

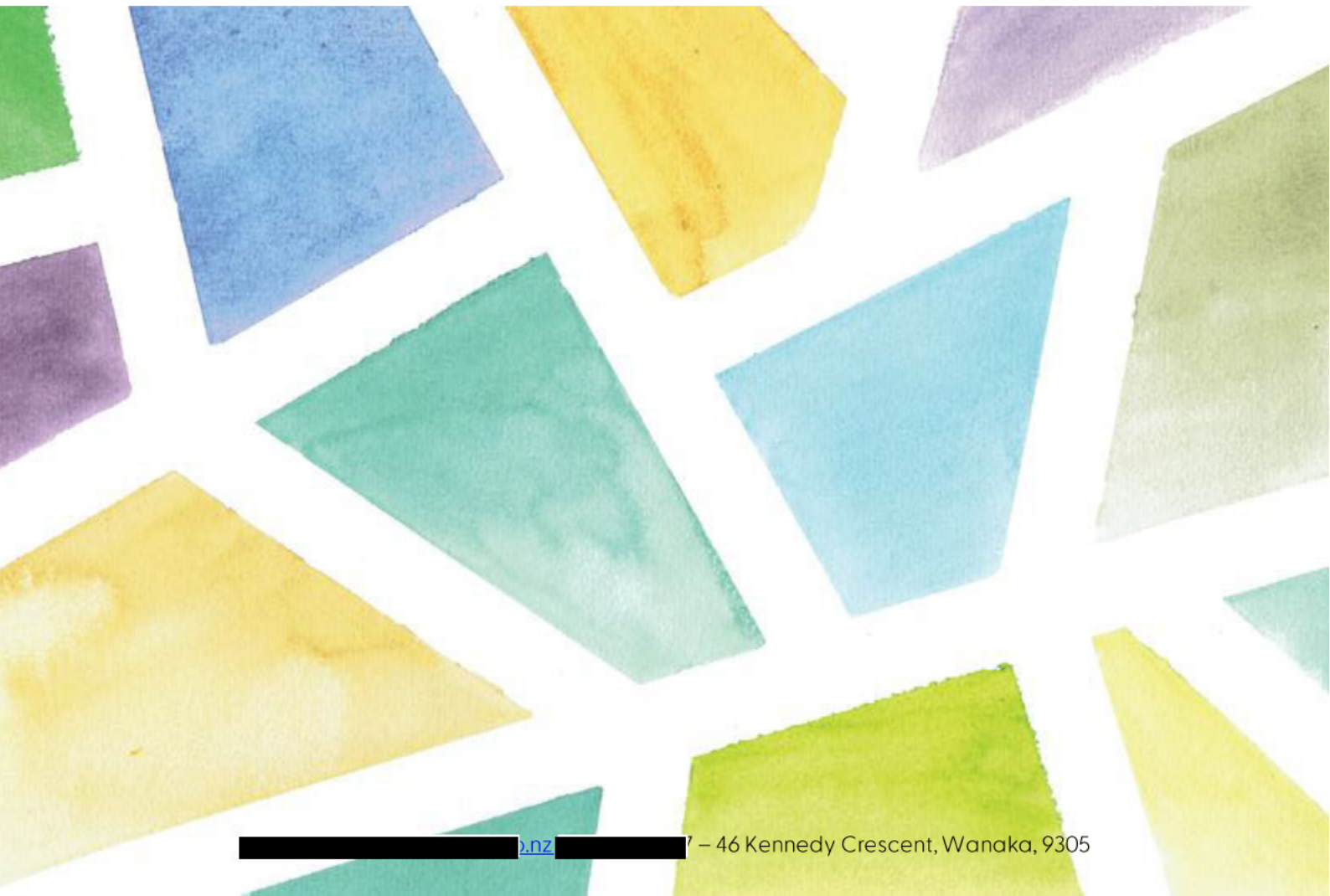


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Oparure Quarry South-Western Pit Economic Assessment

Fast-Track Substantive Application (FTAA-2602-1168)

Prepared for: Graymont (NZ) Limited, June 2026 – Final



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Executive Summary

The Oparure Quarry South-Western Pit Project proposed by Graymont (NZ) Limited at its existing Oparure Quarry in Waitomo District, is aimed at securing access to a high-quality limestone deposit located on-site that would enable them to continue to meet customer demand over the long term. The Project is aimed at ensuring that the regional and national economy, which relies extensively on limestone and lime products for economic growth and wellbeing, is maintained and supported efficiently, by protecting established upstream and downstream economic linkages in the economy.

These benefits are material in the context of the local and national economic climate. The scale and diversity of these downstream linkages – spread across almost the entire North Island and reaching a substantial share of the national population – means that even small disruptions to supply would have disproportionate consequences for national productivity, supply chain resilience, and community well-being. By avoiding these risks, and by maintaining an efficient, centrally located, high-quality source of limestone and lime products, the Project delivers economic benefits that are enduring, wide-reaching, and significant at the national level. These economic benefits are additional to the Project's net positive environmental benefits, achieved through the proposed Ecological Betterment Plan discussed elsewhere in the application.

The following provides a summary of key findings of this assessment:

The Project will support the development of natural mineral resources.

The Project enables the use and development of natural limestone resources. Limestone deposits are found in a number of geological areas in New Zealand. Quarrying of limestone therefore has a functional and operational need to be located where limestone deposits are accessible and economic to extract. The Project will support the long term development of limestone resources in the Waitomo District where it is strategically located relative to high value customers throughout the North Island and of a high quality (CaCO_3 concentration) relative to many other deposits commercially quarried. Extracting high quality limestone results in more sustainable use of the resource (i.e. when used as a soil conditioner, less is required when the CaCO_3 concentration is higher)¹ and provides opportunities for more valued added downstream uses, including steel production and other industrial uses.

Enabling the Oparure Quarry to expand will support the continued development of natural limestone resources in a way that seeks to minimise the direct environmental impacts, while at

¹ Christie, T et al. Mineral Commodity Report 21 – Limestone, marble and dolomite.



the same time, generating a number of environmental gains (in the form of a proposed package of environmental betterment initiatives).

The Project has been identified as a priority project in a central government strategy.

In January 2025, the Government released “A Minerals Strategy for New Zealand to 2040”.

The Strategy recognises that minerals are:

- essential for our way of life;
- the foundation for the technologies, infrastructure and industries we use and rely on;
- essential inputs that enable innovation, manufacturing and economic growth; and
- support the sustainable development of societies.

While the goal of the Minerals Strategy is doubling minerals export value by 2035 – and exports are only a minor component of Graymont’s Waikato operations, the overarching vision of the Strategy is “a minerals sector that delivers for New Zealanders, now and into the future, by supporting a productive and resilient economy through responsible and sustainable practices.”

Enabling the expansion of the Oparure Quarry to secure long term supply of high-quality limestone (and lime products) relied on by a broad range of New Zealand sectors, including the gold mining sector, which is strongly focussed on export growth at present, is directly aligned with the vision of the Minerals Strategy. Maintaining domestic supply of limestone in a strategic central North Island location, minimises transport costs (and transport externalities) for key customers, increases the resilience of supply chains (by avoiding reliance on imported products), retains value added processing within New Zealand, and sustains high-value jobs in the minerals sector. These are all outcomes sought by the Minerals Strategy.

The Project will deliver regionally or nationally significant infrastructure or enable the continued functioning of existing regionally or nationally significant infrastructure.

The Oparure Quarry is the largest limestone quarry in New Zealand (in terms of tonnes extracted per annum). It has been in operation for 45 years. During that time, there has been significant investment by Graymont and previous owners in on-site infrastructure (including roading, processing, storage and transport infrastructure) that enables it to achieve a high level of output and efficiency.

The quarry directly (and wholly) supports two lime processing plants (kiln sites) within a short distance of the quarry. These processing sites represent significant capital investment, with



one site containing a rail siding dedicated to transporting product to New Zealand Steel in Auckland.

The continued operation of the Oparure Quarry (by enabling the Project) will also indirectly contribute to the delivery of regionally and nationally significant infrastructure such as roading and tunnelling projects carried out in the North Island due to limestone (and lime products) being used as an input to those projects (through ground stabilisation, drainage material and more). It will also support the continued functioning of existing regionally and nationally significant infrastructure through maintenance and repair of key land transport infrastructure and the ongoing operation of existing water (and wastewater) treatment plants in many North Island districts (including Auckland).

The Project will deliver significant economic benefits.

Graymont's upstream supply chains linked to activities at the Oparure Quarry and the two vertically integrated kiln sites (and a proportionate share of the upstream supply chain for the regional office) are estimated to contribute the following indicative (rather than absolute) gross economic impacts in the local and wider economy once direct, indirect and induced transactions are accounted for:

- around \$₂₀₂₅29 million per annum spent with goods and services suppliers (based on quarry and kiln site expenditure only, with regional office expenditure additional);
- which translates up to an indicative \$₂₀₂₃42.7-46.5 million in total value added (GDP) per annum; and
- sustains up to an indicative 262 FTE jobs per annum.

Approval of the Project ensures that all of these existing upstream economic impacts are maintained over the long term and limestone production from New Zealand's largest limestone quarry is maintained without disruption.

More significantly, the Project secures wide-ranging downstream economic benefits generated by the Oparure Quarry's critical role in supporting industries that are foundational to the functioning of New Zealand's economy over the long term. Limestone and lime products sourced from Oparure underpin key export sectors such as agriculture, dairy processing, pulp and paper manufacturing, and gold mining, and support major domestic manufacturers including New Zealand Steel and Oji Fibre, as well as essential infrastructure services such as drinking water treatment, wastewater management, roading and construction. Combined with the Quarry's upstream economic supply chains, these downstream economic linkages are extensive and significant at the national level. If the consent is not approved, then many of



these economic benefits will be lost, disrupted or compromised and it will likely force significant reliance on imported lime products for some customers which exposes New Zealand industry to supply chain risks and reduces the resilience of the national economy.

The Project will increase the supply of housing to address housing.

Housing development places significant demand on products like concrete, aggregates, steel, adhesives, paint, glass, plasters, mortars, landscape supplies and engineered wood products. Limestone and lime products are inputs into all these building materials. While the Project does not directly increase housing supply, it facilitates the increase of housing supply through industries that provide critical inputs to the construction sector. Further, Oparure Quarry supplies products to roading and infrastructure developers, and water and wastewater treatment plants that are all necessary to service housing growth.

The Project will support primary industries.

The Project will enable the continued and long term supply of agricultural lime products (including for aerial top-dressing) to pastoral farms and horticultural activities throughout the central North Island (where Graymont has the largest market share of limestone supply for soil conditioning).

The Oparure Quarry also supplies, pulverised limestone as a dietary supplement (Calcimate™)² for the dairy farming sector and egg farming sector. This includes products sold directly to farmers (or via agricultural supply stockists) or sold to manufacturers of stock feed mixes (located in both the North and South Island). Enabling long term supply of limestone at the Oparure Quarry therefore supports New Zealand's land-based primary producers which have a core role in the New Zealand economy, including export revenue.

The Project will support climate change mitigation, including the reduction or removal of greenhouse gas emissions.

By maintaining long term continuity of limestone and lime supply for customers spread throughout the North Island from a centrally located quarry (including one rail-enabled kiln site), approval of the Project is likely to avoid customers needing to source alternative product from suppliers (including imports in some cases) that may require increased truck movements or vehicle kilometres travelled. While counterfactual supply scenarios are uncertain and cannot be quantified, long-haul heavy trucks have an emissions factor of 0.105kg CO₂e/tonne km which would apply for every net additional tonne km travelled.³

² <https://www.calcimate.co.nz/>

³ MfE, Table 27.



The Project will support recovery from events caused by natural hazards.

The Project will enable Graymont to continue to supply limestone and lime products to roading and civil contractors and infrastructure developers. This includes products that dry soil-substrates, improve soil stability and that are used as a roading (aggregate) and track material. Limestone and lime products can therefore play a critical role in road and track maintenance and repair to support the recovery from natural hazard events. Being centrally located, the Oparure Quarry is also well placed to supply materials quickly and efficiently to a range of locations throughout the North Island when the need arises. Approval of the Project will ensure that this supply can continue into the long term.

The Project will address significant environmental issues.

Ensuring healthy municipal water supply, efficient and effective wastewater treatment, and the effective management of industrial and processing wastes are all important environment issues. Graymont supplies lime products sourced from Oparure Quarry to a range of businesses that are involved in these activities.

Based on the local authorities to whom Oparure Quarry supplies products for water treatment plants, Graymont's products directly assist those authorities to supply healthy drinking water to nearly half of the New Zealand population including where more than half of long term population growth is expected to occur.

Approval of the Project will ensure these environment issues can continue to be addressed without disruption of supply and that demand growth can be met. As addressed in Application report, Graymont will also be implementing measures as part of an environmental betterment proposal to improve the local environment post its consent being implemented. One of these measures involves the reduction of sediment from its landholdings (and some around them) to waterbodies. This is a significant issue facing the Waikato Region.

Conclusion on Significant Regional and National Economic Benefits.

Having regard to the New Zealand limestone quarry and processing industry and understanding the critical role that Graymont's Oparure Quarry and related kiln sites currently play in that industry, I consider that the Project will deliver significant and long term national and regional economic benefits and meets the purpose of the Act. The remainder of this report contains an economic assessment from which these key findings and conclusions were drawn.



1 Introduction

This report, prepared by Natalie Hampson at Savvy Consulting,⁴ assesses the economic benefits and significance of a request for approval under the Fast Track Approvals Act 2024 (“the Act” or “FTAA”) for a project that would deliver a new south-western pit and haul road at the Oparure limestone quarry in the Waitomo District (“the Project”).

The scope of this independent economic assessment has been designed to assist with Graymont’s substantive application by outlining the economic effects (benefits and costs) of the Project, and to directly inform the significance of the Project’s regional or national benefits, and their extent in accordance with s 81(4) of the Act.

Code of conduct

I have approached this assessment on the basis that it is prepared in the same way as it would be for expert evidence in Environment Court proceedings.

I therefore confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023 and confirm that I have complied with it in preparing this assessment. I confirm that the issues addressed in this assessment are within my area of expertise, except where I have indicated that I am relying on others’ opinions. I have not omitted material facts known to me that might alter or detract from my opinions expressed.

1.1 The Project

The Project entails the development, operation and progressive rehabilitation of a new opencast pit (the south-western pit) at the existing Oparure limestone quarry. The quarry already contains an existing opencast pit (current Pit) which is nearing the end of its economic life. The proposed new pit ensures continuity of production (and limestone supply) into the future based on current demand trends. The Project ensures the critical continuation of operations for upstream suppliers and downstream customers of the quarry’s limestone products.

The area to be disturbed over the lifetime of the new pit would be 57.4 ha, as shown in blue in Figure 1.1 below and described in more detail in Section 4.1 (Overview) of the substantive application. Only small sections would be quarried in stages and then rehabilitated. Mining

⁴ The experience and qualifications of the report author are contained in Appendix 1.

Figure 1.1 – Proposed South-Western Pit and Haul Road, Oparure



The purpose of the Project for Graymont (NZ) Ltd (“Graymont”) is to ensure that the upstream, and more importantly, the downstream economic linkages of the existing Oparure Quarry in the regional and national economy can be maintained well into the future.

It is important that this distinction – maintaining rather than growing economic activity – is understood for the evaluation of this Project under the Act as it guides the nature of the economic assessment required.

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economy. This is material because growth in one location or sector may not result in net economic growth if other sectors are declining or contracting. To grow New Zealand's economy, we must first ensure that we do so from a solid and resilient base. This makes projects such as this one very important. This is particularly so as recently some long established manufacturing businesses have been closing in some regions in the face of rising costs, and global events highlight the vulnerability of the economy to fluctuating import prices.

If a snapshot of the economy was taken today, the operations of the Oparure Quarry (and related facilities) form part of that snapshot (as an existing activity). This means that it is appropriate for this economic assessment to:

1. Understand the limestone/lime industry as it operates today. This has been addressed in Sections 2.1-2.4 of this report.
2. Understand the role of Oparure Quarry (and related facilities) in that wider industry (to appreciate its scale and importance). This has been addressed in Section 2.5.
3. Articulate the specific economic linkages (backward and forwards) of the Oparure Quarry (and related facilities) to understand the scale and extent of its contribution to the current economy (gross benefits). This has been addressed in Sections 3.1-3.3.
4. Understand the counterfactual scenario if the Oparure Quarry is unable to expand and continue its operations. These opportunity costs (that the Project is trying to avoid) are addressed in Section 4.
5. Address the economic costs of the Project. This is addressed in Section 5.1.
6. Determine the net economic benefits of the Project (to the extent that comparable economic benefits and costs can be combined) and draw overall conclusions on the extent and significance of those benefits. This is addressed in Sections 5.2-5.3.

Data sources considered or relied on are listed in Appendix 2. It is also noted that while Graymont has been able to share relevant commercially sensitive data with me so that I can have a sound understanding of their business in New Zealand to inform this economic assessment, it is not appropriate for some of that information to be revealed in this report. This is not an unusual request in my experience. I have therefore presented data in a way that balances the needs of Graymont's commercial privacy with the need to deliver an economic assessment that meets its purpose, is informative and can be relied on by those both in the project team and making decisions under the Act.



1.2.1 Role of Report in the Proportionality Assessment

For clarity, this economic assessment considers economic costs and benefits but does not contain a Cost Benefit Analysis (“CBA”) (formal or otherwise) that assesses all effects (impacts) of the Project.⁵ The economic assessment is one of several technical assessments which support the application. The application report and AEE prepared by Enspire bring the conclusions of each of those technical assessments together (including their respective benefits and costs (impacts)) to form a view on whether any adverse impacts are sufficiently significant to be out of proportion with the Project’s benefits (which are not limited to economic benefits).

Parts of this assessment rely on economic impact assessments (“EIAs”) that use economic multipliers within an Input-Output model framework. I consider that EIA is an appropriate methodology (particularly when appropriately caveated and coupled with assessment of wider economic wellbeing benefits) and is consistent with the purpose of identifying economic benefits of a Project under the FTAA. While it has been raised in other FTAA projects that applicants should use a CBA approach,⁶ the FTAA does not contain a direction requiring this.

⁵ A range of decisions under the FTAA have determined that a full CBA of a Project is not required as part of the economic assessment, particularly as it risks double counting adverse impacts at the time of the proportionality assessment. See for example: Ayrburn Screen Hub [158–160], Waihi North [782], Taranaki VTM [95], Draft Decision on The Point Mission Bay [323.10].

⁶ See for example, the peer review of the Delmore FTAA economic assessment, and others.



2 The Limestone Quarry & Processing Industry

To understand the economic significance of the Project, it is important to understand the wider industry and the products and uses of limestone and its derivatives. The limestone/lime market plays a pivotal role in the economic development and wellbeing of New Zealand and its communities and the Oparure Quarry plays a critical role in that market.

2.1 The Limestone Resource

As most limestone is derived from shelly marine organisms, and most of New Zealand was once covered by the sea at some point, limestone can be found in many (but not all) areas of the country. Figure 2.1 shows a map of limestone deposits in the North and South Islands.⁷ It includes marble and dolomite deposits which are closely related to limestone but are not the focus of this assessment. The main locations of limestone are in Northland, Waikato, southern Hawke's Bay, Wairarapa, north-west Nelson, Westland, Canterbury and Southland. However, quality varies and economically viable deposits are limited to relatively few areas. The Oparure Quarry is in the Waikato/King Country limestone region where high-grade, crystalline limestone is found.

2.2 Limestone and Lime Products and Uses

In New Zealand, the term 'lime' includes:

- limestone (calcium carbonate - CaCO_3),
- quicklime (aka burnt lime) (calcium oxide - CaO), and
- hydrated lime (aka slaked lime) (calcium hydroxide - Ca(OH)_2).

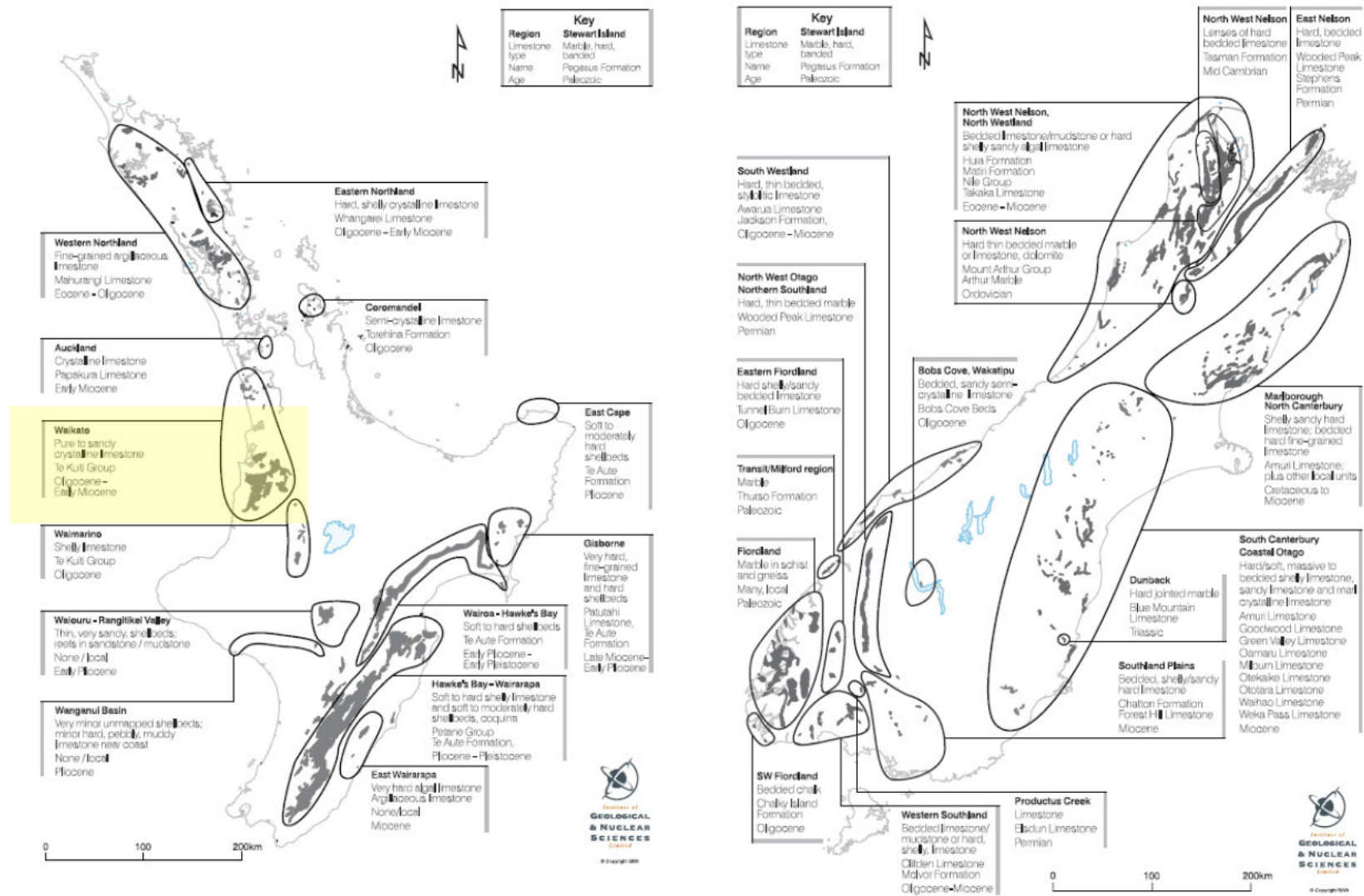
All of these materials are used in large quantities in New Zealand (as they are throughout the world).⁸ For the purpose of this report, I refer to limestone and lime products separately (the latter requiring further processing using industrial scale kilns). For completeness, it is noted that 'Ag-lime' is commonly referred to term and this is a limestone product.

⁷ Sourced Chistie, T. et al, based on maps prepared by Turnbull and Smith Lyttle (1999).

⁸ Marble is a very dense form of limestone and is found in relatively few parts of New Zealand. This assessment does not consider the economic use of marble (or dolomite) as these are considered separate industries.



Figure 2.1 – Location of Limestone, Marble and Dolomite Deposits in New Zealand





Limestone products and uses are summarised in Table 2.1. These products are created through grinding/crushing and screening of quarried limestone, often at the site of extraction or at a separate site nearby. Different uses require different particle sizes (from fine grains for aerial top-dressing to coarse grains for landscaping or aggregate alternatives). In addition, limestone can be cut into blocks for use in building construction or landscaping (known as 'face-block').

The diverse way in which limestone products are used demonstrates the significant breadth of the limestone industry's downstream economic linkages, both in terms of the range of dependent industries and the location of those industries (and in turn their customers) nationwide.

Table 2.1 – Limestone Products and Uses

Use	Description and extent of use
Soil conditioner/fertiliser	Limestone is one of the most common fertilisers used in New Zealand. Most New Zealand soils are naturally acidic or become acidic with plant growth and use over time. This results in a build-up of aluminium and manganese ions that are toxic to plants (and therefore hinder plant growth). The addition of finely ground limestone to the soil corrects the pH balance of the soil. Limestone also improves the soil tilth ⁹ and friability. ¹⁰ This is particularly important in parts of New Zealand where soils have a high clay content. The higher the concentration of CaCO_3 , the less limestone that needs to be applied. The periodic addition of limestone on pastoral farms and horticultural land to maintain optimum soil condition creates significant seasonal demand for limestone in New Zealand. ¹¹ Limestone fertiliser is also sold to household consumers (through garden supply retailers) for home gardening.
Animal supplement	Limestone is used as a supplement in animal feed, particularly for cows, poultry (egg farming – to support shell

⁹ Tilth refers to the depth of soil influenced by cultivation (i.e. fine, crumbly soil).

¹⁰ Friability refers to ease at which soil is crumbled.

¹¹ <https://aaa.org.nz/wp-content/uploads/2022/03/Lime-The-Essential-Element-Book.pdf> provides further detail on how lime contributes to agricultural productivity.



	formation), pigs and horses and in drenches for dairy cows to increase milk production. This demand is nation-wide, commensurate with the location of these farming activities.
Cement manufacturing	Limestone is a key ingredient in the production of Portland cement, where it is combined with marl. Portland cement is the only type of cement in common use in New Zealand today (with fully integrated domestic production now only occurring south of Whangarei (by Golden Bay Cement) after Holcim (NZ) closed its Westport plant and reverted to an import model). ¹² The cement manufacturing process requires very consistent raw materials in order to achieve the required performance properties of Portland cement. Golden Bay Cement transport cement nationwide. The uses of cement are vast and around 1.5 million tonnes of Portland cement is used each year in New Zealand. ¹³ It is a critical material in construction – whether residential, commercial, industrial or infrastructure. Its importance cannot be overstated.
Asphalt	Adding crushed ultra-fine limestone to asphalt mix improves the density of the road surface – makes it stronger, more resistant to breaking down. This reduces demand for road repairs and costs for private sector, local councils and NZTA. It is a growing market.
Mineral filler	Limestone is used in plastic product manufacturing, adhesives and sealants to make them more sustainable, improve their performance and functionality. ¹⁴ Limestone is also used in paint production and in the manufacturing of engineered wood products (as a wood fibre replacement). It is also used as a filler in mortar, plasters and renders. It is added to concrete to aid with surface smoothness, colour/brightness, thermal properties, reducing density and

¹² https://concretenz.org.nz/page/Holcim_NZ. In addition to Holcim, I understand there are some other companies importing finished, or semi-finished (i.e., clinker) cement products.

¹³ Source: [Low-Carbon Solutions](#)

¹⁴ <https://www.omya.com/en/omya-specialty-materials/industries/adhesives-and-sealants>



	to improve the workability of concrete for a range of applications. It is used in paper and board production as a fibre replacement and to make tissue paper softer. CaCO_3 is used in skin care products, make-up, toothpaste, surface cleaners and laundry powder. This is not a comprehensive list of the uses of limestone as a mineral filler.
Air pollution management	Limestone (and lime) products are used for the removal and neutralisation of acidic pollutants from flue emissions in factories (wet and dry scrubbers) and on marine vessels. ¹⁵
Coal mining	Limestone is used as a dusting agent to prevent fires and improve air quality in coal mines. Limestone used for this purpose must be of high quality to avoid adding hazardous impurities to the ambient air.
Steel and other slag forming industrial processes	Limestone is used to remove impurities from industrial processes by formation and subsequent removal of slag.
Glass manufacturing	Limestone is used as a key ingredient in glass manufacturing and as a melting agent in ceramics. ¹⁶
Aggregate and aggregate alternative	Limestone is used as a roading material in areas where there is no superior alternative ¹⁷ locally available (noting that transporting aggregates long distances is cost prohibitive (being a low value but large bulk and weight product)). I note that in the Waikato Region, most of the aggregate quarries and shingle pits are located in the northern half of the area meaning that region-wide, there is an inadequate supply of easily obtainable first-class road making aggregate. ¹⁸ This is also the case in some other parts of New Zealand, where limestone aggregate is relied upon.

¹⁵ <https://www.omya.com/en/omya-specialty-materials/industries/air-treatment>

¹⁶ [Building and Construction - High-Quality Mineral Solutions | Omya](#)

¹⁷ Preferred roading aggregates are greywacke sandstone, greywacke gravels, basalt and andesite.

¹⁸ Source: Christie, T. et al (GNS). Mineral Commodity Report 22 – Aggregate.



	Limestone aggregate is used for drainage chip applications and as a surface in farm raceways.
Architectural use / building construction	Limestone is used for landscaping or as a building material for walls ('face-blocks'). Limestone blocks may also be used for decorative carving/sculpture. Limestone chip products are also used as a plaster render or decorative aggregate for landscaping purposes.

Quicklime and hydrated lime products and uses are summarised in Table 2.2. As noted above, these products are created through further processing of quarried limestone, at the same or separate site of extraction. The diverse way in which lime products (as distinct from limestone products) are used, further demonstrates the significant breadth of the limestone industry's downstream economic linkages, both in terms of the range of dependent industries and the location of those industries (and in turn their customers) nationwide.

Table 2.2 – Quicklime and Hydrated Lime Products and Uses

Use	Description and extent of use
Steel manufacturing	Quicklime is used as a basic flux in steel production. It forms a fluid slag in which impurities dissolve leaving the iron relatively pure.
Pulp and paper manufacturing (central North Island)	Lime a critical chemical for process efficiency, environmental protection, and product quality in the NZ pulp and paper industry. Lime products are used in the pulping process as a causticizer. Once used it can be re-converted into quicklime if the factory has on-site kilns. Quicklime is used as a filler and part of the bleaching process and as a coating pigment in papermaking to improve brightness, opacity and printability. Lime is also used in the paper recycling process to control pH and prevent microbial growth and in coatings for packaging products.



Sugar industry	Hydrated lime is used as a processing aid to clarify mixtures and refine sugar from crushed sugar cane juice.
Gold mining and mineral processing	Quicklime is used to neutralise acids in the industrial scale processing of gold ore (for example, the Martha Hill gold mine in Waihi, and Macraes gold mine in Waitaki District (Otago) both owned and operated by Oceana Gold). This also applies to many other mineral processing applications, including many of the minerals required for the “green economy.” This includes but is not limited to rare earth minerals processing.
Road and ground stabilisation	Quicklime stabilisation has been around for centuries, it is an efficient and cost effective way to improve the workability and load bearing characteristics for a variety of different applications. The two main benefits in lime stabilisation are the drying effect it has on wet soils commonly utilised in the building industry on wet access roads and building pads reducing their down time. The most important benefit is substantially increasing the load bearing characteristics of the subgrade while still maintaining a level of flexibility. It is particularly effective on clay soils. NZTA has introduced a new Recycling and Rehabilitation Policy for roading projects. NZTA is focused increasingly on recycling material in situ rather than removing substrates that are not useful, dumping and replacing with new raw materials. NZTA is now specifying that lime be used on roading infrastructure projects to reduce demand for virgin aggregates. This indicates growing demand for quicklime.
Drinking water treatment	In municipal water treatment, Hydrated Lime is added to water to raise the pH level, neutralising any acids. This helps maintain healthy pipes and actively kill bacteria and germs, which helps in the purification process. ¹⁹

¹⁹ [Industrial Lime – Websters](#)



Waste water treatment	Hydrated lime and quicklime are used in sewage sludge to manage pH, improve flocculation and improve biological processes. Hydrated lime absorbs heavy metals and phosphates as well as neutralising hydrogen sulphide, which causes a lot of smell. It assists in the settling process, which reduces the detrimental effects commonly associated with wastewater overflows. Hydrated lime is also ideal for treating effluent ponds created for intensive farming operations, leaving a product that is more beneficial when used as a fertiliser. Quicklime is effective for speeding up the natural decomposition process and is effective for neutralising and drying back bio sludge material before disposal. As quicklime will actively kill bacteria and germs, it is ideal for use in septic tanks and offal pits.
Soil Steriliser	Quicklime is often used to give a spike in pH killing bacteria or “sterilising the soil” effective if the area is prone to bacterial diseases. Used extensively in Brassica production as an effective tool for preventing club root.²⁰
Commercial composting	Quicklime assists in decomposition of plant material.
Pollution control	Quicklime is used to neutralise acids to control pollution and help industries with environmental compliance. This includes the meat processing industry, but also the pulp and paper industry (which has acidic effluent). Lime is also used to precipitate solids and remove contaminants.
Hide/animal skin processing	Hydrated lime is used for preserving hides and skins at tanneries. It softens the pelt and maintains the correct pH levels. It is also widely used to treat any waste by-products from the tanning process.

²⁰ [Industrial Lime – Websters](#)



Cool Storage	Hydrated Lime is used extensively to naturally absorb CO ₂ from the atmosphere, ideal for use in cool stores where fruit benefit from a CO ₂ reduced environment. ²¹
Herbicides and pesticides	Hydrated Lime is widely used to produce a number of herbicidal and pesticide products. ²²
Underwater construction	Hydraulic lime (a specific type of hydrated lime) is a specialist type of cement used in for concrete emplaced under water.

2.3 Key Industry Players and Locations

The limestone industry in New Zealand is comprised of quarries and lime processing facilities (also referred to as kiln sites for this report). Together, these sites supply the products discussed above to meet industry demand across New Zealand (with imported products playing a negligible role at present).²³

Quarries range from small-scale farm and forestry quarries to large scale commercial quarries in locations where limestone deposits are found (and are accessible and economically viable). A report by MPI indicated that there were 68 commercial limestone quarries that supplied lime for sale in New Zealand.²⁴

The production of quicklime requires limestone feedstock with a high concentration of CaCO₃ (i.e. greater than 90-95%) and kilns that heat the limestone at extremely high temperatures. Hydrated lime is a derivative of quicklime. It is produced by reacting quicklime with water in a continuous hydrator. This process also gives off a lot of heat. Kiln sites that produce quicklime and hydrated lime are capital intensive, industrial activities and so are relatively few in number compared to the total count of limestone quarries.

I have considered a range of spatial datasets that would illustrate where limestone quarries and kiln sites are located across New Zealand. Two examples of spatial datasets that have been considered are the LINZ maps of quarries in New Zealand (which contains a field describing the material being quarried), and the Aggregate & Quarry Association (“AQA”)

²¹ <https://www.whlc.co.nz/industrial-lime>

²² <https://www.whlc.co.nz/industrial-lime>

²³ Imported lime products are all related to lime for industry. Imported product amounts to approximately 1% of total domestic production of lime products based on harmonised import statistics and Graymont data.

²⁴ MPI, 2021, page 6.



Quarry Database which contains fields on the location, owner, type and status of limestone quarries and satellite sites. However, both datasets have been found to contain significant limitations (including data gaps and inconsistencies in classification) which reduces their utility and reliability. I have opted not to analyse that data any further for this assessment and opt for a qualitative description instead.

Some of the key companies operating in the limestone quarry and processing industry, and that are of particular relevance when considering the role of Graymont's operations, include:

- Graymont (NZ) Limited – discussed further in Section 2.5.
- Palmer Resources: Palmer Resources is a New Zealand based company that has quarries in Waikato (close to the Oparure Quarry), Canterbury and Southland. The trade under the names Palmer Industrial Minerals, Supreme Lime, Victory Lime and Springfield Lime Company and Healthy Cow. They supply agricultural lime, animal nutrition limestone, limestone aggregates and chip products, limestone face rock, and industrial limestone.
- Omya: Omya is an international company with a quarry and nearby processing (although not a kiln) facility in Te Kuiti. As such, they are also located close to Oparure Quarry. Omya produces a range of agricultural limestone and industrial limestone products but specialise in serving the pulp and paper industry (Oji Fibre), with their agricultural limestone products a by-product of their industrial limestone processing.
- Rorisons RMD: Rorisons is a New Zealand based company that has two adjacent quarries in Waitomo District. Rorisons focus on agricultural limestone for fertiliser and fertiliser blends and animal nutrition.
- Websters Lime: Websters is a New Zealand based company based in Hastings District, Hawke's Bay. They produce agricultural limestone, animal nutrition limestone and industrial limestone (fine ground, aggregate/chip, landscaping rock) and through their on-site kiln facility, produce quicklime and hydrated lime.

2.4 National Production Statistics

This section briefly describes the scale of the total national limestone industry in terms of annual production output (tonnes) and value. This data is sourced from the '*New Zealand Coal, Industrial Minerals and Metallic Minerals Production Survey*'/Statistics managed by New Zealand Petroleum and Minerals. The survey is voluntary and does not capture all production, but I consider it likely that it captures the main producers and therefore is likely to account for

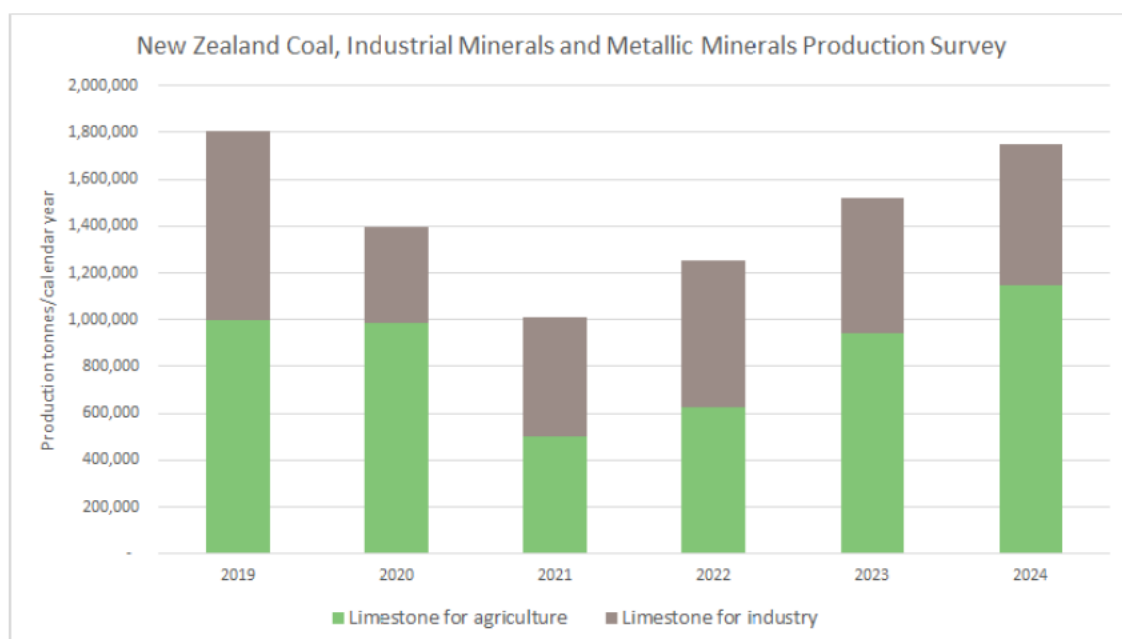


most production. The limestone production statistics do not include quicklime or hydrated lime products which are produced from extracted limestone.

While the survey records data for the following three categories – limestone for industry, limestone for agriculture and limestone and marl for cement – the latter is impacted by withheld data (to protect the confidentiality of producers when there are few in the market).²⁵ As such, the following focusses only on limestone for industry and agriculture.

Figure 2.2 shows that in the 2024 calendar year, a total of 1.75 million tonnes of limestone was extracted and sold within New Zealand, with 66% of that used for agriculture and 34% used for industrial inputs. This volume is only marginally lower than output in 2019, although between those years, total production reduced in 2020 (driven by a halving of limestone for industry compared to the previous year) and reduced further in 2021 to an industry low (driven by a significant decrease in limestone for agriculture, countered by a recovery in limestone for industry). These declines are attributable to the effects of Covid19. Since 2021, demand (and supply) for domestic limestone for agriculture has increased steadily each year, to reach a new peak in the time series shown.

Figure 2.2 – New Zealand Limestone for Agriculture and Industry Production by Tonnes (2019-2024)



²⁵ In years when it has been recorded (such as in 2019), the tonnes produced is greater than either agricultural or industrial limestone although the value of the product is lower by several orders of magnitude.



Figure 2.3 – New Zealand Limestone for Agriculture and Industry Production by Dollars (2019–2024)

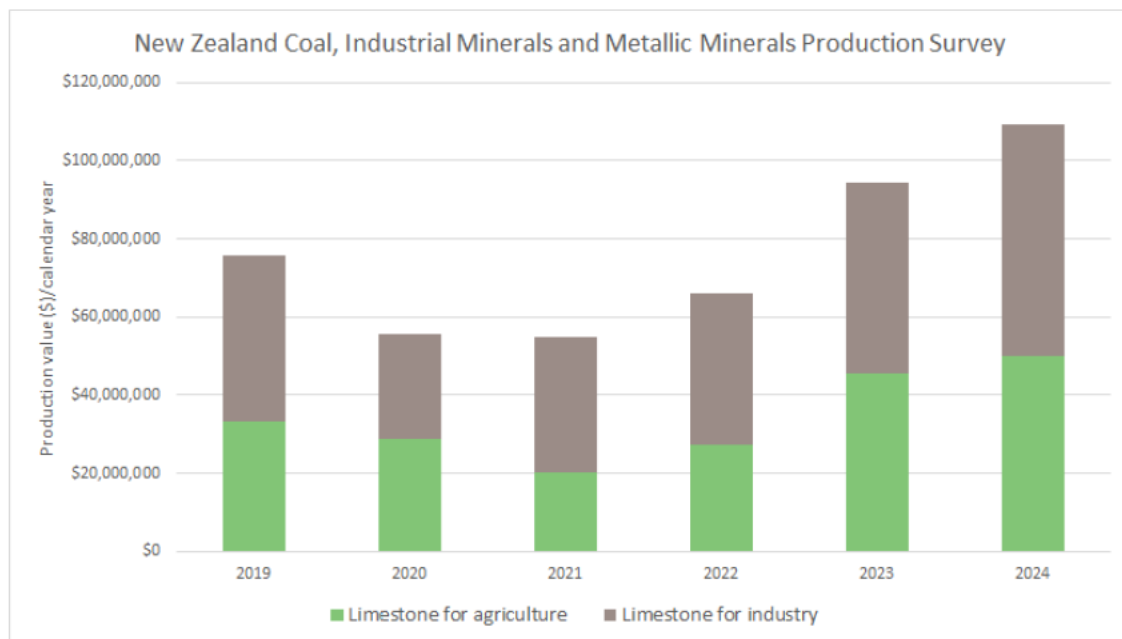


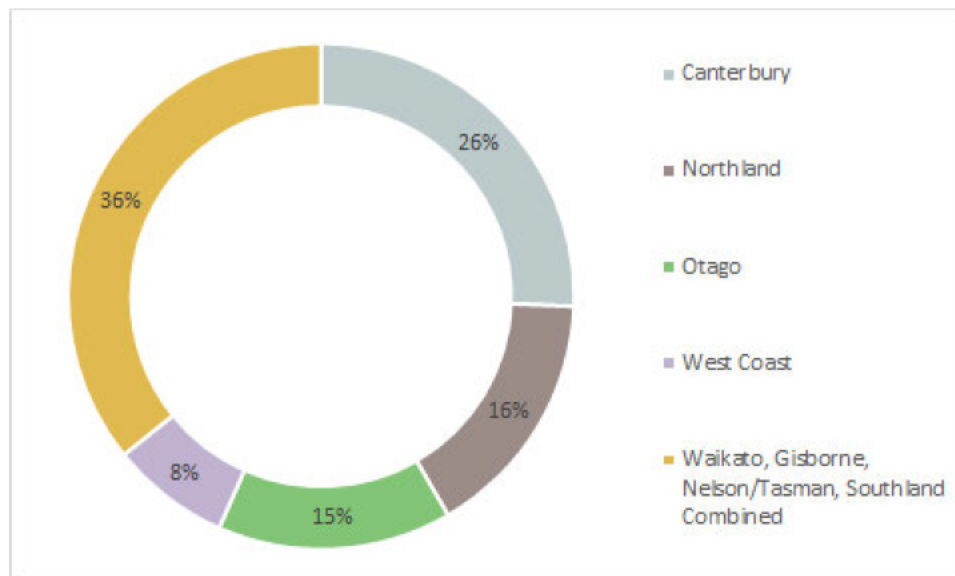
Figure 2.3 shows the value of limestone for agriculture and industry sold in New Zealand since 2019. This data shows a commensurate decrease in sales value in 2020 and 2021 when production decreased, and the steady increase in sales since 2021 to a new peak in value in 2024 – approximately \$110 million dollars in turnover (excluding limestone for cement).

The value of output in 2024 is considerably larger than in 2019 despite being a similar quantum of material sold. The average value of limestone for industry is almost double that of limestone for agriculture (at around \$98/tonne compared to \$44/tonne in 2024). The average value of limestone for agriculture per tonne has increased by 31% since 2019, while the average value for industry per tonne has increased by 86% in that same period. This value growth (on a unit basis) reflects not only growing demand but continued evolution of products and uses which continue to add value to industry. As a result, in 2024 limestone for industry accounted for 54% of the total value of limestone produced despite accounting for 34% of the output in tonnes.

The mineral production statistics provide a summary by region, although data is withheld when there is only one (or few) responding operators in a region, to protect commercially sensitive data. Figure 2.4 shows the tonnes of limestone for agriculture produced by region in 2024. The data for Waikato, Gisborne, Nelson/Tasman and Southland regions are necessarily combined (and account for around 410,000 tonnes). The Oparure Quarry accounts for substantial share of limestone production in these combined regions. Canterbury is a major producer (of those regions specified), with 26% of total national production, followed by Northland and Otago and then the West Coast.



Figure 2.4 – Breakdown of 2024 Limestone for Agriculture Production (tonnes) by Region



The equivalent data for limestone for industry is not revealed at the regional level (with all region values withheld). However, the data indicates that the regions involved in supplying limestone for industry include Canterbury, Northland, Otago, Waikato, West Coast, Nelson/Tasman and Manawatu/Wanganui.

2.4.1 Royalties

Some (but not all) limestone in New Zealand is a crown-owned mineral either by right or because it is located on Crown-owned land. Crown-owned minerals are administered under the Crown Minerals Act 1991. As such, the limestone (quarry) industry does contribute royalty payments to the Crown. Royalties for limestone for agriculture, cement and industry are currently charged at \$0.30/tonne sold (up from \$0.25/tonne sold prior to 1 January 2024). This royalty rate is equal to dolomite, and higher than pumice, marl, aggregate for construction materials and clay for bricks and tiles, but lower than many other non-metallic minerals (including coal). However, decorative/dimension building stone (which can include limestone) has the highest royalty rate of the non-metallic minerals, at \$2.21/tonne sold.

Specific Crown royalty revenue from limestone production is not available. It falls within the 'Other Minerals' category in the available statistics which in total amounted to just \$1.6 million in the year ending June 2025. This category currently makes up around 12% of total annual royalties from gold, iron sand and other minerals but a negligible share of total royalties and energy resource levies. Government revenue from petroleum and mineral royalties and energy resource levies is the lowest it has been since 2009, largely due to royalties from petroleum almost halving since June 2024. Royalties paid by the limestone industry (including



Graymont in relation to the Oparure Quarry) are a positive economic benefit of the industry (and the Project), but given limestone's very minor (proportional) contribution, I do not consider it further in this report.

2.5 Graymont's Role in the Industry

2.5.1 Graymont's Operations

Graymont is a global calcium-based solutions company with significant and long-established operations and capital investment in New Zealand. Graymont's New Zealand, Australia, Malaysia and Philippines operations are managed from a regional office based in Hamilton.

Graymont has two large scale commercial limestone quarries in New Zealand and three kiln sites as follows:

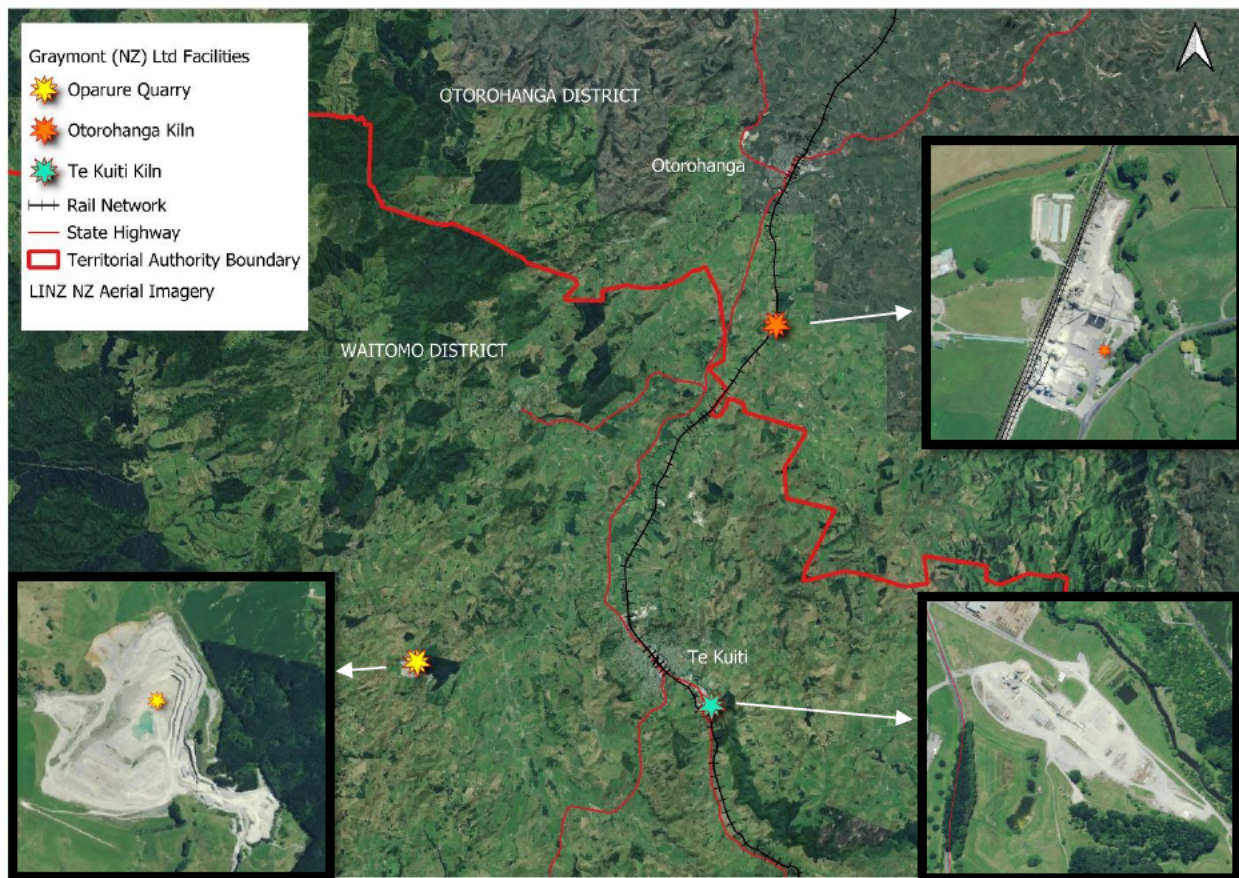
- Oparure Quarry in the Waitomo District (Waikato Region) – the subject of this application.
- Ōtorohanga Kiln Site in Ōtorohanga District (Waikato Region) – also relevant to this application.
- Te Kuiti Kiln Site in Waitomo District (Waikato Region) – also relevant to this application.
- Makarareo Quarry and Kiln Site in Waitaki District (Otago Region).

The Oparure Quarry is the largest producer of limestone products in New Zealand in terms of tonnes of output and has been in operation for 45 years, with Graymont owning it for the past ten years. The site produces high-quality limestone (in terms of CaCO_3 concentration). The quality of limestone a quarry produces influences the products that it can produce, and therefore the sectors/industries that it sells to. Oparure Quarry is able to sell limestone for agriculture and industry as well as providing a suitable feedstock for the production of quicklime and hydrated lime. Graymont's Ōtorohanga and Te Kuiti kiln sites process limestone supplied only from Oparure Quarry and as such, their fate (and the fate of their staff) is currently linked to the ability of the Oparure quarry to continue to provide kiln feedstock over the long term.

Figure 2.5 maps the location of Graymont's three related facilities in the Waikato Region. Both the Oparure Quarry and Ōtorohanga kiln site are in rural areas, while the Te Kuiti kiln site is in an industrial area on the outskirts of Te Kuiti.



Figure 2.5 – Map of Graymont’s Waikato Region Operations



2.5.2 Oparure Quarry Outputs

Quarrying typically has an agile production model, with extraction scaled to meet demand (notwithstanding some storage of product to provide a buffer and improved supply chain resilience). If demand increases (including seasonally), then – within limits – supply increases to match. This is still dependent on ready access to the resource and the capital infrastructure being in place to enable increased supply. Approving the Project increases the amount of resource than can be quarried at Oparure (i.e. the opportunity) but will not mean that supply suddenly increases. Operations at Oparure will still be demand-driven hence the focus on sustaining these critical operations.

Oparure Quarry sells nearly 100% of its limestone products within New Zealand, with only a very small quantity of agricultural limestone and animal nutrition limestone exported to some Pacific Islands in 2025. Limestone is a bulk item and generally not viable for long transport distances, hence it is not easily (or often) exported or imported. This makes domestic supply particularly important. Graymont has supplied data showing a breakdown of output (based on tonnes) for the Oparure Quarry operations in the YE April 2018 (which is also considered representative for 2025). Product types are summarised into six broad categories, but within



each category are a wide range of sub-products with different grain sizes/densities to meet specific customer needs and applications.

Excluding Graymont's own kiln feed transported from the quarry to the Ōtorohanga and Te Kuiti Kiln Sites, agricultural lime accounts for around 41% of external sales, followed by limestone for roading applications (at around 36%). High-quality industrial (steel) grade limestone for New Zealand Steel accounts for 15% of external sales.

When considering the distribution of quarry output inclusive of the product that goes to Graymont's nearby kiln sites, the data shows that when Graymont kiln feed and steel grade feed is combined, a substantial 47% of quarry output supports the production of steel, quicklime and hydrated lime. Agricultural lime then accounts for 26% of total output and roading limestone products account for 21%. Animal nutrition, architectural/landscaping and construction related products make up the remaining 6% of output leaving the quarry gate.

2.5.3 Waikato Kiln Sites Output

Using limestone transported from the Oparure Quarry, the two Graymont kiln sites sold 99.6% of their quicklime and hydrated lime product within New Zealand in the 2025 calendar year. The 0.4% of quicklime and hydrated lime exported from the kiln sites also goes to Pacific Islands (including Fiji and New Caledonia). While lime products are imported into New Zealand, this totalled just 804 tonnes in 2024²⁶ which is a small fraction of the lime products produced by Graymont, and an even smaller fraction of total lime products produced in New Zealand.²⁷

I have considered data showing a breakdown of product sold from Graymont's two kiln sites by broad category. Domestic sales (by tonne) from the kiln sites are dominated by quicklime (just under 95% of output), with hydrated lime accounting for just over 5%.

2.5.4 Competition and Market Shares

As evident above, Graymont produce a range of limestone and lime products. At a high-level, these two products operate in two separate markets. Limestone, as noted, is often sold in bulk and its distribution is therefore influenced by transport efficiencies.²⁸ There are also many limestone quarries spread around New Zealand – some of which are listed above as well as lots of small to medium sized producers, including farm quarries – which means that the limestone market operates largely (but not entirely) at a 'regional' scale, dictated by the

²⁶ Based on Harmonised Import Statistics (10 Digit).

²⁷ Estimated at approximately 1%.

²⁸ Up to 300km from the quarry for bulk transport is a general upper limit for cost efficiency.



location of other competing quarries/suppliers, rather than at a national or sub-national level.²⁹

The only caveat to this market operation is limestone quality (CaCO_3 concentration). Not all quarries produce high-grade limestone such as found in parts of the Waikato-King Country area including at Graymont's quarry, and this means that product (including for animal nutrition, industrial limestone and steel grade limestone) can be transported further where the value proposition makes it worthwhile. I discuss the extent of Graymont's trade catchments for its Waikato operations later in the report.

As the biggest limestone quarry in New Zealand (by output), it is not unexpected that it also has a significant market share of limestone product. However, only limited information is available to quantify market shares.

Graymont advise that their main regional competitors for agricultural limestone are the local quarries of Palmers Resources (Supreme Lime), Omya, Rorisons, and Hatuma Lime (Central Hawke's Bay) and to a lesser extent, Avoca Lime which is Northland-based but sells some product in north-Waikato. However, Omya is only a small producer of products for the agricultural sector (but of a similar high quality) so has a small market share. Output from the Supreme Lime quarry and Rorisons is significantly less than Oparure's. However, it is estimated that Graymont and Supreme have a similar regional market share of the aerial limestone sub-market. Overall, Graymont estimates it has a 50% market of agricultural lime for soil conditioning in the Waikato-King Country region, and an 80% market share nationally for dairy sector nutrition supplements.

In terms of market share for limestone aggregates and construction products in the region, Graymont's main competitor is Palmers Resources (Supreme Lime) and to a small extent, Avoca Lime in the north of the region. Again, based on relative scale, Graymont is the key supplier in the region.

In terms of industrial grade limestone products (in the Waikato), Graymont's main competitors are likely to be Omya and Palmers Resources. Omya dominates the industrial grade limestone products throughout New Zealand. Industrial limestone market share(s) is harder to gauge as some supply arrangements are tied to specific quarries/producers. As discussed later, Graymont is the only supplier of limestone (and quicklime) to New Zealand Steel in Auckland.

In terms of quicklime and hydrated lime, this is relatively simple. Websters are the only other company in New Zealand that produces quicklime and hydrated lime for the market (in

²⁹ In this instance, regional should not be interpreted in terms of regional council boundaries.



addition to Graymont's two Waikato kilns and one South Island kiln). As noted, imports are very minor. Oji Fibre has several kilns at their paper plants, but all output is consumed by the paper plant so they are not on-selling or a direct competitor. Graymont estimate that they have a significant market share for quicklime nationwide, with the Ōtorohanga and Te Kuiti kiln sites linked to Oparure Quarry the major producers. Currently, the Ōtorohanga site is the only kiln that can produce steel grade quicklime. There is also a minor competitor in Nelson – estimated to be producing around 1,000 tonnes/annum of quicklime, although they mainly target the West Coast mining sector and water treatment plants in the top of the South Island.

In summary, Graymont's market share for products sold from their Oparure quarry and related kiln operations is substantial across the board. This market share is directly relevant to considering the counterfactual scenario, should the Project not be approved. This is discussed further in Section 4.



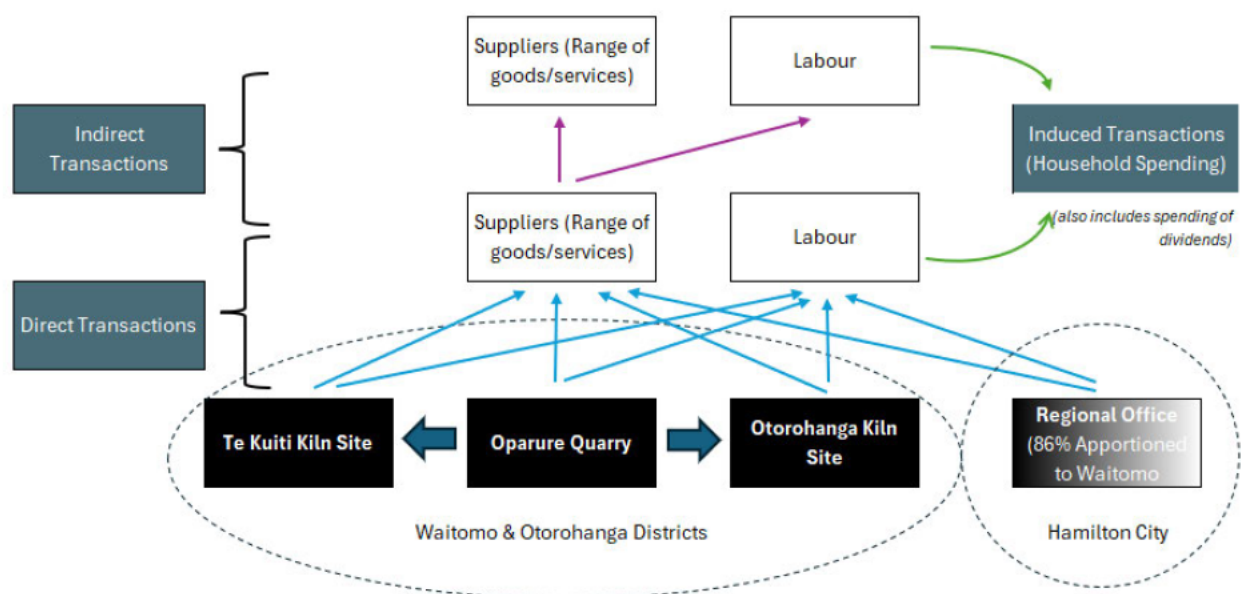
3 The Project's Economic Impacts

The scale and significance of the economic impacts of the Project can be determined by looking at the economic impacts linked to the current operation of the Oparure Quarry. This requires consideration of the two nearby kiln sites that are dependent on limestone from the Oparure Quarry, and to a large extent, the regional office in Hamilton, which only exists in New Zealand because of Graymont's operations in Waikato and (to a lesser extent) the South Island. Those economic impacts arise from upstream (backwards) linkages and downstream (forward) linkages. The granting of consent enables those economic impacts to continue over the long term.

3.1 Upstream/Backward Economic Linkages of Oparure Quarry and Related Facilities

Upstream, or backward, economic linkages refer to the direct expenditure of Graymont as a business entity on its operations in Waitomo and Ōtorohanga districts and Hamilton City and the flow-on effects of that expenditure through the economy.

Figure 3.1 – Upstream Economic Linkages Linked to Oparure Quarry Operation



This arises as suppliers to Graymont increase their inputs to meet Graymont's needs (from their suppliers), and throughout the supply-chain, wages, salaries and dividends attributable to Graymont's activities are paid to households who in turn spend money across a range of



businesses. As discussed earlier, those impacts are not limited to the Oparure Quarry operation, as the two nearby kiln sites are wholly dependent of the Oparure Quarry and cannot be separated because of that dependency. Figure 3.1 illustrates how upstream economic linkages apply in a general sense.

While upstream economic impacts are important benefits of the Project – and are the easiest to quantify in terms of GDP and employment – these impacts are expected to be a minor component of the extent of the total regional and national economic benefits of the Project for reasons explained in Section 3.2.

3.1.1 Waikato Operations Economic Impact Assessment 2025

As part of this economic assessment, I have carried out a comprehensive economic impact assessment of Graymont's North Island operations (focussed on upstream economic linkages). I have been supplied detailed expenditure data from Graymont for each of its operational sites for the year ending December 2025. This included a breakdown of operational spend ('opex') and capital expenditure ('capex') over those 12 months. I have then used a multi-regional Input-Output ('MRI-O') multiplier model³⁰ to measure the direct, indirect and induced contribution to GDP (value added) and employment that is sustained from that expenditure. The multi-regional nature of the model captures the flow of expenditure across and between economic regions for indirect and induced transactions and so results are not constrained to the location of Graymont's operations or suppliers. Further technical detail is provided in Appendix 3.

The results from the MRI-O model are presented for 40 economic 'regions' across New Zealand (comprising a mix of territorial authorities, regions or grouped territorial authorities), and by 109 economic sectors.³¹ The MRI-O has a 2023 base year, and so all expenditure inputs have been deflated to 2023 dollars, and similarly all results remain in 2023 dollars (as per best practice).

The following is focussed on the economic impacts arising from combined operations at the Oparure Quarry and the two nearby kiln sites.³² However, if Graymont had no operations in New Zealand, it is reasonable to assume that the regional office in Hamilton would instead be in Australia, Malaysia or the Philippines. Therefore, the economic impacts of running the regional office in New Zealand can be attributed to Graymont's activities in the Waikato Region and Waitaki District. As activities at (and related to) Oparure Quarry account for 86%

³⁰ This is the ELM sub-contracted from Formative Limited.

³¹ Not all regions or sectors are impacted by Graymont's North Island operations.

³² In the MRI-O, the quarry and kiln sites fall within a composite economic region that comprises South Waikato District, Ōtorohanga District, Waitomo District, Hauraki District and Thames Coromandel District.

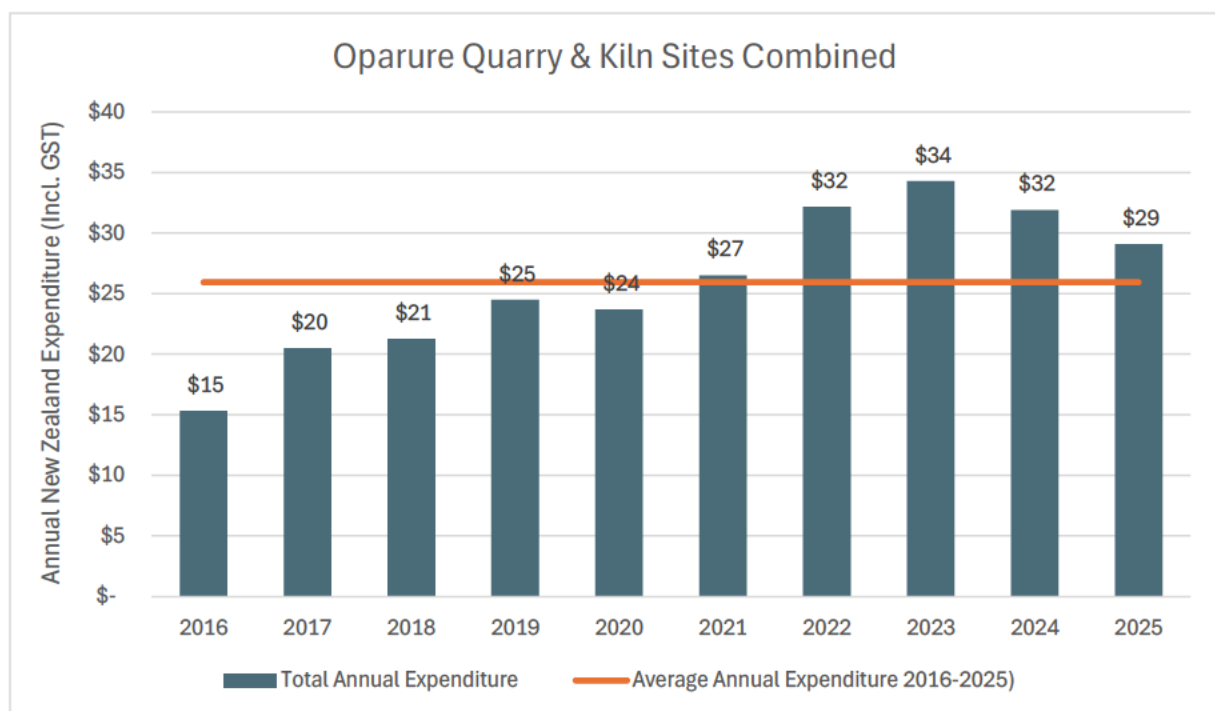


of Graymont's national output (turnover), it is assumed that 86% of the economic impact sustained by the regional office can be apportioned to the Waikato operations. These impacts are included in the results below.

3.1.2 Direct Expenditure Summary 2016-2025

Figure 3.2 provides a summary of Graymont's expenditure linked to the operation of the Oparure Quarry and two kiln sites (combined), excluding expenditure on wages and salaries, imports and tax. This expenditure supports the gross output (turnover) of a broad range of businesses in New Zealand who supply the Waikato sites with goods and services.³³

Figure 3.2 – Graymont Direct Expenditure for Combined Oparure and Related Kiln Operations 2016-2025



Including GST, the Oparure Quarry and two kiln sites directly contributed (spent) \$29 million in the local and wider economy in 2025. It is this expenditure that is used in the economic impact assessment below to calculate indirect and induced impacts.³⁴ On average over the last decade, Graymont has contributed nearly \$26 million per annum, although expenditure was highest in 2023 at \$34 million. Cumulatively over the last decade, the Oparure Quarry and two

³³ These businesses are where Graymont's indirect economic impacts are felt.

³⁴ Direct GDP and direct induced impacts (i.e. spending by Graymont staff) are calculated from turnover and data supplied by Graymont and direct multipliers from the I-O model.



kiln sites have spent a significant \$259 million with goods and service suppliers in New Zealand. Annual expenditure associated with the operation of the regional office is additional.

3.1.3 Direct Employment 2025

Table 3.1 contains current Graymont direct employment data for the Waikato sites and Hamilton office. Excluding contractors, the Oparure Quarry currently has a staff count of 15. The Ōtorohanga kiln site has the highest employment of all the operational sites at 24 staff. The Te Kuiti kiln site operates with 4 permanent staff (although technical staff at the larger Ōtorohanga kiln site also service the Te Kuiti site). In total, there are currently 43 staff directly employment by Graymont at the Quarry and kiln sites in the Waikato. The regional office in Hamilton had 15 staff at the time that the data was supplied. As footnoted in the table, I was advised that there were 3 vacancies in the regional office expected to be filled which would bring the total staff to 18.

Table 3.1 – Current Graymont Direct Employment (Excluding South Island Operations)

Department	Oparure Quarry	Otorohanga Kiln Site	Te Kuiti Kiln Site	Total Waitomo/ Otorohanga District Operations	Hamilton Regional Office *
Health & Safety, Environmental Management	-	-	-	-	2
Human Resources	-	-	-	-	1
Maintenance Mechanic	3	4	-	7	-
Operations (Salaried)	3	3	-	6	1
Production Operator	9	13	4	26	-
Quality Lab Technician	-	2	-	2	-
Sales and Marketing	-	1	-	1	8
Technical Services	-	1	-	1	3
Total Graymont NZ Employment	15	24	4	43	15

Source: Graymont (NZ) Limited. Excludes contractors working on site.

* At the time data was supplied, the regional office was down one sales person and two HSE staff. Addressing these vacancies would bring the total to 18 staff.

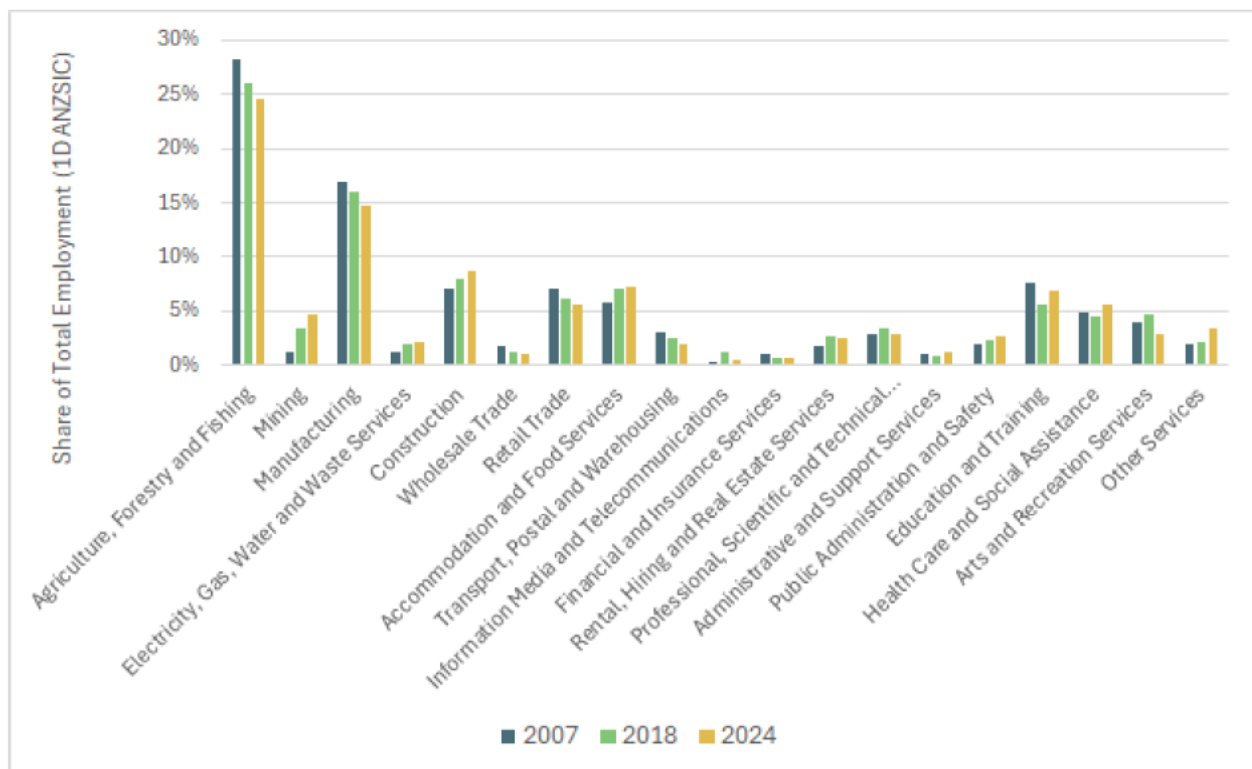
While the employment counts at the Quarry and related kiln sites are not substantial, they are still important in the context of Waitomo District and Ōtorohanga District, particularly as they are stable, skilled jobs with above average wages and salaries. Figure 3.3 shows a snapshot of employment by 1 Digit ANZSIC in 2007, 2018, 2024 for Waitomo District (with 2024 being the most recent year available in the StatisticsNZ Business Demography data).

Figure 3.3 shows that the Waitomo District is strongly focussed on agriculture and forestry employment, which accounts for around 25% of the total employment in 2024. This is followed by manufacturing at just under 15% of total employment. Structurally, the Waitomo economy has not materially changed over time although it is notable that mining (which includes quarrying) has increased from 1% of Waitomo's total employment in 2007 to 5% in 2024



meaning it has an increasingly important role, albeit still minor in the context of total employment. The equivalent analysis for Ōtorohanga also showed an economy dominated by agriculture and forestry, although with manufacturing relatively less important compared to Waitomo and equally as important as several other industries in the district.

Figure 3.3 – Comparison of Total Employment Structure in Waitomo District 2007, 2018 and 2024



In carrying out this analysis, it is evident that total employment in Waitomo District has decreased by a net 280 jobs or 5% between 2018 and 2024. Those job losses are spread across ten of the 1-Digit ANZSIC industries with the three largest reductions in agriculture (146 less jobs), manufacturing (110 less jobs), and arts and recreation (101 less jobs). Partially countering this, job increases have been spread over nine of the 1-Digit ANZSIC industries with the three largest increases in other personal and household services (63 more jobs), mining (which includes quarrying) (60 more jobs) and education and training (53 more jobs).

A similar picture was evident in Ōtorohanga District with employment reducing by 2% (-97 jobs) between 2018 and 2024 (with manufacturing being the second largest industry to decrease).

A district experiencing overall employment decline such as Waitomo District or Ōtorohanga District makes it all the more important to retain businesses like Graymont that directly provide high-value employment in the mining/quarrying and manufacturing industries (and support



further employment through their upstream (and downstream) supply chains as discussed below).

At present, the workforce for the Oparure Quarry and two kiln sites is comprised of 46% Ōtorohanga residents (20 workers), 24% Te Kuiti residents (10 workers) and 29% residents (13 workers) in surrounding rural areas (i.e., commutes greater than 50km) who will, depending on their home address, likely rely on one of these two towns for their day to day household needs. Wages and salaries paid to workers across the three sites are therefore expected to strongly benefit businesses in Ōtorohanga and Te Kuiti (i.e. direct induced impacts).

In addition to providing meaningful and above average paid work to 43 residents in the wider Ōtorohanga-Te Kuiti community, Graymont exercises its corporate responsibility by supporting community events and initiatives (including through donations and sponsorship) each year across the two towns. Enabling the Oparure Quarry to sustain operations over the long term ensures that these established social benefits continue.

3.1.4 Contribution by Sector

This section describes the gross direct, indirect and induced (i.e. flow-on) economic impacts of Graymont's 2025 operations, showing a breakdown by sector across total New Zealand.

Table 3.2 shows the results, as modelled, for the combined operations of Oparure Quarry and the two kiln sites. These operations directly contribute \$₂₀₂₃15 million to GDP and 43 FTEs. Once indirect and induced impacts are included, the quarry and kiln sites contribute an estimated \$₂₀₂₃43 million to GDP and 225 FTE jobs over the course of the year. As discussed further below, these gross impacts should be considered indicative and an upper limit.

Table 3.2 lists the top 15 sectors (in GDP terms) impacted (directly, indirectly and/or through induced spending) by the operation of the Oparure Quarry and two kiln sites. The sector most impacted is the metal ore and non-metallic mineral mining and quarrying sector with 23% of the total GDP impact and 8% of the total employment impact. This is followed by the non-metallic mineral product manufacturing sector (18% GDP and 13% of total employment). Other key sectors experiencing an increase in demand as a result of the quarry and kiln site operations include (but are not limited to) machinery and equipment wholesaling, electricity supply and distribution, road transport, scientific and engineering services and repair and maintenance services.

Other sectors not ranked in the top 15 collectively account for 26% of the total GDP impact and 49% of the total employment impact which shows that once flow on impacts are accounted for, the impact of the upstream linkages of the operations is widespread across the sectors of the economy.



Table 3.2 – 2025 Modelled GDP and Employment Impacts of the Oparure Quarry and Two Kiln Sites by Sector

IO Model Sectors (109)	GDP (2023 \$ Million)				Employment (FTEs)			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Metal ore and non-metallic mineral mining and quarrying	\$ 8	\$ 2	\$ 0	\$ 10	15	4	0	19
Non-metallic mineral product manufacturing	\$ 8	\$ 0	\$ 0	\$ 8	28	0	0	28
Owner-occupied property operation	\$ -	\$ -	\$ 2	\$ 2	0	-	-	-
Machinery and equipment wholesaling	\$ -	\$ 2	\$ 0	\$ 2	0	11	1	12
Electricity generation and on-selling	\$ -	\$ 1	\$ 0	\$ 2	0	4	0	4
Road transport	\$ -	\$ 1	\$ 0	\$ 1	0	8	1	9
Electricity transmission and distribution	\$ -	\$ 1	\$ 0	\$ 1	0	1	0	1
Scientific, architectural, and engineering services	\$ -	\$ 1	\$ 0	\$ 1	0	10	1	11
Gas and water supply	\$ -	\$ 1	\$ 0	\$ 1	0	3	0	3
Repair and maintenance	\$ -	\$ 1	\$ 0	\$ 1	0	10	1	11
Banking and financing; financial asset investing	\$ -	\$ 0	\$ 0	\$ 1	0	1	1	2
Petroleum and coal product manufacturing	\$ -	\$ 1	\$ 0	\$ 1	0	0	0	0
Advertising, market research, and management services	\$ -	\$ 0	\$ 0	\$ 1	0	5	2	6
Fuel retailing	\$ -	\$ 1	\$ 0	\$ 1	0	6	1	6
Non-residential property operation	\$ -	\$ 0	\$ 0	\$ 1	0	1	0	1
Other Sectors	\$ -	\$ 6	\$ 5	\$ 11	0	51	58	109
Total New Zealand	\$ 15	\$ 19	\$ 9	\$ 43	43	115	67	225

Source: Graymont (NZ) Ltd, Savvy Consulting. Model run using the Formative ELM.

Table 3.3 shows the results, as modelled, for the operation of Graymont's regional office in Hamilton. While the operation of the office will directly contribute to GDP this will be relatively minor and to be conservative, I have not included any direct GDP for the office on account that it does not generate any revenue (gross output) in and of itself (as sales have been attributed to the quarry and kiln sites). As discussed above, the regional office has direct employment of 15 FTEs (and likely increasing to 18 once vacancies are filled). Once indirect and induced impacts are included, the regional office contributes up to an estimated \$₂₀₂₃3.6 million to GDP and 44 FTE jobs over the course of the year.

Table 3.3 – 2025 GDP and Employment Impacts of the Regional Office by Sector

IO Model Sectors (109)	GDP (2023 \$ Million)				Employment (FTEs)			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Owner-occupied property operation	\$ -	\$ -	\$ 0.4	\$ 0.4	0	0	0	0
Advertising, market research, and management services	\$ -	\$ 0.2	\$ 0.0	\$ 0.2	0	3	0	3
Banking and financing; financial asset investing	\$ -	\$ 0.1	\$ 0.1	\$ 0.2	0	0	0	1
Scientific, architectural, and engineering services	\$ -	\$ 0.2	\$ 0.0	\$ 0.2	0	1	0	2
Fuel retailing	\$ -	\$ 0.2	\$ 0.0	\$ 0.2	0	2	0	2
Non-residential property operation	\$ -	\$ 0.1	\$ 0.0	\$ 0.2	0	0	0	0
Legal and accounting services	\$ -	\$ 0.1	\$ 0.0	\$ 0.2	0	1	0	1
Health and general insurance	\$ -	\$ 0.1	\$ 0.0	\$ 0.2	0	0	0	0
Auxiliary finance and insurance services	\$ -	\$ 0.0	\$ 0.0	\$ 0.1	0	0	0	0
Furniture, electrical, and hardware retailing	\$ -	\$ 0.0	\$ 0.0	\$ 0.1	0	1	1	1
Air and space transport	\$ -	\$ 0.1	\$ 0.0	\$ 0.1	0	1	0	1
Residential property operation	\$ -	\$ 0.0	\$ 0.1	\$ 0.1	0	0	0	0
Food and beverage services	\$ -	\$ 0.0	\$ 0.1	\$ 0.1	0	1	2	3
Residential care services and social assistance	\$ -	\$ 0.0	\$ 0.1	\$ 0.1	0	0	1	1
Electricity transmission and distribution	\$ -	\$ 0.0	\$ 0.0	\$ 0.1	0	0	0	0
Other Sectors	\$ -	\$ 0	\$ 1	\$ 1	15	4	9	28
Total New Zealand	\$ -	\$ 1.7	\$ 1.9	\$ 3.6	15	15	14	44

Source: Graymont (NZ) Ltd, Savvy Consulting. Model run using the Formative ELM.



Table 3.3 lists the top 15 sectors (in GDP terms) impacted (directly, indirectly and/or through induced spending) by the operation of the regional office. The sector most impacted is the owner-occupied property operation sector with 12% of the total GDP impact. This is followed by the advertising, market research and management services sector (7% GDP and 7% of total employment). Other key sectors experiencing an increase in demand as a result of the regional office operation are relatively typical of most commercial office businesses (i.e. banking, professional services, fuel retailing, legal and accounting services, insurance etc).

Other sectors not ranked in the top 15 collectively account for 36% of the total GDP impact and 64% of the total employment impact which shows that once flow on impacts are accounted for, the impact of the upstream linkages of the regional office operation is widespread across the sectors of the economy.

Apportioning 86% of the regional office's total economic contribution to the presence of the quarry and kiln site operations in Waikato, this equates to an indicative \$3.1 million in total GDP and 38 total FTEs. Combined with total GDP and employment contributed by the quarry/kiln sites, Graymont therefore contributed up to an estimated \$₂₀₂₃46.5 million in GDP and 262 FTEs to the economy in that year – all linked to ability to extract limestone at the Oparure Quarry.

3.1.5 Contribution by Economic Region

Table 3.4 shows the same economic impact results but broken down by economic region in the MRI-O model. It lists the top ten regions (in GDP terms) impacted (directly, indirectly and/or through induced spending) by the operation of the Oparure Quarry and two kiln sites. The region most impacted is the region where the sites are located (Waitomo District and Ōtorohanga District, although these are also grouped with South Waikato District, Hauraki District and Thames Coromandel District in the model). An estimated \$₂₀₂₃21.4 million in total GDP (49%) and total FTEs of 82 (37%) accrued to this local area in the last calendar year.

This is followed by the Auckland Region (15% of total GDP and 19% of total employment). Other key regions experiencing an increase in demand as a result of the quarry and kiln site operations include (but are not limited to) Hamilton City (12% of total GDP and 18% of total employment), Taranaki Region, Wellington City and Waikato District.

Other regions not ranked in the top ten collectively account for 9% of the total GDP impact and 12% of the total employment impact which shows that once flow on impacts are accounted for, the impact of the upstream linkages of the operations is widespread across the economy but largely concentrated in the central and upper North Island.



Table 3.4 – 2025 Modelled GDP and Employment Impacts of the Oparure Quarry and Two Kiln Sites by Economic Region

IO Model District/Region	GDP (2023\$ Million)				Employment (FTEs)			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
South Waikato District, Otorohanga District, Waitomo District, Hauraki District, Thames Coromandel District	\$ 15.3	\$ 5.2	\$ 0.9	\$ 21.4	43	31	8	82
Auckland Region	\$ -	\$ 4.0	\$ 2.7	\$ 6.7	0	23	20	43
Hamilton City	\$ -	\$ 4.5	\$ 0.6	\$ 5.1	0	36	5	40
Taranaki Region	\$ -	\$ 1.3	\$ 0.2	\$ 1.5	0	3	1	5
Wellington City	\$ -	\$ 0.5	\$ 0.6	\$ 1.1	0	3	3	6
Waikato District	\$ -	\$ 0.9	\$ 0.1	\$ 1.0	0	3	1	4
Tauranga City	\$ -	\$ 0.4	\$ 0.5	\$ 0.9	0	3	3	6
Christchurch City	\$ -	\$ 0.2	\$ 0.4	\$ 0.7	0	2	3	5
Matamata-Piako District	\$ -	\$ 0.1	\$ 0.4	\$ 0.4	0	0	3	3
Hawkes Bay Region	\$ -	\$ 0.2	\$ 0.3	\$ 0.4	0	1	2	3
Other New Zealand	\$ -	\$ 2	\$ 2	\$ 4	-	10	17	27
Total New Zealand	\$ 15	\$ 19	\$ 9	\$ 43	43	115	67	225

Source: Graymont (NZ) Ltd, Savvy Consulting. Model run using the Formative ELM.

Table 3.5 lists the top ten regions (in GDP terms) impacted (directly, indirectly and/or through induced spending) by the operation of the regional office. The region most impacted is Auckland with 34% of the total GDP impact and 21% of the total employment impact. This is followed by Hamilton City (the local economy for the office) with 31% of total GDP and 58% of total employment). Other key regions experiencing an increase in demand as a result of the regional office operation include (but are not limited to) Waitomo and Ōtorohanga districts, Wellington City, Tauranga City, Christchurch City and Hawke's Bay Region.

Table 3.5 – 2025 Modelled GDP and Employment Impacts of the Regional Office by Economic Region

IO Model District/Region	GDP (2023\$ Million)				Employment (FTEs)			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Auckland Region	\$ -	\$ 0.7	\$ 0.6	\$ 1.2	0	5	4	9
Hamilton City	\$ -	\$ 0.7	\$ 0.4	\$ 1.1	15	7	4	25
South Waikato District, Otorohanga District, Waitomo District, Hauraki District, Thames	\$ -	\$ 0.1	\$ 0.0	\$ 0.2	0	2	0	2
Wellington City	\$ -	\$ 0.0	\$ 0.1	\$ 0.2	0	0	1	1
Tauranga City	\$ -	\$ 0.0	\$ 0.1	\$ 0.1	0	0	1	1
Christchurch City	\$ -	\$ 0.0	\$ 0.1	\$ 0.1	0	0	1	1
Hawkes Bay Region	\$ -	\$ 0.0	\$ 0.1	\$ 0.1	0	0	0	0
Taranaki Region	\$ -	\$ 0.0	\$ 0.0	\$ 0.05	0	0	0	0
Palmerston North City	\$ -	\$ 0.0	\$ 0.0	\$ 0.04	0	0	0	0
Manawatu-Wanganui Region Excl. Palmerston North City	\$ -	\$ 0.0	\$ 0.0	\$ 0.04	0	0	0	0
Other New Zealand	\$ -	\$ 0.1	\$ 0.4	\$ 0.5	-	1	3	3
Total New Zealand	\$ -	\$ 1.7	\$ 1.9	\$ 3.6	15	15	14	44

Source: Graymont (NZ) Ltd, Savvy Consulting. Model run using the Formative ELM.



Other regions not ranked in the top ten collectively account for 13% of the total GDP impact and 8% of the total employment impact which shows that once flow on impacts are accounted for, the impact of the upstream linkages of the regional office operation is widespread across the economy but largely concentrated in Hamilton and the other major cities.

3.1.6 Overall Findings on Upstream/Backward Economic Benefits

Based on an analysis of 2025 expenditure and financial data, Graymont's upstream supply chains linked to activities at the Oparure Quarry and the two nearby kiln sites (and a proportionate share of the upstream supply chain for the regional office) are estimated to have contributed:

- Up to \$₂₀₂₃46.5 million in total value added (GDP), and
- sustained up to 262 FTE jobs.

These gross economic impacts occur largely in the Waitomo and Ōtorohanga districts and in Hamilton City, although are spread across the central and upper North Island and major cities. They are also spread across a diverse range of economic sectors once direct, indirect and induced transactions are accounted for.

Enabling the Oparure Quarry to extend its operations as proposed by way of a new south-western pit will ensure that these economic contributions are sustained over the long term. To understand the present value of those long term indicative GDP impacts, I have applied an 8% discount rate to an estimated 53 year economic lifespan of the proposed South-Western Pit. Table 3.6 shows that the indicative total GDP contribution of the Graymont operations linked to the Oparure Quarry have a net present value of \$₂₀₂₃571 million if current modelled impacts (expenditure and prices) hold constant over a 53 year period.



Table 3.6 – Summary of Modelled Economic Impacts, with Long Term Net Present Value

	Annual GDP Contribution (\$ ₂₀₂₃ million)	Cumulative 53 years (\$ ₂₀₂₃ million)	Net Present Value (\$ ₂₀₂₃ million)
Quarry/Kiln Operational Impact			
Direct	\$ 15.3	\$ 813	\$ 188
Indirect	\$ 19.0	\$ 1,005	\$ 233
Induced	\$ 9.1	\$ 483	\$ 112
Total	\$ 43.4	\$ 2,301	\$ 533
Regional Office Impact (Proportional Share)			
Direct	\$ -	\$ -	\$ -
Indirect	\$ 1.5	\$ 77	\$ 18
Induced	\$ 1.6	\$ 85	\$ 20
Total	\$ 3.1	\$ 162	\$ 38
Combined Waikato Region Operations Impact			
Direct	\$ 15.3	\$ 813	\$ 188
Indirect	\$ 20.4	\$ 1,082	\$ 251
Induced	\$ 10.7	\$ 569	\$ 132
Total	\$ 46.5	\$ 2,463	\$ 571

Source: Graymont (NZ) Ltd, Savvy Consulting. Model run using the Formative ELM.

Conversely, if the Quarry is forced to close, once the existing pit reaches the end of its economic life, the upstream annual economic impacts discussed in this section are indicative of how the economy would contract following the closure of the Quarry and (most likely) two kiln sites and regional office. In this scenario, \$₂₀₂₃571 million represents the net present value of the long term opportunity cost.

3.1.7 Caveats and Limitations of Multiplier Model Results

While the above sections show the gross economic impact results as modelled, care is needed with interpreting the results as there are several inherent limitations of using multipliers in an Input-Output ("I-O") based framework. In short, I-O based multipliers tend to overstate economic impacts, and so they should be considered as an indicative upper limit, subject to a range of assumptions. The following table provides a brief discussion of those assumptions and their implications in the context of Graymont's operations.

Limitation/Caveat	Implications
The historical and fixed nature of multipliers which are typically calculated from input-output tables from surveys undertaken	In this case, the MRI-O has a 2023 base year, which is sufficiently close to the 2025 financial data supplied by Graymont. The structure of the 2023 economy is therefore likely to be very similar to the 2025 economy



several years earlier. Therefore, they may not accurately reflect the relationships between sectors in the current economy.	and this limitation is likely to have only a very minor effect on the robustness of the results.
I-O modelling assumes no supply constraints (goods, services and labour) to meet new demand. This often raises concerns that increased demand can only be achieved (except where there is high unemployment or labour is sitting idle) by displacing economic effort/activity elsewhere. If displacement occurs, the implication is that the modelled impacts are not net additional economic growth.	This limitation is most relevant for new (growth) activities, whether they already exist in an economy or are entirely new economic activities in a particular region. New activities place additional (and sometimes novel) demands on supply sectors that may already be operating at full capacity. In reality, there are often constraints to growth at the business level. Shortages or competition for resources and labour can drive up costs. When this happens, the model's estimates of value added and employment impacts should be seen as an upper-bound rather than a guaranteed outcome. That said, this limitation is not considered applicable in this case, as Graymont's operations in the Waikato Region are existing. This means that supply chain arrangements are already in place and form part of the existing economy from which the multipliers are generated.
Multipliers are fixed ratios (linear relationships between the production and inputs) and do not account for elasticities, price changes or economies of scale.	Again, this limitation is most relevant for estimating the economic impacts of new activity. For example, if a business has increased demand for its services, multiplier analysis assumes that labour (and other) inputs must increase to meet that demand – indicating that employment impacts represent the equivalent of “new” jobs. Businesses can respond to increased demand in a range of ways, meaning that in some cases, they can accommodate an increase in output using existing staff (for example) rather than employing new staff. This limitation is particularly relevant for indirect and induced impacts. In the context of the existing Graymont operational impacts, their expenditure on wages and salaries (direct) and procurement of goods and services (indirect spending) is already contributing to the existing GDP and employment quantified in particular sectors and



	locations, but it is not possible to know if its contribution is proportional to its share of generated gross output or not. With no evidence to the contrary, I assume that the linear relationships implicit in the multipliers are applicable to Graymont's economic contribution. As such, this limitation is likely to have only a very minor effect on the robustness of the results for the 2025 operational year. When projecting those annual impacts over the long term, price changes may be expected to influence economic impacts over time. If prices (and labour costs) were higher in the future than embedded in the current multipliers, the multiplier effect on economic activity would be lower than modelled as less of each dollar spent translates into real increases in output. This is a relevant consideration, and applying a discount rate to future impacts can help account for this limitation.
Multipliers are an average across each economic region in the model and may not reflect the productivity of actual businesses engaged by Graymont, or Graymont itself.	This is a relevant limitation of the modelling carried out for Graymont's existing operations and is the key source of any overstatement. There are two components that apply: a) It is possible that the specific businesses that form Graymont's upstream supply chain do not share the same GDP and employment productivities as the average for the economic sector they have been coded to. They may require more or less inputs to production, or pay higher or lower wages, both of which would mean they have higher or lower multipliers than the average. It is not practicable to quantify the effect of this limitation on the modelled impact results. 'Overs' and 'unders' may or may not cancel each other out. b) In addition, the direct GDP multiplier for the Oparure Quarry operations adopts the 'metal ore and non-metallic mineral mining and quarrying' multipliers for the combined 'South Waikato District, Ōtorohanga District, Waitomo



	District, Hauraki District, Thames Coromandel District' economic region. OceanaGold's gold mine at Waihi falls within Hauraki District and the high level of operating surplus (i.e. profit associated with export gold prices) for that operation will be increasing the direct GDP multiplier for the sector overall such that it is likely too high for a limestone quarry in the same economic region.³⁵ To account for the influence of the Waihi gold mine in the direct GDP multiplier, I have tested (arbitrarily) halving that direct multiplier.³⁶ The weighted effect of this adjustment is that the total direct GDP contribution from both the quarry and the kiln sites is potentially overstated by 25% and may be closer to \$₂₀₂₃11.56 million compared with the \$₂₀₂₃15.33 million modelled.³⁷ All else being equal, total direct, indirect and induced gross impacts would be 8% lower at \$₂₀₂₃42.7 million due to this specific limitation and assumed adjustment factor.
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Overall, the known limitations of multiplier analysis – some, but not all of which are relevant to the modelling of Graymont's existing contribution to the economy – are a reminder that modelled results are gross impacts and should be treated as indicative rather than absolute. While the sectors and economic regions impacted are robust and based on actual expenditure patterns and known inter-sectoral relationships, the quantum of GDP and employment sustained throughout Graymont's upstream supply chain is a theoretical upper limit and may be somewhat lower in practice.

Are Economic Impacts Economic Benefits?

³⁵ Direct GDP for the kiln sites is based on the non-metallic mineral product manufacturing sector in that same region (applied to total kiln site gross output). While this may be the average of a range of manufacturing businesses that fall within that sector, I consider it more likely than not to be sufficiently representative of the lime manufacturing businesses operated by Graymont. No adjustments are therefore made.

³⁶ This also puts the adjusted multiplier well below the national average multiplier for that sector and is therefore assumed to a conservative scenario.

³⁷ Other adjustments (than 50%) would have a higher or lower impact on the adjusted direct GDP result.



The indicative gross economic impacts quantified above cannot be wholly equated with enhancement of economic wellbeing and therefore economic benefits. However, it is considered that a substantial portion of those upstream impacts will:

- support local businesses that contribute to the vitality and vibrancy of local communities;
- generate tax income for the government;
- include direct investment in local communities through sponsorship and donations;
- provide meaningful, well-paid employment;³⁸ and
- provide incomes for households that support their standard of living.

As such, economic impact modelling is, in my view, a useful indicator of the likely scale of economic benefits. Except for government earnings through taxes, these economic wellbeing benefits will be felt ‘on the ground’ in the same geographic extent as the Graymont’s upstream supply chains.

3.2 Downstream/Forward Economic Linkages of Oparure Quarry

Downstream, or forward, economic linkages refer to the sales made by Graymont’s Waikato operations to customers, for whom limestone or lime products are an input to their own production. It requires a Graymont-centric perspective – looking at how its products play a role in further economic activity.³⁹

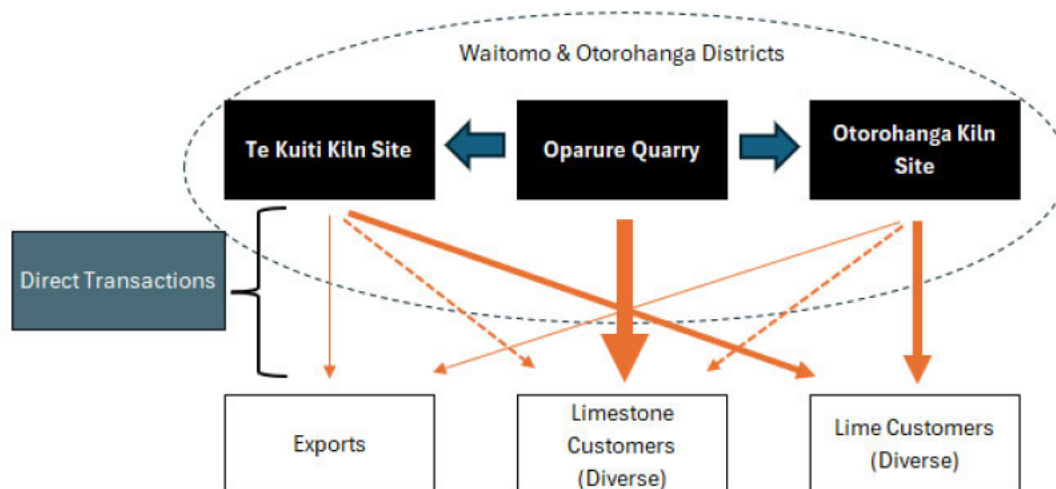
This section examines the scale and extent of Oparure’s downstream economic role. While the two kiln sites are technically ‘downstream’ of the Oparure Quarry (as they rely on limestone delivered from the Quarry), the operations are vertically integrated and so I consider the kiln sites’ customers the same as the Quarry’s customers as those customers are indirectly dependent on the ongoing operation of the Quarry. Figure 3.4 illustrates how downstream economic linkages apply in a general sense.

³⁸ While in a pure economic sense (and particularly in a CBA framework) employment is treated as a cost to people’s time and freedom, I consider that so long as employment is well paid and supported with best practice employment practices, including training and health and safety, then employment should be treated as an economic (and social) benefit.

³⁹ For those downstream customers, Graymont would one of many of their upstream direct supply chain providers.



Figure 3.4 – Downstream Economic Linkages Linked to Oparure Quarry Operation



While upstream economic impacts discussed in the previous section are important benefits of the Project (and significant in the local context) – and are the easiest to quantify in terms of indicative gross GDP and employment impact terms – it is these downstream economic linkages where the substantive economic benefits of the Oparure Quarry are felt in my view. However, they are not easy to quantify.

As shown in Tables 2.1 and 2.2 (products and uses of limestone and lime) – the range of ways in which limestone and lime contributes to industry and economic wellbeing are vast, and by producing a full array of both limestone and lime products, Graymont potentially interacts with nearly all of those potential uses (except where distance and competition precludes a supply opportunity).

To get a sense of the diversity of Oparure Quarry’s immediate downstream economic linkages, it is useful to consider the sorts of customers purchasing Oparure limestone products. The following has been summarised from examination of Graymont’s sales-by-customer data for the YE April 2018 (and remains representative for 2025):

- Agricultural limestone is sold directly to a broad range of farming and horticultural customers, although large shares are sent to transport/fertiliser companies (including on consignment) where they are further distributed.
- Graymont’s animal nutrition products are sold to animal nutrition manufacturers and wholesalers or direct to farmers.
- Its architectural and landscaping limestone products are sold to concrete customers, stonemasons, landscape companies, drainage companies, and landscape supply outlets.



- Construction limestone products are sold to asphalt companies, large/national construction companies (North Island branches), drainage companies, roading companies and plaster companies.
- Kiln or steel grade limestone products are sold to New Zealand Steel (or used at the two kiln sites).
- Roding limestone products are sold to drainage and roading/rural carrier companies or often sold to transport companies (including on consignment)

I have analysed sales data (measured in tonnes of output) from the Oparure Quarry by customer type (as opposed to product type discussed above and earlier in the report). This data is based on the 2025 calendar year.

Figure 3.5 shows the customer type distribution (to scale) for all limestone sold by Graymont (across the three sites but primarily from the Oparure Quarry), excluding limestone “sold” internally between the quarry and kiln sites (i.e. Figure 3.5 captures only external customer sales patterns).

Figure 3.5 – Limestone Product Output (Tonnes) by Customer Type 2025 Calendar Year (Excluding Internal Sales)

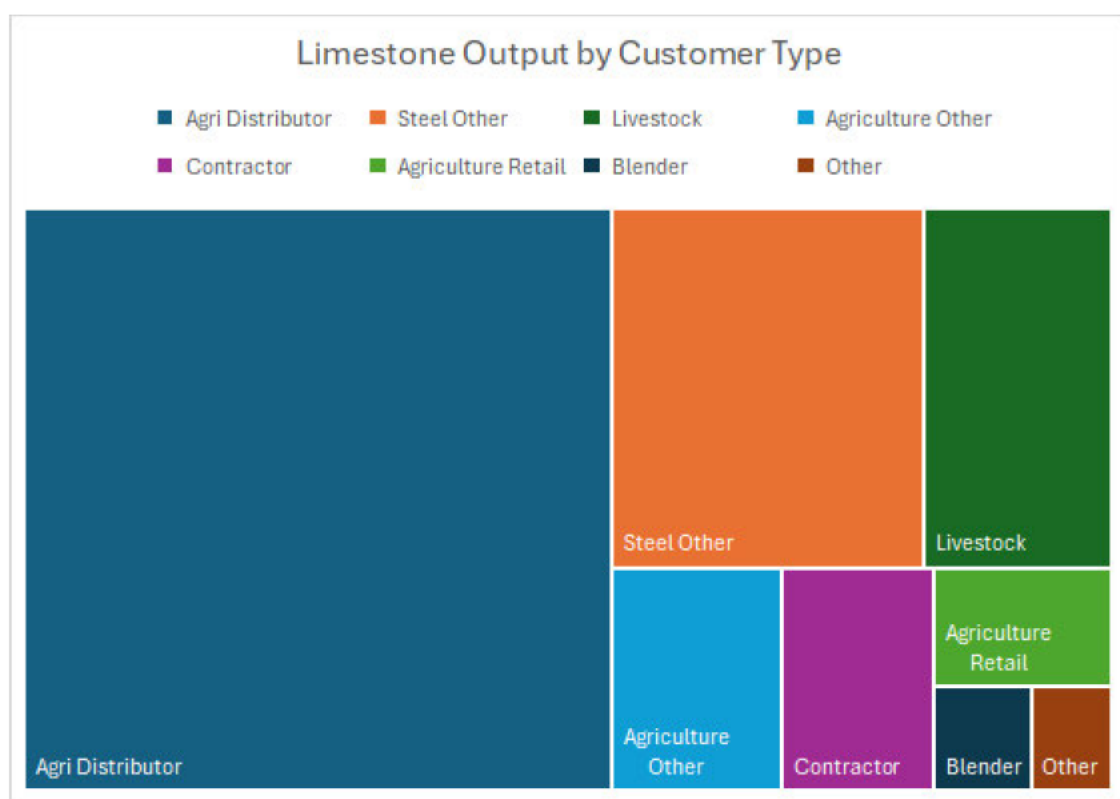




Figure 3.5 shows that customers most reliant on limestone sourced from Oparure Quarry (in terms of tonnes) are agricultural distributor businesses, followed by New Zealand Steel, livestock feed businesses, other agricultural businesses, roading and construction contractors and then agricultural product retailers. In Figure 3.5, “Other” includes Other Construction businesses, crop production businesses, Oceana Gold (Waihi Gold Mine), glass manufacturing businesses, construction product distributors, construction product retailers and asphalt producers.

The geographic extent of Oparure’s limestone customers described above ranges from Gisborne District in the east, Whangarei District in the north, South Taranaki District in the west and Lower Hutt City in the south, along with Dunedin City and Christchurch City in the South Island.

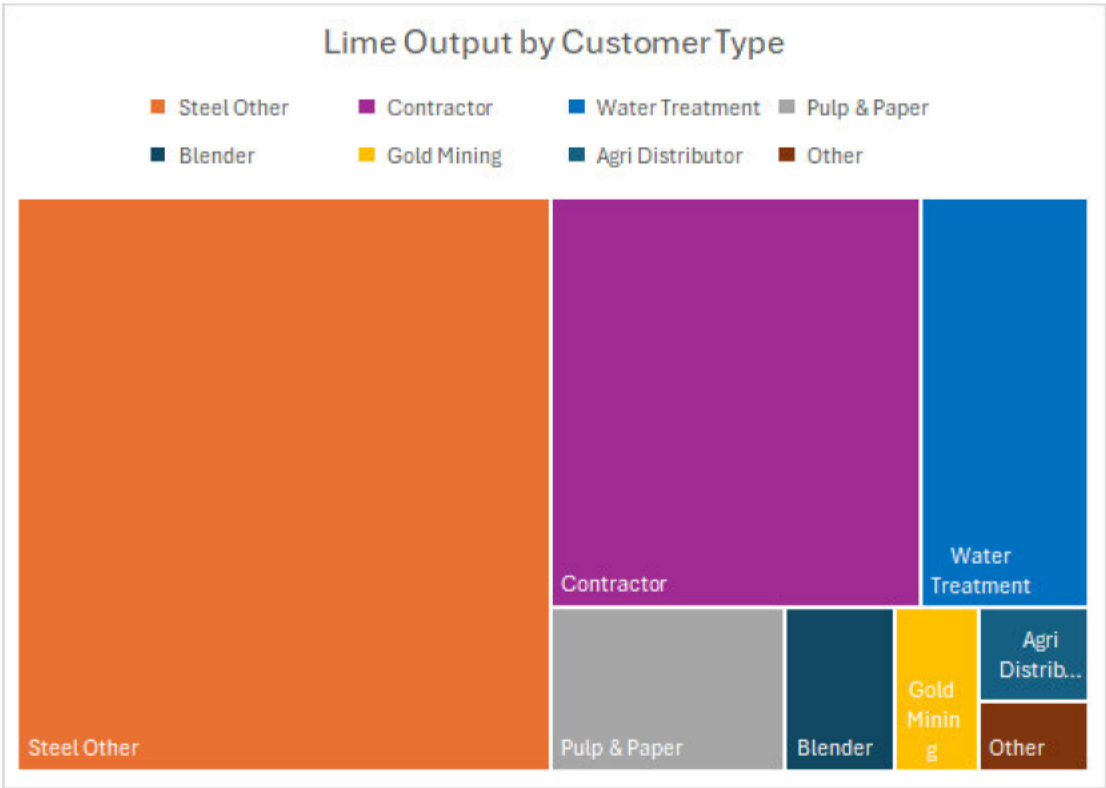
The following provides an equivalent description of the diversity of downstream economic linkages from the kiln sites in terms of lime products sold in 2025:

- Construction product customers include major (national) construction companies (branches throughout the North Island),
- Hydrated lime customers include Oceana Gold (Waihi Gold Mine), Watercare Services (multiple locations), dairy product processors, New Zealand Steel, and tanneries.
- Quicklime customers include major civil engineering/roading companies (branches within the North Island), New Zealand Steel, Oji Fibre (Kinleith and Tasman Mills), Oceana Gold (Waihi Gold Mine), local councils and Watercare in Auckland.
- The roading product produced at the kilns (where not quicklime) is a kiln dust product, sold to large roading/civil companies.

Figure 3.6 shows the customer type distribution (to scale) for all lime sold (from the two kiln sites). It shows that customers most reliant on lime originally sourced from Oparure Quarry (in terms of tonnes) are New Zealand Steel, followed by roading and construction contractors, water treatment plants, Oji Fibre, customers that blend lime into other products (such as Holcim cement company), Oceana Gold (Waihi Gold Mine – see case study below) and agricultural product distributors. In Figure 3.6 “Other” includes business that manufacture formulated products, agricultural retail businesses, construction product retailers, livestock nutrition manufactures, other construction businesses, wastewater treatment plants, other utility providers, and chemical distributors.



Figure 3.6 – Quicklime and Hydrated Lime Product Output (Tonnes) by Customer Type 2025 Calendar Year



The geographic extent of Oparure’s quicklime and hydrated lime customers described above ranges from Gisborne District in the east, Far North District in the north, New Plymouth District in the west and Wellington City in the south, along with Christchurch City in the South Island.



Case Study: Waihi Gold Mine

Image source: <https://oceanagold.com/operations/waihi>



Gold was first discovered at the Waihi Martha hill site in 1878. Modern mining techniques began in 1988 and after Oceana Gold purchased the mine in 2015, it has been transitioned from a mature open-pit site to an underground operation known as Martha Mine.

The site has substantial well developed growth plans. While currently mining the Martha Underground, they are advancing towards the nearby Waihi North Project (recently consented under the FTAA) which includes the high-grade Wharekirauponga Underground.

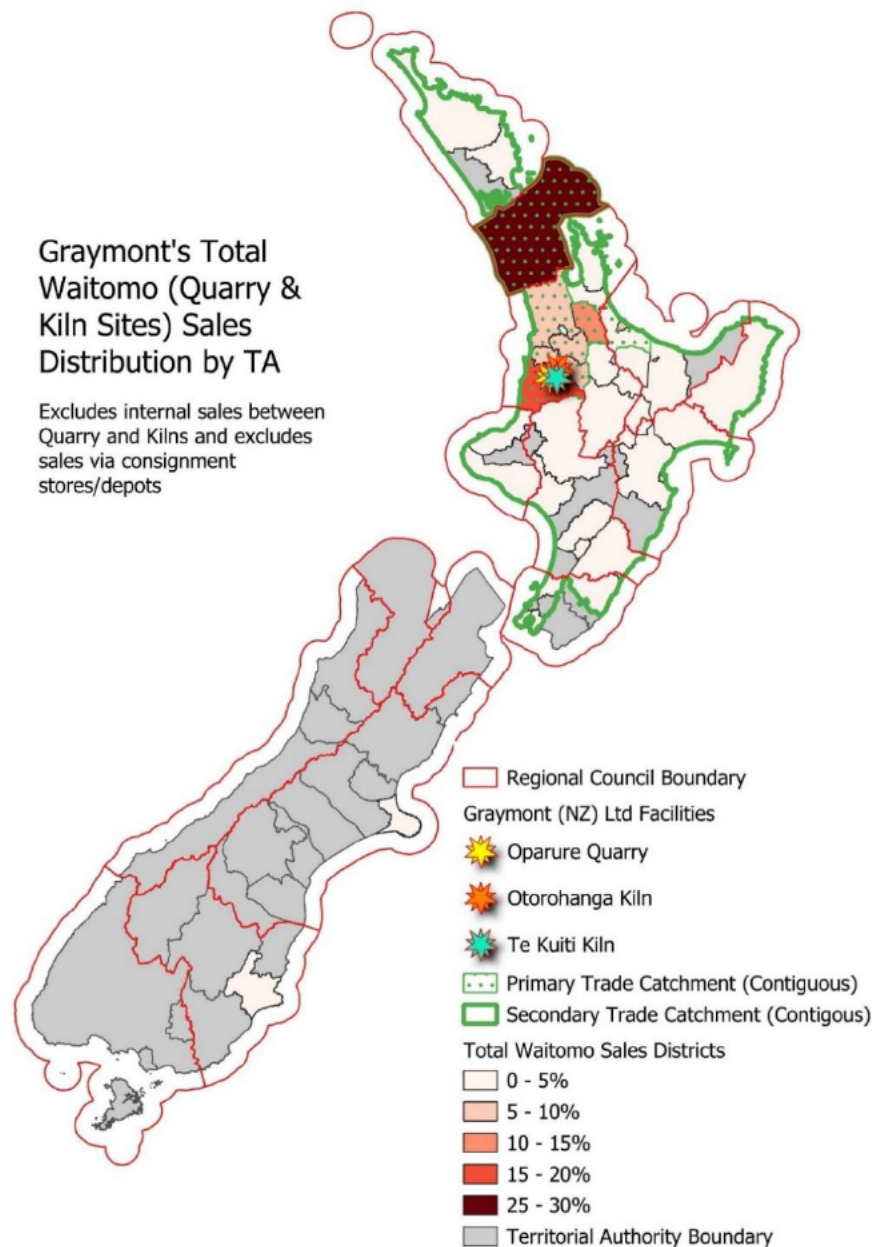
Graymont's North Island sites have supplied high concentrate calcium quicklime and limestone to Oceana Gold in Waihi since 2015 (continuing a supply arrangement established by previous owners). The lime products supplied are an essential component used in the mineral extraction process on site and are used to safely manage and meet their environmental permit demands and discharges through water and tailings treatment.

Graymont's quicklime calcium based solutions have been preferred by Oceana Gold staff over many other conventional imported materials due to safer handling (less corrosive), superior chemistry, price and supply reliability. For example, quicklime is typically lower cost and more efficient at precipitating heavy metals from waste streams compared to harsher chemicals such as caustic soda. Graymont has supported operations in Waihi with innovative material storage and handling equipment on an ongoing basis and during periods of high demand, Graymont has supplied daily deliveries and operated the lime supply chain working closely with Oceana Gold to work effectively within the mine permit requirements.

Summary of the functions of Graymont's lime products at Waihi Gold Mine: Quicklime is used to adjust (increase) pH in the Carbon in Pulp (CIP) leaching of gold/silver ore. Hydrated Lime is used to adjust (increase) pH in the water treatment process prior to discharge into the river system.



Figure 3.7 – Extent of Oparure Quarry’s Direct and Indirect Downstream Trade Catchments



3.2.1 Extent of Oparure’s (and Related Facilities) Trade Catchment

Figure 3.7 (above) provides a composite analysis of the extent of Oparure’s downstream customers (including kiln site customers). It combines limestone and lime product customers and shows their distribution using territorial authority boundaries. The territorial authorities are coloured according to the share of downstream sales (measured in tonnes), in broad



percentage ranges. I have defined a contiguous but indicative primary trade catchment (based on those districts accounting for the majority of Graymont's North Island sales) and an indicative secondary trade catchment.

Graymont's North Island primary trade catchment (i.e. customer concentration) can be described as Auckland and central and northern Waikato Region. The secondary trade catchment can be described as the North Island excluding South Wairarapa/Carterton District. South Island sales would be considered a tertiary trade catchment (not shown).

3.2.2 Overall Findings on Downstream/Forward Economic Benefits

These indicative trade catchments illustrated in Figure 3.7 are a key component of understanding the extent of the Oparure Quarry's downstream economic benefits, and that the Project is trying to maintain over the long term. The operation of Oparure Quarry is supporting businesses across a significant geographic extent of New Zealand.

The other key component of understanding the extent of Oparure Quarry's downstream economic benefits is the significant range of industries and number of businesses using products sourced from Oparure Quarry. In summary:

- Some of those industries are New Zealand's biggest exporters – the agricultural sector, dairy product processing, the gold mining sector and the pulp and paper sector.
- Other customers include some of New Zealand's largest domestic manufactures and producers (like New Zealand Steel and some of the national roading/infrastructure providers and egg farmers⁴⁰).
- Lime sourced from Oparure Quarry is currently used for drinking water treatment in Auckland, Hamilton City, Waitomo District, Waipa District, Tauranga City and New Plymouth District. In the 2023 Census, the population of those locations was estimated at 2.26 million people – a significant 43% of New Zealand's population. By 2053, those same local authorities could account for 47% of New Zealand's population. They are expected have population growth of 0.91 million people between 2023 and 2053 – this is 58% of total projected population growth in the country.⁴¹ This alone is a significant economic benefit in my view.
- Oparure Quarry sourced products are being used in Watercare's Central Interceptor Project – a significant infrastructure project involving a giant wastewater tunnel under

⁴⁰ Un-named for commercial sensitivity reasons.

⁴¹ Based on StatisticsNZ 2023 Base, 2025 released population projections by TA.



Auckland – as well as many other major roading projects in the North Island. See case study below.⁴²

TURNING WET SPOIL INTO SUSTAINABLE BACKFILL

GRAYMONT'S ROLE IN WATERCARE'S CENTRAL INTERCEPTOR PROJECT.

Watercare, together with construction partners Ghella Abergeldie Joint Venture (GAJV), set out to build Auckland's \$1.2-billion Central Interceptor – New Zealand's largest wastewater project – with sustainability at its core.

A major challenge was managing the 66,000 tonnes of spoil generated over six years. The GAVJ had committed to diverting more than 80 per cent from landfill, but the excavated material was too wet and unstable for direct reuse or transport.

Graymont played a vital role by supplying a calcium-based solution to transform wet spoil into stable backfill. Collaborating with GAVJ and Watercare, Graymont developed a tailored lime treatment solution. Trials determined the optimal dosing rate, and Graymont ensured a reliable supply from its Otorohanga and Te Kuiti plants using pneumatic tankers, minimising packaging waste.

As spoil surfaced on the tunnel conveyor, it was treated with quicklime. The exothermic reaction dried the soil, improving handling and transport for deposit at Puketutu Island, Māngere, where Watercare is restoring a former quarry.

Quicklime delivers many environmental benefits in the construction sector: it can assist to neutralise acid sulphate soils, mitigate undesirable leachates, treat wastewater and biosolids, and dewater and fortify soils.

This collaboration turned a waste challenge into environmental success, supporting Auckland's infrastructure while contributing to land regeneration. //



Tunnel spoil is treated with quicklime before transport to Puketutu Island

Calcium-based solutions for New Zealand's largest wastewater treatment project

LIME AND LIMESTONE CONSTRUCTION APPLICATIONS

- Water and biosolids treatment
- Soil and water pH modifier
- Road and soil stabilisation

- Sludge treatment
- Acid sulphate soils treatment
- Gabion rock and road base



RELIABLE CHEMISTRY



BULK PRODUCT SUPPLY



BULK BAG SUPPLY



REGIONAL SUPPLY NETWORK



CUSTOMER SUPPORT



INDUSTRIAL FINE LIME



QUICKLIME



HYDRATED LIME

Another one-off project supported by products sourced from Oparure Quarry was the remediation of the Tui Mine in Te Aroha (Waikato) between 2011-2013. See for example the

⁴² Sourced from NZ Infrastructure Review magazine.



case study below, where 10,000 tonnes of quicklime and fine lime blend product were supplied from Graymont's Waikato sites.

TUI MINE REMEDIATION PROJECT

Waste rock, ore dumps, tailings and ruins: when the Tui Mine on Te Aroha Maunga was abandoned by its bankrupt operators in 1975, the environmental legacy was significant.

Heavy metals from acid rock drainage leached into local streams; dammed tailings posed a serious risk of liquefying and flowing down the mountain. It was the country's largest contaminated site – and remained that way for decades.

The problem was complex and costly. With welcome government funding announced in 2007, research and planning began on a project to remediate the site once and for all. Quicklime was an integral part of the solution.

A two-phased approach

The massive challenge was split into two phases. The first focused on the required preparatory work. This involved detailed design, site establishment, and the creation of an access road. The old underground mine workings also needed treatment to prevent the continuous discharge of contaminated water from occurring.

This saw limestone bunds built to neutralise groundwater acidity and contaminant loadings. Limestone slurry was also injected as an alkaline solution to counter the strongly acidic conditions and immobilise heavy metals, reducing the amount of contaminants leaching into the local Tunakohia Stream.

Phase Two aimed to chemically and geotechnically stabilise the 130,000 m³ tailings (piles of ore and sand-sized crushed ore) and reduce leaching through in-situ and ex-situ amendment. The plan involved using a binder recipe comprising cement, high-calcium Quicklime and crushed limestone. At full production, the stabilisation process used in excess of 170 tonnes of binder per day.

**Quicklime is created by heating limestone as shown in the following equation:
 $\text{CaCO}_3 + \text{HEAT} = \text{CaO} + \text{CO}_2$**

Why was Quicklime such an integral part of the solution?

Adding lime to substandard soil substantially improves soil strength and stability. At Tui Mine, saturated and contaminated soil was causing significant ecological damage. Quicklime helped reduce moisture content, permeability and plasticity, while increasing soil strength.

The completed project resulted in the strengthening and stabilisation of the tailings and underlying soils to create an engineered landform, protecting the surrounding ecological and environmental landscapes from further devastating contamination.

The \$21.7million project involved the Ministry for the Environment, Waikato Regional Council, Matamata Piako District Council, Department of Conservation, and local iwi.

Benefits of Graymont Quicklime

- ▶ Graymont's Quicklime (calcium oxide (CaO)) is made from rich deposits of high-calcium limestone containing less than 5% magnesium carbonate. A widely used chemical compound, Graymont's Quicklime delivers exceptional acid-neutralization, SO₂-absorption, and sludge-stabilization.

Photo provided by Waikato Regional Council with thanks.

Downstream economic impacts are difficult to quantify (in terms of GDP and employment impacts) and would be especially difficult to quantify for Oparure Quarry (and the related kiln



sites) given the number and complexity of the supply chains involved, and the total absence of data to inform that analysis.⁴³ Despite not being quantified, but based on the findings described above,⁴⁴ I consider that the downstream economic impacts arising from Oparure Quarry's operation are significant at the national level and will be equally, or increasingly, significant in the future if the Quarry is able to be expanded.

Sapere Research

While I have been unable to quantify those downstream impacts, there is an existing publication that has measured the economic contribution of some key businesses that use products sourced from Oparure Quarry. This 2024 research by Sapere Limited (which was part of the 'Future of Work Tripartite Forum Research' program),⁴⁵ examined upstream and downstream economic linkages and impacts (direct, indirect and induced GDP and employment) of a number of Emission-Intensive – Trade-Exposed ("EITE") businesses, of which Graymont's Waikato kiln site operations were one of 11 businesses studied. My focus is not on the kiln site operation, but rather the other EITE businesses that are customers of Graymont's Waikato operations. These include New Zealand Steel, Oceana Gold (Waihi North Goldmine), and Oji Fibre (Tasman and Kowarau Mills).

The objective of the Sapere research was to understand the economic impacts (supply chain effects) *if* these key manufacturers were forced to reduce their outputs or (worst case) close.⁴⁶ It considered the likely economic consequences for upstream suppliers and downstream customers of these businesses under those circumstances. It then considered the potential for downstream customers of the EITE business to substitute or import products rather than rely on these New Zealand based manufacturers (i.e. the counterfactual supply scenario).

The outcomes of reduced output or closure were considered in the context of national policies impacting greenhouse emissions by industry, but the proposition being tested could also apply to significant changes in their upstream supply chains (which includes supply of

⁴³ One potential method is to consider using National Accounts (2020) transaction tables to understand the dollar value of gross output (sales) of the limestone/lime industry and look at the industries that those sales are distributed across (much like the discussion previously in the report but based on dollars not tonnes). You can then look at the total inputs to production of those purchasing industries and express limestone/lime as a share of those total inputs in dollar terms. This can then be multiplied by the gross output (turnover) of those industries nationally on the assumption that a share of that output is attributable to its reliance on limestone (proportionally) as an input. Unfortunately, the limestone/lime industry is not an industry in its own right in the National Accounts and is grouped with 'Metal ore and non-metallic mineral mining and quarrying'. As such, the inter-industry relationships are skewed by other products in the category, making this approach inappropriate.

⁴⁴ Which themselves have been based on Graymont's quantitative data.

⁴⁵ I understand that this was for a Business NZ-CTU Joint Venture, supported by MBIE.

⁴⁶ Sapere tested worst case outcomes of EITE business closure but considered that (due to the I-O model approach adopted) a reduction in output instead of closure was proportionate (i.e., any reduction in output would have a corresponding reduction in GDP and employment contributions).



limestone/lime products). The research is therefore relevant to the potential impact of Oparure Quarry likely needing to close in the near future if the new south-western pit is not approved.

It is important to note, that in providing excerpts from the Sapere report below, I am not inferring that the economic contribution made by some of Oparure Quarry's downstream customers will be reduced or lost if the consent is not approved. This depends on the relative role of limestone/lime products to those customers' overall inputs to production and their ability to source alternatives (domestically or through imports). Rather, the following economic contributions of these customers (which are themselves limited to upstream economic impacts) are provided because a portion of these economic contributions are currently linked to and facilitated by the operation of the Oparure Quarry (as one of their suppliers). Even if that portion is comparatively small for each customer, this can still translate into a material share of their GDP and employment impacts attributable to Oparure Quarry products. When combined across all customers, this is expected to be a significant facilitated impact. Notably, this exercise captures only a handful of Oparure Quarry's downstream customers, although New Zealand Steel is a major consumer of Graymont's North Island industrial limestone and lime output.

In that context, the following provides some key findings from that report considered relevant to this assessment:

- a) New Zealand Steel is estimated to contribute (annually) \$460 million to the Auckland Region and \$679 million to national GDP (2023)⁴⁷ and sustain 4,210 FTE jobs in Auckland and 5,370 FTE jobs nationally once direct, indirect and induced economic impacts are accounted for. This is based on a 2023 estimate whereby it accounts for 0.18% of New Zealand's total GDP in that year. While Auckland has a relatively robust economy, potential losses arising from the closure of this EITE business are significant and would intensify current issues with New Zealand's productivity at the national level.
- b) Oji Fibre's Kinleith and Tasman Mills are estimated to contribute (annually) \$396 million in Waikato Region, \$177 million in Bay of Plenty Region and \$816 million to national GDP (2023)⁴⁸ and sustain 1,753 FTE jobs in Waikato, 786 FTE jobs in Bay of Plenty and 3,593 FTE jobs nationally once direct, indirect and induced economic impacts are accounted for.

⁴⁷ Indicatively, if Graymont's limestone and lime accounted for 2% of New Zealand Steel's inputs to production by value (actual figure unknown), this infers that Oparure's Quarry facilitates around \$13.6m of that national GDP contribution.

⁴⁸ Indicatively, if Graymont's limestone and lime accounted for 2% of Oji Fibre's inputs to production by value (actual figure unknown), this infers that Oparure's Quarry facilitates around \$16.3m of that national GDP contribution.



- c) Oceana Gold is estimated to contribute (annually) \$165 million to Waikato Region's GDP (2023)⁴⁹ and sustain 823 FTE jobs in Waikato once direct, indirect and induced economic impacts are accounted for.⁵⁰
- d) "Our findings indicate that a reduction, or cessation, of the outputs of these firms would have a considerable impact on productivity, amplified by New Zealand's productivity problem".
- e) "If EITE businesses were to cease production in New Zealand, sectors supplying inputs would likely experience significant negative economic impacts arising from the loss of revenue from EITE businesses. Similarly, sectors with EITE businesses provide significant volumes of outputs to other sectors that are important to the New Zealand economy, such as construction and primary food production. Recipient sectors of EITE business outputs would likely be required to import substitute products, if EITE businesses were to cease production in New Zealand".

The following two text boxes are from simple case studies in the Sapere Report, referring to Graymont's 2 lime kiln sites in the Waikato Region and Oji Fibre respectively. They provide further insight on the upstream and downstream economic linkages of these firms.

Lime and lime products are used by a range of organisations, including several other EITE businesses

Lime and lime products have multiple applications across various sectors of the New Zealand economy, including sectors where other EITE businesses operate. For example, quicklime is used for soil stabilisation in residential construction and infrastructure development (particularly roading). Lime products are also used in steel manufacture as flux to remove impurities; fertiliser manufacturers use lime for producing low leachate products; gold mining uses lime for the processing of gold ore; and businesses in the pulp and paper sector have various uses for lime, including bleaching and wastewater treatment. The dairy sector also has multiple uses for lime, including sanitation, animal health, and soil amendment. Additionally, lime is supplied for treating drinking water in New Zealand.

Suitable alternatives may be hard to source

If lime product production ceased in New Zealand, lime as a calcium or pH adjuster would most likely come from Southeast Asia, where coal tends to be used as the source of fuel for kilns. The cessation of lime production in New Zealand would likely lead to carbon leakage, from the comparatively higher CO₂ profile of lime production in Southeast Asia. Lime products used in steelmaking may be more difficult to source due to the specifications required in steelmaking.

⁴⁹ Indicatively, if Graymont's limestone and lime accounted for 2% of Waihi North's inputs to production by value (actual figure unknown), this infers that Oparure's Quarry facilitates around \$3.3m of that Waikato Region GDP contribution.

⁵⁰ National impacts not included as they encompassed Oceana Gold's Otago mine which is not supplied by limestone products sourced from Oparure Quarry.



3.2.3 Waikato pulp, paper, and converted paper product manufacturing

An EITE business in the pulp, paper, and converted paper product manufacturing has multiple locations in the Waikato. Perhaps unsurprisingly, forestry and logging products comprise the largest proportion of pulp, paper, and converted paper product manufacturing inputs in the region (25 per cent). This is followed by other pulp, paper, and converted paper product manufacturing firms (11 per cent) and wood product manufacturing firms (nine per cent). These inputs highlight the significance of firms in the Waikato pulp, paper, and converted paper product manufacturing sector to forestry in the region. Although the downstream impacts are comparatively more diverse, they further highlight interdependencies between pulp, paper, and converted paper product manufacturing firms and with wood product manufacturing:

- Pulp, paper, and converted paper product manufacturing (18 per cent)
- Wood product manufacturing (eight per cent)
- Dairy product manufacturing (six per cent)
- Meat and meat product manufacturing (five per cent)
- Non-metallic mineral product manufacturing (four per cent).

An EITE pulp, paper, and converted paper product manufacturing executive in Waikato advised that *“We are the biggest user of wood residues in the country, roughly four million tonnes of wood and wood waste per annum. There would be a fairly significant impact on forestry, including price, and sawmill chip (considered a waste product) which would potentially go to landfill.”* On the downstream impacts, the executive explained that they supply about 50 per cent of packaging market for horticultural exports. If production of packaging in New Zealand were to cease, horticultural exporters would most likely source alternatives from South America. He noted that the CO₂ from production in South America is likely higher than in New Zealand as *“marginal electricity here comes from thermal generations. We are 80 per cent renewable excluding electricity, with electricity about 85 per cent.”*

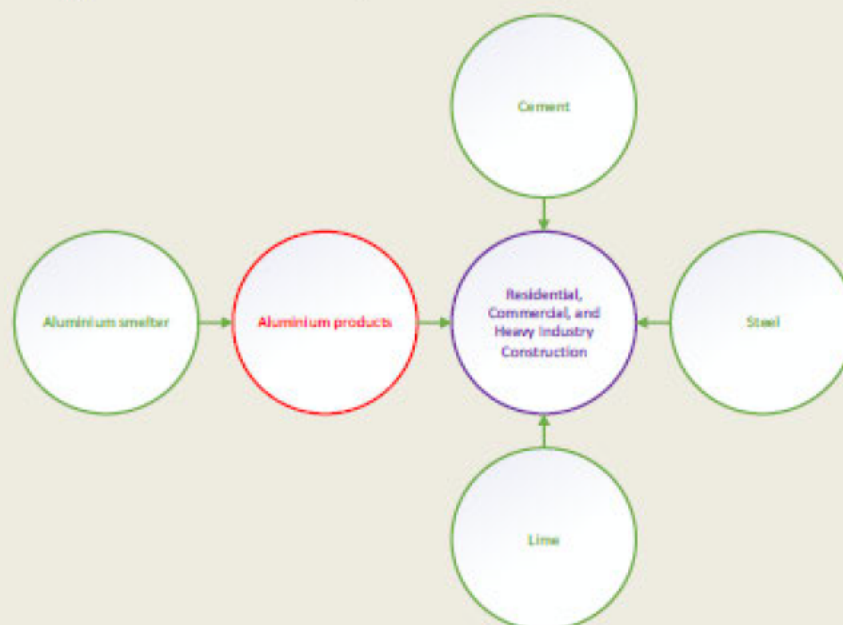
The following was a case study in the Sapere Report that showed how the construction sector in New Zealand relies on a number of the EITE businesses included in the study. This included Graymont’s Waikato kiln sites that rely on Oparure Quarry. However, it also identifies New Zealand Steel which uses products sourced from the Oparure Quarry.



Case study: The New Zealand construction sector utilises a suite of EITE products

Amongst a suite of other domestically produced products and services, New Zealand's construction sectors are reliant on mineral product manufacturing; metal and metal product manufacturing; fabricated product manufacturing; and cement manufacturing. New Zealand's construction sectors access these products via a combination of domestic manufacture and overseas imports. There are four EITE businesses in New Zealand supplying essential construction products, including:

- *Fletcher Building* – through the manufacturing of cement
- *New Zealand Steel* – through the manufacture of steel pipes and frames
- *Rio Tinto* – by supplying aluminium extruders that, in turn, create finished aluminium products, used for door and window framing
- *Graymont* – through the manufacture of lime and lime products, which have wide-ranging applications in construction, from construction, and steel manufacture to water treatment.



Construction sector resilience could be compromised by an increased reliance on imports

At present, these EITE businesses supply around five per cent of all construction sector inputs. At the same time, around 11 per cent of construction sector inputs come from overseas inputs. Without inputs from EITE businesses, construction sector inputs from imports would likely increase to 15-16 per cent. An increased reliance on overseas imports further exposes the construction sector to international pricing fluctuations and supply chain shocks. This poses increased vulnerability to domestic, commercial, and infrastructure construction projects across New Zealand. However, importation of alternatives is not always feasible. To illustrate, during COVID-19, GIB Board was scarce as equivalent products from Australia could not be imported and used as an alternative, delaying construction projects.



3.3 Summary of Gross Economic Benefits

The gross economic benefits arising from the operation of the Oparure Quarry can be considered in terms of its upstream and downstream economic impacts.

As set out in Section 3.1, upstream supply chains linked to activities at the Oparure Quarry and the two nearby kiln sites (and a proportionate share of the upstream supply chain for the regional office) are estimated to contribute \$₂₀₂₃46.5 million in total value added (GDP) per annum and 262 FTE jobs per annum sustained in the local and wider economy once direct, indirect and induced transactions are accounted for.

As set out in Section 3.2, downstream supply chains linked to products sourced from the Oparure Quarry are unquantified in GDP and employment terms but are diverse in their nature and widespread in terms of their location in New Zealand. They include some of New Zealand's key industries (including export industries) and businesses that make a significant contribution to New Zealand's economy and community wellbeing. When considering the role of Oparure Quarry's products (including processed lime) in agriculture and industry, even when those products potentially make up a minor proportion of total inputs to production, the share of downstream GDP and employment attributable to that proportion is expected to be significant when aggregated across all downstream customers.

Being able to supply lime products from an accessible and central North Island location, Graymont's operations in the Waikato Region also improve the self-sufficiency of New Zealand's economy and the efficiency and resilience of supply chains by reducing the need for many industries to import equivalent products (or find substitutes – which may or may not be as effective or viable).

Overall, I consider that the gross economic impacts attributable to Oparure Quarry are nationally significant. The extent of those impacts goes well beyond the Waikato region, with the secondary trade catchment of the quarry and related kiln sites close to the whole of the North Island (and beyond when considering the small portion of products distributed in the South Island and exported).

While not all economic impacts (GDP and employment modelled using I-O multipliers – as relied on in Section 3.1 above and in the Sapere report) are necessarily benefiting economic wellbeing, I consider that they are a close proxy in this instance. This is on the basis that limestone and lime products sourced from Oparure Quarry are contributing to the production of so many products that are critical for New Zealand's infrastructure, roading, housing and commercial construction, household products, packaging, meat, vegetables, fruit and dairy



products. Further, they are supporting the supply of healthy drinking water to nearly half of the country's population and helping with wastewater treatment and pollution management. Last, defensive capex required by Graymont to mitigate the effects of the Project (i.e. the Betterment Plan and pit rehabilitation) is not counted in upstream economic impacts quantified in this report so is not a source of over-estimation of economic impacts or benefits.

Maintaining all of the expected economic benefits described above into the future is contingent on Oparure's continued operation. That requires continued and economic access to more limestone resource.



4 The Counterfactual – No Quarry Expansion

While the existing pit at Oparure Quarry has some remaining resource covered by its existing consent, the 'stripping ratio' to access this remaining deposit (effectively the cost/tonne extracted) is very high. Relying on this is unlikely to sustain the economic viability of the Waikato operations as higher extraction costs are unable to be passed onto customers and allow Graymont to remain competitive in the industry. The stripping ratio of the proposed south-western pit will be lower, ensuring the quarry is economically viable and will therefore provide the investment security that Graymont needs to continue operations. Graymont has advised that the need for the new south-western pit has become time-critical.

If unable to develop the new south-western pit, the quarry will close. In addition to possible job losses and reduction in opex and capex spend at the quarry, this could have a range of effects:

1. Demand for limestone products usually supplied by Oparure Quarry (including agricultural and industrial limestone) would not cease. Other regional quarries would need to lift their production to cope with transferred demand. As Oparure is the biggest limestone quarry in New Zealand, with significant market shares, this would be a big ask for reasons set out below. It would be unlikely that quarries further afield (including investing in expanding Graymont's South Island site) would be able to satisfy all of the Quarry's existing direct (bulk) limestone customers at the same price due to increased transport costs for some customers. This may drive up limestone prices (and transport externalities)⁵¹ and reduce profits or drive up prices for their downstream customers (i.e. a ripple effect of price rises).
2. Importantly, any redistribution of demand to other existing quarries will:
 - a) Likely require further capital and operational investment to increase output. Even with additional revenue opportunity, this may not be desirable or viable for some operators. For example, the additional output required may push extraction into less economic parts of their quarry; the rate of growth needed to take on additional market share may exceed their tolerance for sustainable business growth; it may not be possible within their existing

⁵¹ These include increased fuel use, CO2 emissions, accelerated damage to transport infrastructure and in some cases, increased traffic congestion.



consent (and any new consents are costly to obtain and are not certain of being granted); they may not be able to secure additional finance needed to expand; or the demand for particular products may not match their business model or market focus.

- b) Accelerate those quarries that pick up Oparure's customer demand towards their end of quarry-life. They in turn would need to apply for new consents to seek expansions if feasible to do so. In other words, it just shifts the issue that the Project is trying to address somewhere else.
 - c) Require some customers to seek substitutes (which may be less efficient or effective) or decrease their own production with consequent adverse economic flow-on effects (upstream and downstream).
3. It is also possible that not all demand from Oparure's limestone customers will be met (including in terms of quality). Limestone production in the market may decrease in net terms along with GDP and employment.
 4. Graymont has previously tested the viability of the two kiln sites if they were required to purchase high-grade limestone feed-stock from another quarry (other than their own Oparure Quarry) and have found this option cost prohibitive and would make the operation of the kiln sites economically non-viable for them.
 5. Nonetheless, the two kiln sites would need to find a new source of high-quality limestone feed-stock within an efficient travel distance and at a viable price to remain in operation.⁵² This may limit the options to Supreme Lime (Palmers Resources), Omya or potentially Rorisons' quarry (contingent on consistent quality). To maintain current demand/supply for quicklime and hydrated lime products by Graymont's customers (especially New Zealand Steel), this would need to be a large volume of high-grade limestone supply each year, on top of their current limestone production, and any increase in limestone production they were able to take on when the Oparure Quarry closed. This is uncertain, meaning the closure of the Oparure Quarry could have direct adverse impacts on these kilns.
 6. Importantly, any redistribution of kiln feed-stock demand to other existing quarries will:

⁵² I've only considered a hypothetical scenario where the kilns may be retained as a going concern as this would be cheaper than abandoning them and someone else building new kiln sites. However, a range of scenarios are possible.



- a. Likely require further capital and operational investment to increase output. Even with additional revenue opportunity, this may not be desirable or viable for some operators for reasons set out above.
- b. Accelerate those quarries that pick up Oparure's quicklime and hydrated lime customer demand towards their end of quarry-life. They in turn would need to apply for consents to seek expansions if feasible to do so. In other words, it just shifts the issue that the Project is trying to address somewhere else.
- c. Mean that not all demand from Oparure's lime customers may be met (including in terms of quality). In that case, lime production in the market may decrease in net terms as would GDP and employment.
- d. Mean that some customers may need to seek substitutes (which may be less effective or efficient) or decrease their own production, with consequent adverse economic flow-on effects (upstream and downstream). Lime substitutes could include sourcing quicklime or hydrated lime from Websters in Hawke's Bay or from Graymont's South Island site subject to significant capital investment to increase output).⁵³ Either domestic option would face additional transport costs for most customers (and associated transport externalities). These alternative domestic sources would not satisfy New Zealand Steel as it will not be steel-grade lime.
- e. See some customers resorting to quicklime and hydrated lime imports. Currently the very small quantity of lime product imported comes from Oman (75%), followed by United Kingdom (10%), Malaysia (5%) and Chile (4%) based on 2025 import statistics. Some of these may be the countries that increase supply to meet New Zealand demand. Increased reliance on imports, particularly for the quantities needed by New Zealand Steel would expose them to supply chain risks and shocks and is likely to increase their supply chain carbon footprint (both from transport and kiln production).⁵⁴
- f. Alternatively, if too many customers seek alternatives, it may not be viable to keep the Te Kuiti and Ōtorohanga kiln sites open. If they close then around 28 specialist staff will lose their jobs. The full GDP and employment contribution of the Oparure Quarry and two kiln sites would be at risk of being lost (up to \$₂₀₂₃43 million/annum

⁵³ It is noted that if the south-western pit is not approved, this may deter other firms from making large capital investments as the industry's long term future may be perceived as being at risk.

⁵⁴ The Sapere Report described increased reliance on imports (from EITE businesses such as lime processors) as compromising New Zealand's overall strategic resilience and creating carbon leakage.



and up to 225 FTE jobs less any transfer in market share of limestone or lime product to other quarries).

These opportunity costs are hypothetical but reasonable. In summary, the counterfactual scenario of the Project not being approved is likely to mean significant disruption across the North Island and beyond that rely on a stable supply of high-quality limestone and lime products at competitive prices. This will in turn result in major constraints in market supply and a contraction of production and associated upstream economic impacts (especially in the short-term) if not able to be fully offset by other producers increasing their market share (and expenditure).

Downstream customers unable to source a suitable domestic substitute are likely to increasingly rely on imported products with consequent risks to the resilience of industrial supply chains. The need for more open pit limestone quarries will be inevitable in or near Waitomo District given the location of key demand markets. This counterfactual scenario will likely be less efficient in economic terms, with lower economic benefits to New Zealand businesses and communities and potentially with higher environmental and transport externalities than associated with the Project.



5 Conclusions

5.1 Economic Costs

As the Project is not a new industry or activity, or a new business in the region (or New Zealand), the approval of the south-western pit does not displace any existing economic activity (or labour) or place any new/increased demand on other resources. On the contrary, it sustains existing labour, uses existing infrastructure efficiently, maintains existing upstream and downstream trade arrangements, and does not materially change transport movements other than through natural growth in product demand, or place any additional strain on non-road infrastructure outside of the site.

Overall, based on my current understanding of the Project, there are no apparent changes likely to occur at the Oparure Quarry other than the current operations over an extended period and therefore no new or increased economic costs. Graymont will continue to pay rates and contribute to road maintenance on Oparure Road.

5.2 Summary of Net Economic Benefits

In the absence of any material economic costs of the Project, I consider that the gross economic benefits are likely to reflect the net economic benefits of the Project. These have been set out in section 3.3 and are not repeated here. The economic benefits are however considered – based on their nature and extent – significant at the national level.

5.3 Conclusions

The Project will deliver nationally and regionally significant economic benefits by ensuring the continued operation of New Zealand's largest limestone quarry and the extensive upstream and downstream economic linkages it supports. By enabling ongoing access to high-quality limestone for many years into the future, the Project safeguards an established economic contribution that includes substantial annual GDP, employment and household income benefits arising from Graymont's upstream supply chains, as well as the continued efficient use of existing capital-intensive kiln infrastructure.

These benefits are material in the context of the national and local economy. Without the Project, the loss of these upstream impacts—combined with the likely contraction of related



industries—would represent a significant economic setback for the North Island and for New Zealand more broadly.

More significantly, the Project secures the wide-ranging downstream economic benefits generated by the Oparure Quarry’s critical role in supporting industries that are foundational to the functioning of New Zealand’s economy. Limestone and lime products sourced from Oparure underpin key export sectors such as agriculture, dairy processing, pulp and paper, and gold mining, and support major domestic manufacturers including New Zealand Steel and Oji Fibre, as well as essential infrastructure services such as drinking water treatment, wastewater management, roading and construction.

The scale and diversity of these downstream linkages – spread across almost the entire North Island and reaching a substantial share of the national population—means that even small disruptions to supply would have disproportionate consequences for national productivity, supply chain resilience, and community well-being. By avoiding these risks, and by maintaining an efficient, centrally located, high-quality source of limestone and lime products, the Project delivers economic benefits that are enduring, wide-reaching, and significant at the national level.



Appendix 1 – CV

I (Natalie Hampson) am the owner and director of Savvy Consulting, which was established in November 2023. Prior to establishing Savvy, I was a director at Market Economics Limited. I have worked in the field of economics for 25 years for commercial and public sector clients with a particular focus (although not exclusively) on economic assessment within the framework of the Resource Management Act (RMA). Since 2001, I have specialised in studies relating to land use analysis, assessment of demand and markets, the form and function of urban and rural economies and growth, policy analysis, and evaluation of economic outcomes and effects, including costs and benefits.

I have considerable experience assessing economic costs and benefits of proposed plan changes, district plan reviews, structure plans, resource consents, fast track applications and policy proposals throughout New Zealand. I have been heavily involved in the preparation of assessments under the National Policy Statement on Urban Development (including Housing and Business Development Capacity Assessments and Future Development Strategies, particularly in Rotorua and Queenstown. I was the co-author of the s 32 assessment and Cost Benefit Analysis (CBA) for the proposed National Policy Statement for Highly Productive Land. I was the author of the CBA for the proposed National Policy Statement for Indigenous Biodiversity and the amendments to the National Environmental Standards for Plantation Forestry.

My clients include some of New Zealand's largest residential, commercial and industrial developers (e.g. Carter Group, Ngai Tahu and Remarkables Parks). I provide services to Woolworth's New Zealand, Port Otago, and Christchurch International Airport. I have acted on behalf of numerous councils throughout New Zealand as well as the Mana Ahuriri Trust (a PSEG) in Hawke's Bay. Other recent projects have included economic assessments (or expert evidence) for: Winston Pulp and Paper in relation to the closure of their plant in Ruapehu District; peer review of a coal mine expansion in Gore District; the proposed Silverlight Studios film campus in Queenstown-Lakes District; Wellington Airport (submissions on the district plan); and Nelson Airport runway extension plan change and NOR (peer review). I am currently involved in a covenant amendment before the High Court and have provide evidence to the Land Valuation Tribunal.

I have been involved (or continue to be involved) in numerous fast-track applications. I was a member of the Expert Panel for the Taranaki VTM FTAA project.



Appendix 2 – Data Sources and References

The following is a list of data sources and literature relied on or referenced in this report:

- Confidential company data provided by Graymont (NZ) Ltd.
- GNS, Mineral Commodity Report 21 – Limestone, marble and dolomite.
- Brunt et al. The Lime Industry (article for Chemicals and Soils)
- New Zealand Petroleum & Minerals, 2018–2024. Mining Production Statistics.
- New Zealand Petroleum & Minerals, Government Revenue 2007–2025.
- Aggregate and Quarry Association, 2020. A Briefing to the Incoming Ministers – Quarry Sector and Aggregate Supply.
- Ministry for Primary Industries, 2021. Purity of Agricultural Lime and Dolomite in New Zealand.
- Infometrics, 2018. Economic Impact of Graymont on Regional Economies.
- Insight Economics, 2022. Economic Impacts of Proposed Limestone Quarry Expansion in Waitomo.
- Castalia, 2019, Emissions intensive Trade Exposed Businesses’ Contribution to New Zealand’s Low Emission Economy.
- Sapere, 2024. Insight into Emissions-intensive, Trade-exposed Businesses (Stage 2).
- Ministry for the Environment, Freight transport emissions factors (Summary Guide), Table 28 – Freight goods in Aotearoa New Zealand.



Appendix 3 – Economic Linkages Model

The Economic Linkages Model (ELM) is a proprietary model that has been developed by Formative Limited to quantify and measure the economic activity and relationships within the New Zealand economy. In summary, the ELM measures the flows of money and goods through the economy, at a sector and subnational level.

The model records the interactions and relationships between actors in the economy, including businesses, households, government, exporters, and importers. At its essence, the interactions in the model describe how each industry responds to changes in the economy, which ripples out to influence a range of other outcomes (e.g. household decisions).

The ELM can measure the economy using a range of standard economic metrics, which includes gross output⁵⁵, GDP⁵⁶, value added, employment⁵⁷, incomes⁵⁸, consumption⁵⁹, tax⁶⁰, and trade. The model uses a subnational Input-Output Table that has been regionalised by Formative. This appendix outlines the nature of the Input-Output table, the underlying assumptions within the ELM and the key modelling steps.

Input-Output Table

Input-Output (I-O) models are quantitative economic tools used to analyse the interdependencies between different sectors of an economy⁶¹. I-O models provide a detailed framework that captures how the output of one industry serves as an input for another. Essentially, they map the flow of goods and services in an economy, illustrating how changes in one sector can ripple through to affect others.⁶²

At the core of an I-O model is the I-O table, a matrix representation where each row and column correspond to an industry or sector. The entries in the table show the monetary value of transactions between sectors—how much each industry purchases from and sells to every other industry. This allows for the examination of both direct and indirect economic impacts.

⁵⁵ Similar to company revenue.

⁵⁶ There is a key difference between GDP and value added. The value added of a sector is measured net of taxes (for instance GST) and subsidies on products. In the GDP in the national accounts for New Zealand product taxes (minus subsidies) are recorded for the economy as a whole and are included as part of the value added.

⁵⁷ Formative uses the BED measure of Total Employment Count (TEC) which includes both the employee count and working proprietors.

⁵⁸ Includes salaries, wages and profits.

⁵⁹ Including household and government.

⁶⁰ Including income taxes, GST, government transfers and subsidies.

⁶¹ Leontief, W. (1936). Quantitative Input and Output Relations in the Economic System of the United States. *The Review of Economic Statistics*, 18(3), 105–125

⁶² Miller, R. E., & Blair, P. D. (2009). *Input-Output Analysis: Foundations and Extensions* (2nd ed.). Cambridge University Press.



For instance, an increase in demand for dairy products not only boosts production in the dairy farming industry but also increases demand in related industries like animal feed production, veterinary services, equipment manufacturing, and transportation. This interconnectedness illustrates how a change in one sector can ripple through the economy, affecting multiple industries and contributing to overall economic growth.

Furthermore, I-O models can be extended to capture economic interactions across different regions through Multi-Regional Input-Output (MRI-O) tables. While conventional I-O models focus on the interdependencies of industries within a single region (i.e. the total country), MRI-O models map the flow of goods and services between industries both within and across multiple regions. This comprehensive approach allows for the analysis of how economic activities in one region can influence and be influenced by activities in other regions, acknowledging the interconnectedness of modern economies.

In MRI-O models, each region is represented with its own set of industries, and the model includes detailed data on inter-regional trade flows. This structure enables analysts to examine the intra-regional transactions (activities within a region) and the inter-regional transactions (trade between regions). For example, an increase in dairy production in one region can lead to increased demand for agricultural equipment produced in another region, illustrating how regional economies are linked through supply chains.

The primary structural difference between MRI-O and single-region I-O models lies in their scope and complexity. A single-region I-O model focuses on the economic transactions within one region, most often a national economy, considering industries' inputs and outputs and the final demand within the national economy. Imports from sub regions typically aggregated and not detailed in terms of their origin, which can limit the analysis of inter-regional dependencies.

In contrast, an MRI-O model disaggregates a national I-O (NI-O) model into multiple regions, each with its own industries, and explicitly models the trade flows between these regions. This results in a more complex, block matrix structure where each block represents the transactions between industries in one region with industries in the same or another region. The MRI-O model's structure allows for a detailed examination of how changes in one region's economy can affect other regions, providing insights into regional spillover effects, supply chain vulnerabilities, and the distribution of economic impacts across different areas.

While an I-O model has been developed and released by Statistics New Zealand which captures the structure of the national economy as of March 2020, there is no official MRI-O table for New Zealand.



Therefore, a Subnational Input-Output Table (SI-OT) has been developed by Formative to provide detail on the economic linkages between sectors and geographies within New Zealand. The table has been defined to include 109 industries, 7 final demand sectors (including, households, non-profit organisations and the public sector) and 40 geographies.

The 109 industries have been defined using standard industry classification (ANZSIC06), and are consistent with the industries used in the Statistics New Zealand NI-O. The 40 geographies (economic regions) have been defined according to either territorial or regional authority boundaries, with more disaggregation provided where there is more economic activity (e.g. upper North Island) and aggregation where there is less economic activity (e.g. West Coast of the South Island).

The SI-OT has a base year of 2023. All transactions in the table are in 2023 dollars, and all economic impacts (for instance GDP, gross output, consumption, taxes) are also in 2023 dollars. The SI-OT is based on a 2020 NIO table released by Statistics New Zealand which has been converted to a 2023 base year using Statistics New Zealand national account data for 2023⁶³

The NI-O table has been regionalised using a hybrid approach. The hybrid approach of combining survey and non-survey (i.e. modelled) methods to regionalise an IO table which is considered the gold standard when an official SI-OT is not available. The survey data sources used in generation of the SI-OT include a range of customised datasets that Formative have purchased and developed:

- **Total Employment:** Formative maintains a detailed database of employment, by geographies and industry (Business Employment Database – BED), which records the total employment in each of 506 ANZSIC06 industry classes and for Statistics New Zealand’s Statistical Areas, including both employees and working proprietors.⁶⁴
- **Electronic Card Transactions:** Formative has purchased detailed electronic card transaction data from MarketView, which records the origin and destination of four retail and services spend types by the 40 geographies.⁶⁵

⁶³ This includes gross output by sector, and national subsidies, exports, imports, change in inventories, gross fixed capital formation, consumption spending (includes households, local and central government and non-profit expenditure), compensation of employees, taxes, consumption of fixed capital and operating surplus.

⁶⁴ Formative (2021) Business and Employment Database – Employment Count, Working Proprietors, Total Employment.

⁶⁵ MarketView (2021) Card transaction data – four spend types and 40 geographies for the 2019 calendar year.



- **Subnational Economic Data:** a range of information that provides valuable insight into the scale of economic activity that is located within each geography. This includes regional GDP, Gross Output and household income.

The above datasets have been combined along with non-survey regionalisation techniques to allocate the national economic activity into each of the geographies. The key method used to accomplish this is the Industry-Specific Flegg's Location Quotient (SFLQ)⁶⁶. This method employs location quotients (LQ) to understand the specialisations and structure of regional economies compared to the national economy. The use of LQ's has been known to understate the amount of regional trade, however the SFLQ approach combats this by allowing for industry specific rates of cross hauling (where regions both import and export a product or service).

This approach has been shown to create accurate estimations of regional multipliers and outperform other non-survey approaches⁶⁷. The SFLQ method was supplemented by a gravity model to help inform regional flows. The SI-OT has been calibrated to better match the relationships in the NI-O table and has been balanced using an iterative proportional fitting procedure to ensure that the table reflects regional gross out and input. The resulting SI-OT table provides a modelled estimate of the relationships within the economy. This means that the economic linkages between sector-geography combinations as of 2023 are captured in the SI-OT.

The ELM uses the SI-OT to estimate the potential economic activity that can be expected from changes in the economy. All economic models apply assumptions because an economy and community is too complex to replicate exactly in a mathematical system. The structure of the ELM utilises the following assumptions:

- Leontief production function, which assume linear relationships between the production and inputs. This means change in the output for an industry will translate into a proportional change in demands for inputs.
- No supply constraints, which assumes that businesses can source sufficient resources (labour, capital, land, etc) to meet new demands.

⁶⁶ Julia Kowalewski (2015) Regionalization of National Input–Output Tables: Empirical Evidence on the Use of the FLQ Formula, *Regional Studies*, 49:2, 240–250.

⁶⁷ Anthony T. Flegg, Leonardo J. Mastronardi & Carlos A. Romero (2016) Evaluating the FLQ and AFLQ formulae for estimating regional input coefficients: empirical evidence for the province of Córdoba, Argentina, *Economic Systems Research*, 28:1, 21–37; Zhao, X., Choi, SG. On the regionalization of input–output tables with an industry-specific location quotient. *Ann Reg Sci* 54, 901–926 (2015).



- Constant returns to scale, which means that there are no economies of scale or diminishing returns in the model.
- Static prices, which assumes that prices remain at 2023 values. The model does not account for substitution effect or dynamic feedback from changes in demand and prices.