hauling materials from other quarries within or outside the county, which would result in longer haulage distances and increased traffic on the road network.
- 4.41 Further development of the existing limestone quarry at Bennettsbridge will help maintain a proven aggregate resource, with no increase in environmental emissions.
- 4.42 As mentioned earlier, this type of development is tied to the location of the resource, unlike a factory, which can be sited in various locations. Aggregates must be worked where they are found, and this can only occur where the environmental impacts of extraction can be managed to an acceptable level.
- 4.43 The existing permitted quarry site has a proven track record of compliance with environmental and planning regulations. Therefore, extending the quarry (along with final restoration), subject to continued implementation of best environmental management practices and compliance with planning conditions and recommended emission limits for the sector, is preferable to developing a new 'greenfield' site in Kilkenny. The existing on-site facilities for manufacturing concrete products further support the suitability of this location, as the integration of quarry operations with manufacturing plants allows for reduced transportation and lower overall environmental impact.
- 4.44 The site offers several advantages for quarry extension, making it highly suitable for continued development:
- Proven limestone reserves (see EIAR Chapter 7: LSG).

- Long-established history of extraction activities at the location.
- Nearby access to the M9 motorway, facilitating transportation to key markets (see EIAR Chapter 13).
- No part of the extension area lies within any site designated under the Habitats, Birds or Wildlife Acts. The nearest Natura 2000 sites—the River Barrow and River Nore SAC (600 m) and the River Nore SPA (660 m)—are both east of the quarry;
- Existing infrastructure that reduces development costs, as this is an extension of an established quarry.
- Use of best practice, industry-standard extraction, and processing methods.

ALTERNATIVE DESIGNS / LAYOUTS

- 4.45 Alternative designs, including alternative layouts within the site, were considered. The design layout that was chosen is considered to best minimise the potential impacts on the environment from noise, dust, and visual impacts.
- 4.46 When evaluating alternative layouts for the quarry extension, three primary options were considered:
- **Deeper Extraction with a Smaller Footprint:** One option was to go deeper, which would have limited the area of the extension. However, this approach was ultimately not as the existing quarry floor is essential for day-to-day truck circulation, stockpiling and plant access; lowering it would severely disrupt operations.
 - **Wider Area with a Higher Floor Level:** The proposed development extends westward across c. 18.2 ha with the working floor proposed at 25–30 m OD. This maintains the existing plant layout, lets current faces advance seamlessly into the new ground, avoids the operational drawbacks of deeper quarrying, and delivers ≈ 17 Mt of additional reserves within a coherent, efficiently worked footprint.
 - **Overburden Storage Options at the Quarry Site:** Several alternatives were evaluated for overburden storage at the site, including the implementation of proposed screening berms and an overburden storage area, each varying in size and height. Ultimately, the decision to proceed with a combination of screening berms and a designated storage area was made. Any surplus inert material will be exported as certified engineering fill, reinforcing the circular-economy goal and avoiding unnecessary land-take. The choice reflects the operational layout of the lateral extension and the proven quality of underlying bedrock, delivering efficient, environmentally responsible overburden management.
- 4.47 Ultimately, the selected layout represents the most balanced approach, considering operational efficiency, environmental impacts, and cost-effectiveness. The chosen design maintains the functionality of existing site infrastructure while allowing for the sustainable extraction of resources.

ALTERNATIVE PROCESSES

- 4.48 Bennettsbridge Limestone is a company with extensive expertise in quarrying, aggregate, lime and concrete production. As part of this planning application, different extraction methods were considered to evaluate their suitability for the proposed quarry extension.
- 4.49 Rock breaking was explored as an alternative extraction method. While it offers the advantage of reducing vibrations compared to traditional blasting, it is less efficient for large-scale operations due to slower production rates, higher operational costs, and increased equipment wear. Consequently, rock breaking was not deemed a viable alternative for this development.

- 4.50 Blasting, the preferred extraction method, provides significant operational advantages. It allows for the efficient removal of large volumes of material, reducing overall costs and ensuring timely delivery of resources to the on-site manufacturing plants. At this time blasting will continue to be employed, with strict environmental controls and monitoring in place to mitigate any potential impacts on surrounding areas – refer to Chapter 11.
- 4.51 The on-site integration of quarrying and manufacturing processes represents a logical and sustainable approach to development. It ensures efficient resource use while minimising environmental impact, aligning with best industry practices and the company's long-term sustainability goals.

Comparative Analysis of Environmental Effects

4.52 This section provides a detailed comparative analysis of the environmental effects associated with the proposed development and its alternatives. The alternatives considered include the 'Do Nothing' scenario, alternative sources of aggregates, alternative locations, alternative designs and layouts, and alternative extraction processes. Each alternative has been evaluated based on its potential environmental impacts, including air quality, water resources, biodiversity, noise and vibration, landscape and visual effects, traffic, and waste management. The comparison aims to demonstrate the rationale for selecting the preferred option while ensuring that environmental considerations are at the forefront of the decision-making process. The following tables outline the key environmental aspects associated with each alternative and highlights the most sustainable and least impactful approach.

Table 4.2: Environmental Comparative Analysis of Alternatives: 'Do Nothing' Scenario; Alternative Sources of Aggregates; Alternative Locations

Environmental Criteria	'Do Nothing' Scenario	Alternative Sources of Aggregates	Alternative Locations
Air Quality	Potential for improved air quality post-restoration.	Increased emissions from transportation and processing.	Potential dust emissions from new site preparation.
Noise Pollution	Reduction in operational noise.	Noise from transport and processing facilities at off-site locations.	Increased noise from new site operations.
Water Quality	Potential improvement with cessation of quarrying activities.	Risk of contamination from transportation runoff.	Potential impacts on local water bodies from new development.
Biodiversity	Habitat restoration opportunities.	Potential disturbance to natural habitats from material sourcing.	Potential habitat loss and fragmentation.
Land Use	Restoration to natural habitat.	Increased pressure on other land uses for material sourcing.	Significant land use change required for new quarry site.
Waste Management	No further waste generation from quarrying activities.	Increased waste from processing and transport operations.	Potential for increased waste generation at new location.
Visual Impact	Improvement over time as site is restored.	Visual intrusion at new transport and processing sites.	Significant visual impact from greenfield development.
Climate Impact	Increased carbon footprint from sourcing materials from other locations.	Higher emissions due to transportation and processing.	Increased emissions from infrastructure development.
Preferred Option	X Not Preferred	X Not Preferred	X Not Preferred

Table 4.3: Comparative Analysis of Environmental Effects for Alternative Layouts / Designs

Criteria	Deeper Extraction with a Smaller Footprint	Wider Area with a Higher Floor Level (Preferred)
Water Management	Increased risk of groundwater inflows requiring complex systems.	Minimal risk of groundwater inflows, manageable with existing systems.
Noise and Vibration	Reduced spatial impact, potentially more intense operations at depth.	Balanced noise impact due to wider distribution of activities.
Visual Impact	Less visible due to smaller footprint.	Effective use of landscaped berms for screening.
Operational Disruption	None as existing footprint is used.	Minimal; aligns with current operations.
Environmental Footprint	Increased due to more energy-intensive water management.	Optimised for resource extraction.
Cost	Higher due to deeper extraction area.	Cost-effective; leverages existing infrastructure.
Overall Feasibility	Not preferred due to operational and environmental challenges.	Preferred; most balanced and sustainable approach.
Preferred Option	X Not Preferred	✓ Preferred

CONCLUSION

- 4.53 In conclusion, the alternatives assessment conducted for the proposed continued use and extension to the existing limestone quarry has revealed that there are no viable or reasonable alternatives available. The project team thoroughly evaluated various alternatives, considering factors such as environmental impact, feasibility, economic viability, and social considerations. However, none of the alternatives presented a suitable solution that could effectively meet the project objectives while minimising adverse impacts on the environment and surrounding communities.
- 4.54 The evaluation process considered potential alternatives, including alternative locations for the extension, alternative extraction methods, and alternative materials sourcing. However, these alternatives were deemed impractical, economically unviable, or resulted in significant environmental and social drawbacks that outweighed any potential benefits. Additionally, the limestone deposit in the proposed extension area is crucial for the continuous supply of limestone, which is essential for the regional construction industry and various infrastructure projects.
- 4.55 It is important to note that the project adheres to all relevant regulations, guidelines, and best practices to mitigate and manage environmental impacts. The project team has developed robust mitigation measures and monitoring plans to minimise disturbance to the natural habitat, control noise and dust emissions, and address any potential impacts on water resources.
- 4.56 The project team is committed to implementing appropriate mitigation measures and rehabilitation plans to restore and rehabilitate the affected areas to their pre-construction state or an improved condition.
- 4.57 Overall, the comprehensive alternatives assessment has determined that the proposed continued use and extension to the existing limestone quarry represents the most appropriate and viable option.