Kings Quarry – Stage 2 Economic Assessment for COVID-19 Recovery Fast-Track Consenting Act Referral Application

21 February 2023

m.e consulting

Kings Quarry – Stage 2 Economic Assessment

Prepared for

Kings Quarry Limited

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Executive Summary

The government have recognised that the COVID-19 pandemic has caused serious economic and social disruption in New Zealand. In order to provide a degree of economic impetus, government are speeding up the consenting process for qualifying development projects, meaning benefits would flow early to communities as demand for labour would increase sooner and wages and salaries paid would sustain communities earlier. In addition, the qualifying developments themselves (commercial, residential and infrastructure) would stimulate and facilitate economic activity in communities suffering from COVID-19 driven downturns.

To this end, the COVID-19 Recovery (Fast-track Consenting) Act came into effect in July 2020. The purpose of this Act was to promote economic activity while continuing to promote sustainable management of natural and physical resources. Developers can apply under the Act, seeking Fast-track status for consents.

Kings Quarry Limited ("KQL") is planning to undertake the development of an extension to the existing Kings Quarry (Proposal) which is being applied for under the COVID-19 Recovery (Fast Track Consenting) Act 2020 (FTCA). Consent is sought under the FTCA, which is designed to help to facilitate New Zealand's recovery from the economic and social impacts of COVID-19.

The quarry is located in Wainui towards the Northern edge of the Auckland region. The site currently contains an existing operational quarry. The proposed development (Stage 2) will see the quarry extended and supporting infrastructure developed onsite.

KQL are aiming to gain consent under the FTCA in order to bring forward production of aggregate for the Auckland market. Granting fast tracked development status to the development would generate significant positive impacts. These impacts include reduced costs for Auckland's construction sector and occur in the context of significant production shortfall in Auckland Region, market uncertainty, growth pressures and the inflationary environment in the local economy. Furthermore, it will sustain a measurable economic impact, in terms of its contribution to GDP and employment.

As Auckland's economy grows, demand for aggregate material will increase into the future. Under the projections presented here, Auckland's own demand for aggregate will increase from 13.1m tonnes currently to between 17.6m and 19.5m tonnes annually by 2043. As the demand for aggregate increases into the future, Auckland's supply deficit will continue to worsen, assuming the region's total production remains at the 2019 level (7.39m tonnes). With demand growth in Auckland, sources of aggregate from neighbouring regions will increasingly be relied upon due to the relatively high costs of transporting the product from regions further afar.

Therefore, granting of the fast track consent for the extension of Kings Quarry (located within Auckland) would reduce Auckland's substantial supply deficit by giving access to an additional aggregate source within the region. As such, Auckland would become less reliant on exports from the Waikato or beyond. This is especially important given the amount of available aggregate exported by Waikato and other regions will reduce as that region grows and their own demand for aggregate increases.

In pure cost terms, the extension of Kings Quarry is expected to generate annual transport cost savings of between $19.8m and $23.2m in absolute terms. Over a 60 year lifecycle, this works out at a total (undiscounted) transport cost saving of between $1.19b and $1.39b.

Comparing transport costs for Auckland as a result of the Kings Quarry extension under the FTCA and a standard Resource Management Act path reveals a cost savings of approximately $55.4m in total. Additionally, the quarry extension would deliver an annual net carbon emissions reduction of around 12,105 tonnes (based on reduced transport kilometres). The value of this reduction is estimated to be between $0.78m and $1.55m, annually. Under a fast track consent scenario, the present value of these reductions across the 60 year lifecycle is estimated to be between $2.0m and $3.99m.

The quarry extension will generate economic impacts in, and deliver benefits to Auckland and the wider New Zealand economy through the economic activity and subsequent employment it sustains. The results of input-output modelling that capture all the flow on effects of bringing the quarry online, indicate that the annual total economic impact will sustain around $4.8m in value added and sustain employment equivalent to around 27 MECs (21.5 FTEs). For the quarry extensions 60 year lifecycle under a Fast track consent, it is projected to sustain a total value added impact with a present value of $90.1m ($285.7 undiscounted), $12.3m more than the standard consent scenario. The lifecycle employment impact is projected to sustain around 1,625 MECs (1,290 FTEs), equivalent to 1,625 jobs for one year. That employment will be realised sooner under the fast-track consent scenario.

1 Introduction

Kings Quarry Limited (KQL) are seeking a consent under the COVID-19 Recovery (Fast Track) Consenting Act 2020 to accelerate the extension of the existing quarry. Granting fast tracked development status has the potential to be beneficial, and this is pertinent in the context of inflationary pressures associated with the COVID-recovery. Market Economics (M.E) were commissioned to assess the economic effects of bringing forward the project, that is, to quantify the economic effect granting consent under the COVID-19 Recovery (Fast-track Consenting) Act will have.

The government have recognised that the COVID-19 pandemic has caused deep economic and social disruption in New Zealand. To provide a degree of economic impetus, the government decided that the consenting and approval process as currently operated under the RMA did not provide the speed and certainty for developers to progress their plans. Government established that by speeding up the development process, benefits would flow to communities as demand for labour would increase sooner, and wages and salaries paid would sustain communities earlier. In addition, the developments themselves (commercial, residential and infrastructure) would stimulate and facilitate economic activity in communities.

To this end, the COVID-19 Recovery (Fast-track Consenting) Act came into effect in July 2020. The purpose of this Act is to promote economic activity while continuing to promote sustainable management of natural and physical resources. The Act established two pathways for projects to be fast-tracked:

- *Listed projects*: these are outlined in Schedule 2 of the Act and are eligible for the fast-track process,
- *Referred projects*: these are projects not listed in the legislation, the Minister for the Environment can refer them to an expert consenting panel for consideration.

The Act sets out the criteria a project will be assessed against to see the degree to which it supports the purpose of the Act. Before deciding whether to refer a project to an expert consenting panel under the Act, the Minister must be satisfied the project will help to achieve the purpose of the Act. The Minister will have regard to a list of matters set out in Section 19 of the Act. The relevant matters (for this assessment) are:

a) the project's economic benefits and costs for people or industries affected by COVID-19, and

b) ….

c) Whether the project would be likely to progress faster by using the processes provided by the Act than would otherwise be the case.

d) Whether the project may result in a public benefit by, for example;

i. Generating employment

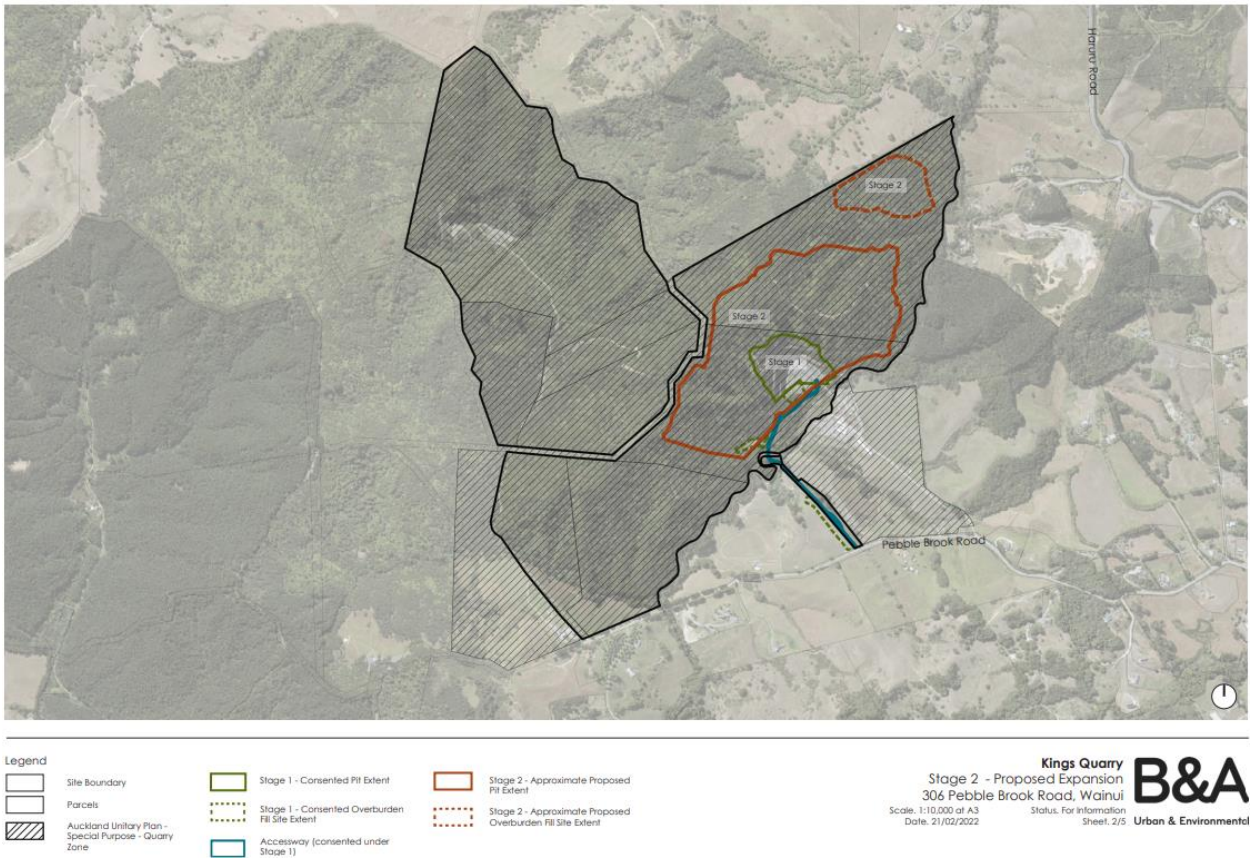
ii. ….

1.1 Project aim

KQL is planning to extend their existing quarry into a second stage. KQL are aiming to gain consent under the COVID-19 Fast Track Consent Act in order to bring forward production of aggregate materials for the

Auckland market. Granting fast tracked development status to the development could generate significant positive impacts. These impacts are mostly in the form of reduced costs for Auckland's construction sector and occur in the context of market uncertainty, growth pressures and the inflationary environment in the local economy. **Figure 1.1** shows the Kings Quarry site within the AUP Special Purpose – Quarry Zone (the Stage 2 pit extent is outlined in red).

Figure 1.1 Kings Quarry Site Stage 2 Expansion



Source: Barker & Associates, February 2023

The purpose of this report is to highlight not only the role that the Kings Quarry expansion has in maintaining an accessible supply of rock aggregate in Auckland, but also the potential costs savings available to the market from the quarry. The report also considers the economic impact that the operation of the quarry sustains in terms of its contribution to value added (GDP) and employment. Bringing this to market early can potentially be achieved under the Fast Track Consent Act.

Initially this report outlines the role aggregate plays in the regional and national economy, then assesses recent trends in aggregate production and consumption in Auckland, highlighting the significant shortfall in supply compared to current and future anticipated demand. Based on this, this report aims to highlight the significance of the expansion of Kings Quarry under the Fast Track Consent process compared to the standard RMA consenting pathway. This is shown in the form of reduced transportation costs arising through bringing the supply on earlier and the associated emissions cost savings and highlighting the economic benefits to the Auckland region.

2 Approach

In order to estimate the impact of the extension to Kings Quarry (Stage 2) will have within the Auckland economy, it is necessary to identify the overall role aggregate plays in the regional economy.

First, the demand and supply of aggregate across New Zealand is examined and likely future consumption is explored under the growth scenarios. To provide a range for comparison, we have estimated the level of aggregate demand from high growth within Auckland from 2019-2043. Under the economic growth scenario, we have projected the additional GDP productivity growth, which is the difference between expected economic growth and population growth. These values are based on outputs from Market Economics' Economic Futures Model and the population growth rate. While the economic growth scenario assumes that much of the growth is tied to population and household growth, it includes additional activity in the Auckland economy that is tied to export performance (both nationally and internationally).

Second, having established the scope and scale for aggregate and its potential future growth and change (in the context of national growth), the benefits are then examined in terms of:

- Avoided costs achieved by sourcing aggregate from Kings Quarry instead of sourcing aggregate from neighbouring regions. More specifically, Kings Quarry is an available resource within Auckland, proximate to growth areas. Because aggregate is a high-mass, low-value product, it is expensive to transport long distances via the road network. This places the quarry extension at a crucial point to decrease Auckland's significant under-supply, in turn reducing the quantity of aggregate imported into the region and the associated transport cost of this.

- The benefits of proceeding based on the fast track consenting process in terms of the delivery of the proposed aggregate volumes occurs sooner compared to the standard resource consent pathway.

Finally, the economic impacts of the project are estimated using a bespoke Multi-regional Input-Output (MRIO) model. The results are presented in terms of Value Added (VA), and the level of employment it will support. A comparison is made between two scenarios reflecting fast track and standard resource consent timelines, in order to highlight the benefits of a fast track consent to the quarry extension.

3 Aggregate Use

Aggregate is an important material used in construction. Aggregates have a wide variety of uses such as base material under foundations, roads, and railroads. They are a component of composite materials such as concrete and asphalt. Without a ready supply of appropriately-located aggregate, the production of concrete and the development of buildings, roading and infrastructure would halt – or cost considerably more. In this section of the report, demand and supply of aggregate across New Zealand is examined and likely future consumption is explored under two growth scenarios.

3.1 Historical New Zealand Aggregate Production

Aggregate production in New Zealand since 2000 has generally followed the fortunes of the economy, albeit not directly. This means that national production levels dropped during the last recession and generally rose in line with economic growth and expansion since. Following the GFC and gains in the economy – supplemented by the Christchurch rebuild - production has since ramped up.

As shown in Table 3-1 national aggregate production in 2019 declined slightly to 32.4m tonnes[1]. In terms of regional production, Auckland has remained in the top three producers in the country over the whole period from 2009-2019. With 7.39m tonnes produced in 2019, Auckland is the largest regional producer of aggregate rock. Auckland's position is consistent with it being the most populated region in the country and subsequent elevated demand for aggregate.

Table 3-1: New Zealand Aggregate Production (million tonnes) 2009-2019

Region	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Northland	2.25	2.50	1.65	1.69	1.96	1.77	1.73	0.72	1.43	0.88	0.81
Auckland	5.86	5.85	5.41	5.57	5.63	7.50	9.01	6.93	8.98	7.40	7.39
Waikato	4.77	6.34	5.52	5.70	6.37	5.60	6.72	4.69	7.75	9.67	5.86
Bay of Plenty	2.34	1.08	1.38	1.24	1.96	1.87	0.75	0.70	1.41	1.35	1.29
Rest of New Zealand	12.61	10.33	11.85	12.61	16.89	17.23	15.38	14.53	16.53	16.98	17.09
Total New Zealand	**27.82**	**26.10**	**25.81**	**26.80**	**32.81**	**33.97**	**33.59**	**27.56**	**36.10**	**36.28**	**32.44**

Source: New Zealand Petroleum and Minerals, Ministry of Business, Innovation and Employment

Because of the nature of aggregate as a low-value, high-weight product, it doesn't travel well, with the cost to the consumer heavily influence by the distance each truck load travels. This means that for aggregate extraction to be economical, it should be located proximate to the areas it is required.

3.2 Historical Per Capita Aggregate Production and Demand

Aggregate production and demand within a region are closely linked, this is because aggregate is a bulky, relatively low-value product that does not lend itself to transportation over long distances. As it is safe to assume that no (or an insignificant amount of) aggregate is imported or exported into/out of New Zealand, total production is equivalent to total demand at the national level. We recognise that aggregate is highly durable, so can be stored easily and supplied in subsequent years. Therefore national per capita averages

[1] Note that supplying production information to MBIE (NZ Petroleum and Minerals) by quarries is voluntary. This means there is an amount of under reporting and fluctuations in the production numbers.

used in this modelling have been taken since 2000. Furthermore, we apply an assumption that the demand per capita is equal across New Zealand. While the use of aggregates in larger buildings is likely to be higher in metropolitan areas, other infrastructure assets are higher on a per capita basis in provincial and rural areas (e.g., length of roading and pipe infrastructure).

The national average level of consumption of aggregate over the past 19 years is 7.8 tonnes per capita. However, this has varied greatly, ranging from a low of 5.9 tonnes in 2011 to a high of 10.4 tonnes in 2005. It is important to recognise that supplying production of aggregate information to MBIE is voluntary for about 90% of quarries, and there is a general trend to under report (especially from the smaller quarries). Some of the variation may be due to reporting inconsistencies rather than actual shifts in demand and supply.

Based on average national per-capita consumption of aggregate from 2009 to 2019 (Table 3-2), it is possible to show which areas are in shortfall and which are in surplus of aggregate. For each year, it can be seen that Auckland produces less aggregate than it requires – given that average per capita production sits at around 4.4 tonnes per capita compared to around 7 tonnes nationally. This means that it must import material from adjacent regions which are over-supplied internally – mainly Waikato. These regions produce more aggregate per person than is required based on the national average. This means the Auckland region faces significant transport costs involved in trucking aggregate from neighbouring regions to rectify their shortfall. Other regions also produce significant shortfalls, such as Hawke's Bay, Taranaki, Bay of Plenty and Wellington.

Table 3-2: Production tonnes per Capita (tonnes) 2009-2019

Region	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Northland region	14.2	15.6	10.2	10.3	11.9	10.5	10.1	4.1	7.9	4.7	4.3
Auckland region	4.1	4.1	3.7	3.8	3.8	4.9	5.8	4.4	5.5	4.5	4.4
Waikato region	11.7	15.4	13.2	13.5	15.0	12.9	15.2	10.3	16.7	20.3	12.1
Bay of Plenty region	8.6	3.9	5.0	4.4	7.0	6.5	2.6	2.3	4.5	4.2	3.9
Gisborne region	6.0	6.9	7.6	5.8	6.7	-	6.3	4.3	8.4	7.6	7.4
Hawke's Bay region	6.1	5.5	5.7	4.4	4.2	1.8	4.6	3.5	5.1	1.4	1.8
Taranaki region	4.3	2.3	2.5	3.7	6.1	3.8	1.8	3.0	3.0	4.0	2.8
Manawatu-Wanganui region	7.5	4.4	6.2	4.7	5.4	10.2	6.4	4.9	7.7	8.0	7.2
Wellington region	4.4	3.9	3.7	2.9	3.0	4.9	4.6	4.4	3.0	3.2	5.0
Nelson/Tasman region	8.9	8.7	8.1	8.5	14.0	6.2	5.6	7.6	8.8	8.1	10.7
Marlborough region	8.7	5.5	5.2	4.2	5.4	3.1	3.4	1.5	-	2.2	-
West Coast region	5.3	7.0	5.1	0.9	7.5	0.6	3.1	3.3	-	9.9	1.1
Canterbury region	6.2	4.2	7.2	9.5	14.7	15.3	12.9	12.1	13.2	13.5	11.4
Otago region	7.5	9.0	6.9	8.9	8.9	7.6	6.7	6.1	8.1	7.5	10.3
Southland region	7.1	5.1	4.6	5.3	5.5	6.2	4.3	3.0	5.8	7.6	6.5
Area Outside Region	39.7	31.2	16.8	12.0	7.7	-	30.0	-	-	-	-
Total	**6.5**	**6.0**	**5.9**	**6.1**	**7.4**	**7.9**	**7.3**	**6.0**	**7.6**	**7.6**	**6.8**

Source: New Zealand Petroleum and Minerals, Statistics New Zealand, Ministry of Business, Innovation and Employment

3.3 Regional Aggregate Demand

Table 3-3 below shows the regional demand for aggregate for each of the years 2009-2019. This is based on the total national aggregate production for each year, allocated proportionally to each region based on population. This means the region with the highest population (i.e., Auckland) will have the highest aggregate demand.

Table 3-3: Regional Aggregate Demand (million tonnes per year) 2009-2019

Region	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Northland region	1.0	1.0	1.0	1.0	1.2	1.3	1.3	1.1	1.4	1.4	1.3
Auckland region	9.2	8.6	8.6	9.0	11.0	12.0	11.4	9.5	12.4	12.5	11.5
Waikato region	2.6	2.5	2.5	2.6	3.1	3.4	3.2	2.7	3.5	3.6	3.3
Bay of Plenty region	1.8	1.7	1.6	1.7	2.1	2.3	2.2	1.8	2.4	2.4	2.2
Gisborne region	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.3
Hawke's Bay region	1.0	0.9	0.9	1.0	1.2	1.3	1.2	1.0	1.3	1.3	1.2
Taranaki region	0.7	0.7	0.7	0.7	0.8	0.9	0.9	0.7	0.9	0.9	0.8
Manawatu-Wanganui region	1.5	1.4	1.4	1.4	1.7	1.8	1.7	1.4	1.9	1.9	1.7
Wellington region	3.1	2.9	2.8	2.9	3.6	3.9	3.7	3.0	3.9	4.0	3.6
Nelson/Tasman region	0.6	0.6	0.6	0.6	0.7	0.8	0.7	0.6	0.8	0.8	0.7
Marlborough region	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.3
West Coast region	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2
Canterbury region	3.6	3.4	3.3	3.4	4.2	4.5	4.3	3.6	4.7	4.7	4.3
Otago region	1.3	1.2	1.2	1.3	1.5	1.7	1.6	1.3	1.7	1.8	1.6
Southland region	0.6	0.6	0.6	0.6	0.7	0.8	0.7	0.6	0.8	0.8	0.7
Area Outside Region	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**27.8**	**26.1**	**25.8**	**26.8**	**32.8**	**35.5**	**33.9**	**28.1**	**36.6**	**37.0**	**34.0**

Source: New Zealand Petroleum and Minerals, Statistics New Zealand, Ministry of Business, Innovation and Employment

3.4 Differences between Aggregate Supply and Demand

The difference between supply and demand for each region, shown in Table 3-4, is the net of regional production and regional demand. Over the period, Auckland has had a deficit of aggregate. This means that it must import aggregate from neighbouring regions of over-supply. In order to minimise transport costs, it can be assumed that imports are sourced from the closest regions – Waikato and Northland. The Waikato especially has experienced a level of over-supply throughout the period, indicating a history of exporting rock aggregate.

Table 3-4: Difference between Regional Aggregate Supply and Demand (million tonnes per year)

Region	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Northland region	1.2	1.5	0.7	0.7	0.7	0.4	0.5	0.3	0.0	0.5	0.5
Auckland region	-3.3	-2.8	-3.2	-3.4	-5.4	-4.5	-2.4	-2.5	-3.4	-5.1	-4.1
Waikato region	2.1	3.9	3.1	3.1	3.2	2.2	3.5	2.0	4.2	6.1	2.5
Bay of Plenty region	0.6	-0.6	-0.3	-0.5	-0.1	-0.4	-1.4	-1.1	-1.0	-1.1	-1.0
Gisborne region	-0.0	0.0	-0.1	-0.0	-0.0	-0.4	-0.1	0.1	0.0	0.0	0.0
Hawke's Bay region	-0.1	-0.1	-0.0	-0.3	-0.5	-1.0	-0.5	-0.4	-0.4	-1.1	-0.9
Taranaki region	-0.2	-0.4	-0.4	-0.3	-0.1	-0.5	-0.6	-0.3	-0.6	-0.4	-0.5
Manawatu-Wanganui region	0.2	0.4	-0.1	-0.3	0.5	0.5	-0.2	0.2	0.0	0.1	0.1
Wellington region	-1.0	-1.0	-1.0	-1.5	-2.1	-1.5	-1.4	-0.8	-2.4	-2.3	-1.0
Nelson/Tasman region	0.2	0.3	0.2	0.2	-0.6	-0.2	0.2	0.2	0.1	0.1	0.4
Marlborough region	0.1	-0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.2	-0.4	-0.3	-0.3
West Coast region	-0.0	0.0	-0.0	0.2	0.0	-0.2	-0.1	-0.1	0.2	0.1	0.2
Canterbury region	-0.1	1.0	0.7	1.9	4.1	4.2	3.2	3.7	3.4	3.7	2.9
Otago region	0.2	0.6	0.2	0.6	-0.3	-0.1	0.1	0.0	-0.1	0.0	0.8
Southland region	0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.3	-0.3	0.2	-0.0	-0.0
Area Outside Region	0.0	0.0	0.0	0.0	-0.0	0.0	-0.0	-0.0	-0.0	-0.0	0.0

Source: New Zealand Petroleum and Minerals, Statistics New Zealand, Ministry of Business, Innovation and Employment

The growth needs of Auckland are great and at the regional level it is important that Auckland maintains an accessible supply of aggregate where it can.

3.5 Future Aggregate Demand

3.5.1 Aggregate Demand with Economic (Productivity) Growth

To provide a range for comparison, we have estimated the level of aggregate demand under a high growth scenario for Auckland from 2019-2043. Under the high growth scenario, we have assumed GDP productivity growth, over and above population growth. These values are based on outputs from Market Economics' Economic Futures Model. While the high growth scenario assumes that much of the growth is tied to population and household growth, it includes additional activity in the Auckland economy that is tied to export performance (both nationally and internationally).

Figure 3.1 below shows the growth range of aggregate demand under both the sole population growth and the high (economic) growth scenarios. The blue section shows aggregate demand for 2019 as a baseline. The orange section shows the growth in demand due only to population growth (and sustained economic activity at current levels relative to population), the grey section shows likely demand if economic growth occurs in line with the Economic Futures Model projections (the high growth scenario). The range determined from these two sections is between 17.6m tonnes and 19.5m tonnes of aggregate in 2043, an increase of between 4.5m tonnes and 6.5m tonnes from 13.1m tonnes required in 2019. The yellow line represents the total existing supply of aggregate within the Auckland Region (2019 production). As the level of Auckland supply is likely to change over the future, this provides a baseline for supply from which the current status quo can be compared to and supply will need to move from this level to respond to changes in demand. Therefore, the difference between the grey and orange area, and the yellow line is Auckland's aggregate supply deficit under both scenarios.

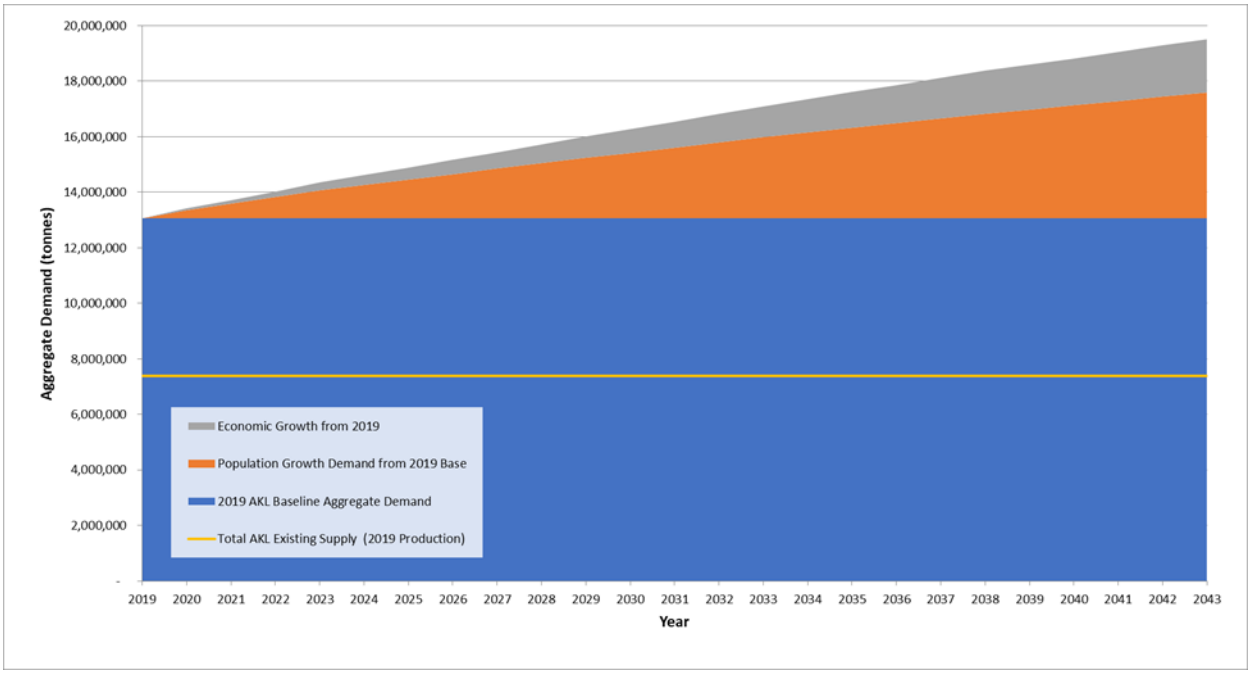
Under the **population growth future**, the Auckland region will experience a 35% increase (4.54m tonnes) in aggregate demand between 2019 and 2043 from 13.1m tonnes to 17.6m tonnes. Assuming that the region's total production stays stable at current levels (7.39m tonnes in 2019), in other words, assuming that no new quarries are developed, or existing quarries increase their production, it means that demand rises from 177% of the current supply to 238%. By 2043 Auckland is consuming more than double the amount of aggregate that it produces. This implies significant volumes will need to be imported from the Waikato. At 30 tonnes per truckload, this is over 340,000 truck movements annually. Given that this is the conservative scenario, it can be assumed that demand as a percentage of supply is likely to be higher than this.

Under the **high (economic) growth future**, the Auckland region experience a 49% increase (6.52m tonnes) in aggregate demand over the period 2019-2043 from 13.1m to 19.5m tonnes. Again, assuming the status quo and the regions total production stays stable at 7.39m tonnes, this means that overall demand profile increases from 177% of the current supply to 264%. This would result in even more aggregate being imported from the Waikato, further increasing transport (over 400,000 truck movements) and associated economic and environmental costs. Again, this does not include any allowance for one-off high-profile projects. Furthermore, if the aspirations and initiatives within the Auckland Plan and supporting strategies are effective, demand growth in Auckland could be even higher than what has been modelled here, further increasing the reliance on aggregate imports.

Based on current production figures, it is clear that the Auckland Region does not have enough aggregate production capacity to support itself currently or into the future under both future demand scenarios. It

must be remembered that while Auckland's economy and aggregate demand profiles expand, so will the Waikato's, Auckland's key source of aggregate. As the two regions grow, Auckland's continued reliance on the Waikato for significant volumes of aggregate imports will become less viable and sustainable. The widening gap between supply and demand is a significant issue for the Auckland region.

Figure 3.1: Projected Future Aggregate Demand (Population- and Economic-Growth Scenarios)



4 Kings Quarry Expansion Stage 2 Benefits

Having established the scope and scale of the Auckland market for aggregate and its potential future growth and change (in the context of national growth), it is necessary to establish the benefits associated with the Stage 2 Fast Track application.

This section focuses on the avoided costs achieved by sourcing aggregate from Kings Quarry instead of sourcing aggregate from neighbouring regions for construction aggregate and more distant regions for landscaping. In so doing, it assumes that the costs of production are primarily similar for other quarries in the Auckland Region.

The benefits of proceeding on the basis of the fast-track consent application at Kings Quarry are twofold. First, as mentioned, the proposed development will deliver its associated benefits sooner if the Fast-Tracked pathway is followed. Progressing under the standard resource consent pathway for the Stage 2 expansion of the Quarry would be time consuming (36 months' delay as anticipated by Kings Quarry Limited) and expensive, which is likely to jeopardise the commercial viability of the operation.

Second, Kings Quarry is an available resource as per Stage 1 of the process, and because aggregate is a high-mass, low-value product, it is expensive to transport long distances via the road network. This places the quarry extension at a crucial point to decrease Auckland's significant under-supply, in turn reducing the quantity of aggregate imported into the region and the associated transport cost of this.

The analysis of transport and emissions costs are informed by the Kings Quarry Stage 2 Extension Greenhouse Gas Emissions Assessment conducted by Air Matters. This report provides the transport distances and level of CO_2 emissions used in the analysis. The transport distances are based on the following assumptions:

- All material sourced from Kings Quarry equivalent to 500,000 tonnes/year will be used within the Auckland Region with target local markets being North Shore and West Auckland.
- Of the 500,000 tonnes/year of aggregate supplied to the Auckland Region from Kings Quarry, it will displace other aggregate supplies at the following ratios:
- South Auckland Region: 40% (200,000 tonnes/year)
- Out-of-Region (Waikato and Northland): 40% (200,000 tonnes/year)
- Kings Quarry will supply 100,000 tonnes/year of decorative pebble to the Auckland market (40% of current market) directly displacing supply from Manawatu Region and the South Island.

Furthermore, the transport and emissions costs estimates are based on high level assumptions and exclude other considerations, like the implications of adding additional truck movements on the roading network and other social costs (accident costs, time delays and so forth). In addition, aggregate is a low value, high volume commodity and is highly sensitive to costs. Increasing transport distances increases transport costs, and the cost per tonne of aggregate, will increase.

4.1 Construction Aggregate Transport Costs

As mentioned, the proposed Stage 2 expansion will deliver its associated benefits sooner if the fast-tracked pathway is followed. Current estimates of transportation costs for construction aggregate are

approximately $0.34-$0.40/km tonne. To assess the benefits of a fast-track consent in terms of the cost savings, two scenarios are compared. The high scenario reflects cost per km/tonne at $0.40 and the low scenario at $0.34, as per King Quarry Limited's anticipated production volume of 500,000 tonnes per year under Stage 2.

It is expected the fast-track scenario delivers the additional capacity and activity 36 months or 3 years earlier when compared to the standard consent approach. This difference is expressed in terms of total transport cost savings for the different scenarios over the expected lifecycle of 60 years. The fast-track approach would deliver greater benefits (in this case in the form of avoided costs) than the standard approach because the aggregate offsets Auckland's shortfall earlier.

Table 4-1 estimates the high and low cost scenarios in terms of the potential annual transport cost savings generated by Kings Quarry Stage 2 instead of if the aggregate is imported from alternate quarries. Based on these estimates, the annual savings in transport costs is between $19.8m and $23.3m per year.

Table 4-1: Annual Transport Cost Savings

Aggregate supply displacement	Tonnes of Aggregate (per year)	Vehicle Movements (29 tonne per vehicle)	Net change in distance* (km per round trip)	km saved per year	Tonne kms	Low Scenario $0.34 per km/tonne	High Scenario $0.40 per km/tonne
Inter-region (South Auckland)	200,000	6,897	25	172,425	2,500,000	$ 850,000	$ 1,000,000
Out-of-region (Waikato/Northland)	200,000	6,897	91	627,627	9,100,000	$ 3,094,000	$ 3,640,000
Out-of-region (Manawatu)	100,000	3,448	930	3,206,640	46,500,000	$ 15,810,000	$ 18,600,000
Total	**500,000**	**17,242**	**-**	**4,006,692**	**58,100,000**	**$ 19,754,000**	**$ 23,240,000**

**Calculated as: the 'Average distance to North Shore/ West Auckland' from the current aggregate supply locations minus the Average distance to North Shore / West Auckland from Kings Quarry (77km).*

It is expected that a fast-track consent delivers the additional capacity and activity 36 months or 3 years earlier when compared to the standard consent approach. To assess this, a midpoint of the annual transport cost savings (Table 4-1) is applied across the Kings Quarry extension's expected lifecycle of 60 years under timelines which reflect the estimated fast track and standard consent pathways. The lifecycle cost savings are discounted at a rate of 5% p.a. The difference is expressed in terms of total transport cost savings for the different scenarios is shown in Table 4-2.

Table 4-2: Lifecycle Transport Cost Savings - Fast Track vs Standard Consent Scenarios

Aggregate Supply Displacement	Fast Track Scenario	Standard Consent Scenario	Difference
Inter-region (South Auckland)	$ 17,510,000	$ 15,125,000	$ 2,384,000
Out-of-region (Waikato/Northland)	$ 63,735,000	$ 55,057,000	$ 8,678,000
Out-of-region (Manawatu)	$ 325,678,000	$ 281,333,000	$ 44,345,000
Total	**$ 406,923,000**	**$ 351,515,000**	**$ 55,408,000**

The present value of transport cost savings for the Kings Quarry extension under a fast track consent is projected to be $55.4m greater than under the standard consenting pathway. While both scenarios create significant cost savings, the fast-track approach would deliver greater benefits (in this case in the form of avoided costs) than the standard approach because the aggregate offsets Auckland's shortfall earlier.

4.2 Emissions Costs

The project will deliver wider environmental benefits through avoided emissions from lower transportation requirements. This contributes to New Zealand's resilience to climate change by reducing the emission of greenhouse gases from lowering the transportation requirements of aggregate.

The estimation of emissions cost reductions is also informed by the Greenhouse Gas Emission Assessment produced by Air Matters. From the report, values can be derived for the amount which quantifies the annual reduction in carbon emissions (tonnes of CO_2) generated by the Kings Quarry Stage 2 extension. Based on this, it is estimated that the project will deliver an annual reduction of 12,105 tonnes. From here, the quantity of carbon emissions is multiplied by Waka Kotahi's recommended shadow price of carbon[2] for 2023. The prices a low value of $64 per tonne and a high value of $128 per tonne. While a portion of the transport cost savings reflects lower emissions costs through diesels inclusion in the Emissions Trading Scheme, the analysis is meant to reflect the impact of potential emissions reductions, separately, in their own right, with monetary values assigned to contextualise the reduction level.

Table 4-3 shows the value of the annual carbon emissions reductions under the high and low shadow price with emissions from freighting aggregate and return trips, separately. The annual cost of carbon emissions, at 12,105 tonnes per year, is estimated to be between $0.75m and $1.55m, under the low and high price, respectively, with a mid-point of $1.16m. Furthermore, a moderate level of uncertainty should be considered given the number of high-level assumptions that have been made.

Table 4-3: Potential Annual Net Changes in Transport Related GHG Emissions Cost

Emissions from heavy vehicles (kg CO2-e per km)									
Aggregate supply displacement	Tonnes of aggregate (per year)	No. of heavy vehicle movements (29 tonne per vehicle)	km saved per year (km per trip)	Emission factor+ (kg CO2-e per km)	CO2-e emissions (tonne)	2023 Shadow Price of Carbon (NZ$2020 per tonne of CO2		Annual Cost of Carbon Emissions	
						Low	High	Low	High
Inter-region (South Auckland)	200,000	6,897	172,425	1.499	258	$ 64	$ 128	$ 17,000	$ 33,000
Out-of-region (Waikato/Northland)	200,000	6,897	627,627	1.499	941	$ 64	$ 128	$ 60,000	$ 120,000
Out-of-region (Manawatu)	100,000	3448	3,206,640	1.499	4807	$ 64	$ 128	$ 308,000	$ 615,000
Emissions from freighting goods (kg CO2-e per tonne.km)									
Aggregate supply displacement	Tonnes of aggregate (per year)	km saved per year (km per trip)	Tonne kilometre	Emission factor^ (kg CO2-e per tonne.km)	CO2-e emissions (tonne)	2023 Shadow Price of Carbon (NZ$2020 per		Annual Cost of Carbon Emissions	
						Low	High	Low	High
Inter-region (South Auckland)	200,000	12.5*	2,500,000	0.105	262	$ 64	$ 128	$ 17,000	$ 34,000
Out-of-region (Waikato/Northland)	200,000	45.5*	9,100,000	0.105	955	$ 64	$ 128	$ 61,000	$ 122,000
Out-of-region (Manawatu)	100,000	465*	46,500,000	0.105	4882	$ 64	$ 128	$ 312,000	$ 625,000
Total (Stage 2 provides a net CO2-e benefit)					**12,105**			**$ 775,000**	**$1,549,000**

** Based on transporting one way and assuming no backhauling of bulk material occurring.*

+ MfE Measuring Emissions: A guide for organisations – 2022. Emission Factor Workbook. ROAD freight emission factors for heavy goods vehicles. HGV diesel >30,000kg (2010-2015 fleet).

^ MfE Measuring Emissions: A guide for organisations – 2022. Emission Factor Workbook. ROAD freighting goods in New Zealand. Long-haul heavy truck

Using the estimates from above, the potential net emissions cost reduction is considered across the 60 year lifecycle of Stage 2 in Table 4-3. While the Air Matters' report does not assess the carbon emissions impact from the whole lifecycle of the quarry, only a 'base year'. In order to assess the benefits of a fast track consent, the annual emissions cost estimates are expanded across the projected timelines for the fast track and standard consenting pathways with a discount rate of 5% p.a. used. However, it must be noted

[2] Monetised benefits and costs manual v1.5 August 2021, p.61, Table 11: www.nzta.govt.nz/resources/monetised-benefits-and-costs-manual

that this relies heavily on the assumptions that the factors which dictate the level of carbon emissions would remain constant over the course of the entire lifecycle and that the shadow price of carbon would remain within the high and low range. Although it is highly likely that these will change over the next 60 years, this provides an approximation of the timing benefits related to a fast-track consent.

Table 4-4: Potential Net Changes in Transport Related GHG Emissions Cost – Fast Track vs Standard Consent

	Low ($64 per tonne of CO2)	High ($128 per tonne of CO2)	Mid-Point
Fast Track Consent Scenario			
Undiscounted	$ 46,483,000	$ 92,966,000	$ 69,725,000
Discounted @ 5% p.a.	$ 14,665,000	$ 29,330,000	$ 21,997,000
Standard Consent Scenario			
Undiscounted	$ 46,483,000	$ 92,966,000	$ 69,725,000
Discounted @ 5% p.a.	$ 12,668,000	$ 25,336,000	$ 19,002,000
Difference			
Undiscounted	$ -	$ -	$ -
Discounted @ 5% p.a.	$ 1,997,000	$ 3,994,000	$ 2,995,000

The Kings Quarry Stage 2 extension is projected to deliver significant CO_2 emission reductions under both consent scenarios. Through the benefit of enabling earlier operation, the quarry extension under the fast track consent scenario is projected to deliver a greater benefit in terms of the present value of carbon cost savings. This is estimated to be between $2.00m and $3.99m more than the standard consent scenario, with a mid-point of $3.00m.

5 Economic Impacts

5.1 Approach

This analysis relies on an estimated cashflow analysis based on projected annual operating costs, in respect to the forecasted spending on operational activities of the quarry extension. This was based on a cost of $8.50/tonne with an annual extraction of 500,000 tonnes. M.E. have matched this planned spending to 109 economic sectors in a Multi-Regional Input-Output (MRIO) model which has been customised for the Auckland economy (using a 2020 base year). The spending is assumed to be mostly directed to the metal ore and non-metallic mineral mining and quarrying industry in the Auckland region.

The MRIO model provides projections of the value added and employment generated and sustained in the economy as a result of this additional activity. Value added (synonymous with GDP) arises through the spending, directly through the construction process and indirectly as construction suppliers increase their purchases of raw materials and services, as the new activity flows on to other sectors of the economy and businesses pay wages and make profits. The links between the study area and the surrounding regions are also captured, showing the extent of the spread of the additional economic activity. This means that if the Auckland construction sector purchases aggregates or construction supplies from the rest of the North Island, then increased demand in Auckland, as a result of this development, has flow on effects in the rest of the North Island which are captured in the MRIO.

The IO model contains data on gross output for each sector and employment in Auckland. We are then able to then generate an annual average ratio of gross output per person employed in each sector in order to translate additional economic activity into additional employment – by sector. By applying these ratios to the annual spending on quarrying activity, M.E have been able to estimate the additional count of jobs (by sector and approximate location) sustained in each year as a result of the proposed development ("job years"). The employment projections are measured in Modified Employee Counts (MECs). This measure is based on Statistics New Zealand's Employment Count (EC) statistic but also includes an estimate of the number of working proprietors. As the IO model uses 2020 as a base year, the projected spending inputs to the model are deflated to 2020 terms. From here, the IO model value added outputs are reinflated to present terms, while the employment outputs reflect the 2020 proportions of gross output per MEC without reinflation. Further detail of the use of MECs as a measure of employment and translation of MECs to Full Time Equivalents (FTEs) is included in the Appendix.

5.2 Annual Economic Impacts

M.E's analysis of value added, and employment sustained considers only the direct, indirect and induced economic impacts. That is, firstly, the effects that are directly associated with the amount of expenditure required to develop the site. From a comprehensive economic impact perspective, 'indirect' and 'induced' impacts – also known as flow-on impacts – are also relevant. These reflect the additional activity, stimulated by the development, across the whole economy.

Many of the inputs required in production are manufactured by industries based across Auckland, with others made around New Zealand. As quarrying activity inputs used in production, the manufacturing

sector increases output. In addition, when more labour is required in quarrying and in the suppling sectors, the workers are paid wages which they then spend at retail outlets and so on, generating more demand for goods and services. Thus, the indirect and induced impacts measure how much additional activity the direct spend will stimulate. The MRIO allows the calculation of these indirect and induced effects as they relate to this development – for the Auckland economy taking into account inter-regional goods flows.

The annual economic impact of the Kings Quarry Stage 2 extension is shown in Table 5-1.

Table 5-1: Annual Value Added and Employment Impacts

	Auckland Region	Rest of North Island	Rest of South Island	Total
Value Added Impact ($m)				
Direct Value Added	2.3	0.0	0.0	**2.3**
Indirect Value Added	0.8	0.2	0.1	**1.0**
Induced Value Added	1.2	0.2	0.1	**1.4**
Total	**4.2**	**0.4**	**0.2**	**4.8**
Employment Impact (MECs)				
Direct Employment	5.1	0.0	0.0	**5.1**
Indirect Employment	7.4	0.5	0.5	**8.4**
Induced Employment	12.4	0.6	0.6	**13.6**
Total	**25**	**1**	**1**	**27**

Value added is effectively the contribution to GDP (less GST) that a project generates, as such it is the value of construction minus the intermediate costs to generate the construction (such things as the cost of building materials, consents, electricity, business services and imported goods). It captures wages and salaries paid, operating surpluses generated for owners, depreciation, and tax. In the construction sector it is equivalent to approximately 30% of total output.

For the quarry extension, it is projected to sustain $4.8m in value added annually. Within this, it will have a direct value added impact of $2.3m per year, with further flow on impacts adding $1.0m and $1.4m through the indirect and induced impacts, respectively. Regionally, the majority of this is directed towards the Auckland regional economy.

In terms of employment, it is projected to sustain a total of 27 MECs (21.5 FTEs) across the wider New Zealand economy, although, mainly within the Auckland region. It is important to note that while the development may generate a number of 'new jobs', the majority of the work will be carried out by existing skilled workers in the engaged sectors. The development does not 'generate' new jobs as much as it sustains jobs across industries. Therefore, this should not be interpreted as 27 new jobs, but rather the economic activity being generated is the equivalent of sustaining 27 jobs for one year.

5.3 Fast Tack Benefits

Based on the information provided, the quarry will have a lifecycle of 60 years at 500,000 tonnes per year. To assess the benefits of a fast track consent, in terms of the quarry's economic impact, the full lifecycle of the extension under two consenting scenarios are assessed. The first considers the quarry extension under

a fast track consent, with operation starting in 2024. The second applies a timeline for the quarry extension under a standard resource consent, with a delay of 36 months for the estimated additional consenting time period and starting operation in 2027. A 5% discount rate is applied to the value added impacts of both scenarios. The results are shown in Table 5-2.

Table 5-2: Economic Impacts across 60 year Lifecycle – Fast Track vs Standard Consent (RMA) Scenarios

	Value Added ($m, Undiscounted)	Value Added ($m, Discounted @ 5% p.a.)	Employment (MECs)
Fast Track Consent Scenario			
Direct Impacts	137.7	43.4	305
Total Impacts	285.7	90.1	1,625
Standard Consent Scenario			
Direct Impacts	137.7	37.5	305
Total Impacts	285.7	77.8	1,625
Difference			
Direct Impacts	-	5.9	-
Total Impacts	-	12.3	-

The fast-track consent scenario has a direct value added contribution with a present value of $43.4m with a total value added contribution of $90.1m. This is a direct impact of $5.9m more than the standard consent scenario. When considering the total value added impact, the difference between the scenarios is $12.3m in favour of the fast track consent scenario. This means that the present value of the value added sustained by the Kings Quarry extension proceeding under a fast-track consent is projected to be $12.3m greater than if the quarry extension proceeds through the standard resource consent pathway.

While discounting is used to illustrate the benefits of timing, the long time period (60 years) in which the quarry is assessed means that the value added of the later years is discounted significantly more than the initial years. When no discounting is applied, the total value added sustained by the quarry is projected to be around $285.7m with $137.7m of this from the direct impacts.

The quarry extension is also projected to have a significant impact on employment across the 60 year lifecycle. A total of 1,625 MECs (1,290 FTEs) are projected to sustained, to be interpreted as the 1,625 jobs for one year. Within the total impact, 305 (242 FTEs) of these associated with the direct impacts. As the employment figures are not discounted, both scenarios are projected to sustain the same level of employment. However, the fast track scenario means that employment can be sustained three years earlier with operation starting in 2024 as opposed to 2027.

6 Conclusions

Efficient and sustainable access to aggregate will be an important factor in both facilitating Auckland's economic growth and providing infrastructure such as roads, buildings, pipes, dams, factories and houses and other economic componentry to support the rapidly growing population and economy. The extension of Kings Quarry will have a positive impact on Auckland's economy by reducing construction costs and helping secure supply locally.

As Auckland's economy grows, demand for aggregate material will increase into the future. With demand growth in Auckland, sources of aggregate close to growth areas will increasingly be relied upon to supply, due to the relatively high costs of transporting the product from regions further afar. Under the projections presented above, Auckland's own demand for aggregate will increase from 13.1m tonnes currently to between 17.6m and 19.5m tonnes annually by 2043. As the demand for aggregate increases into the future, Auckland's supply deficit will continue to worsen, assuming the region's total production remains at the 2019 level (7.39m tonnes).

Therefore, granting of the fast-track consent for the extension of Kings Quarry would reduce Auckland's substantial supply deficit by increasing the amount of local aggregate available. As such, Auckland would become less reliant on sourcing aggregate from the Waikato and other parts of New Zealand, at a lower cost. Furthermore, this helps to reduce pressure on Waikato's quarries as they will also face future increases in demand locally.

In pure cost terms, the extension of Kings Quarry is expected to generate annual transport cost savings of between $19.8m and $23.2m. When the operation of the quarry is assessed over a 60 year lifecycle, the value of cost savings for the quarry extension proceeding under a fast-track consent is projected to be around $55.4m greater than under the standard consent scenario.

The quarry extension would deliver an annual net carbon emissions reduction of around 12,105 tonnes. The value of this reduction is estimated to be between $0.78m and $1.55m, annually. Under a fast-track consent scenario, the present value of these reductions across the 60 lifecycle is estimated to be between $2.00m and $3.99m more than the standard RMA consent scenario.

The operational activity is projected to generate positive impacts which flow across the Auckland economy. The quarry is projected to sustain total impacts of around $4.8m in value added and support 27 MECs (21.5FTE's[3]), annually. When the full lifecycle is considered under a fast track consent scenario, it is projected to sustain a total value added contribution to the economy of around $90.1m ($285.7m undiscounted), $12.3m more than the scenario reflecting a standard resource consent. While the employment impacts are not projected to differ, with 1,625 MECs (1,290 FTE's) sustained, a fast track consent will bring forward the employment impacts by 36 months.

Once fully developed, the quarry will provide a new source of aggregate to increase supply within the Auckland region. The development will help ensure that Auckland has a sufficient aggregate supply for potential development in order to help meet projected growth.

[3] See definition of conversion between MECs and FTE's in the Appendix

Appendix

Population Growth

Table below shows the expected population growth of New Zealand regions[4]. In terms of population growth, Auckland is expected to out-grow many other New Zealand regions in terms of percentage growth as well as in total volume, not surprising given Auckland is the largest and most populated region in the country. This means that into the future, the imbalance between demand for aggregate and Auckland quarries ability to provide it will widen. Combined with increases in economic development, this means that overall, more aggregate will be used in Auckland, and an increase of the existing deficit will continue into the future.

It must be noted that the Waikato region is also expected to experience a sizable amount of population growth to 2048, with an increase in population of 23%. As such, the Waikato is going to require more aggregate production of its own than it has done in the past. Overall, more aggregate will be used in Waikato, and this in turn would lead to a greater supply deficit in the Auckland region as the amount of available exportable aggregate declines.

Projected Population Growth 2023-2048

Region	2023	2028	2033	2038	2043	2048	% Change 2022-2043
Northland region	204,200	214,100	222,600	229,800	236,000	241,300	18%
Auckland region	1,692,400	1,765,500	1,859,400	1,948,700	2,034,100	2,114,000	25%
Waikato region	519,900	549,000	574,600	597,700	619,100	639,000	23%
Bay of Plenty region	352,500	370,200	384,500	396,600	407,500	417,100	18%
Gisborne region	52,000	53,200	54,000	54,500	54,700	54,700	5%
Hawke's Bay region	183,700	190,000	195,300	199,800	203,800	207,000	13%
Taranaki region	128,000	131,400	134,100	136,100	137,500	138,500	8%
Manawatu-Whanganui region	259,600	266,400	271,800	275,500	277,900	279,300	8%
Wellington region	545,400	559,500	574,000	586,500	596,900	605,000	11%
Tasman region	59,600	62,200	64,400	66,100	67,200	67,800	14%
Nelson region	54,500	55,800	56,700	57,300	57,500	57,400	5%
Marlborough region	52,000	53,200	54,200	54,700	55,100	55,200	6%
West Coast region	32,700	32,700	32,400	31,800	31,000	30,000	-8%
Canterbury region	661,000	688,500	715,500	739,800	762,200	782,700	18%
Otago region	248,600	257,300	264,700	271,000	276,400	281,100	13%
Southland region	102,500	104,100	105,300	106,100	106,400	106,200	4%
Total	**5,148,600**	**5,353,100**	**5,563,500**	**5,752,000**	**5,923,300**	**6,076,300**	**18%**

Source: Statistics New Zealand Medium Growth Projections

[4] This is based on Stats NZ medium level population projection growth rates.

Employment Impacts in FTEs

MEC is a headcount of all employees and includes an allowance for working proprietors. This is based on data from the Business Demography Survey (BDS) and the Linked Employee-Employer Dataset (LEED). The result is a headcount of employees (wage or salary earners) and working proprietors (the self-employed), i.e., modified employee count. Both LEED and BDS includes all workers with wages or salaries reported to Inland Revenue (PAYE data), and LEED data is augmented with self-employment data from annual tax returns to include working proprietors. LEED is a comprehensive database which contains data belonging to all individuals with taxable income, suggesting that there is a lower risk of sampling errors being introduced. Both these data sets have a fine-grained sector resolution that provides insight into how different parts of the economy are impacted.

StatsNZ's provide high level information about FTEs in the Quarterly Employment Survey (QES). The QES collects data from a sample of employers (approximately 3,900 enterprises) about filled jobs, earnings, and paid hours and covers all employees on the employer's payroll, but working proprietors are not included. The QES does not cover all industries of NZ's economy (agriculture is excluded), and the sector aggregation is very high level. The employment levels are translated into full-time employment equivalents using a basic calculation - total number of full-time employees plus half of part-time employees.

This suggests MEC is a more robust measure of employment providing finer resolution, covering all sectors and capturing the self-employed (working proprietors). Despite these limitations, the employment impacts presented in section 5 have been translated from Modified Employee Counts (MECs) to Full Time Equivalents (FTEs) below.

Employment Impacts in FTEs

	Auckland Region	Rest of North Island	Rest of South Island	Total
Annual Employment Impact (FTEs)				
Direct Employment	4.0	0.0	0.0	**4.0**
Indirect Employment	5.9	0.4	0.4	**6.7**
Induced Employment	9.9	0.4	0.5	**10.8**
Total	**19.8**	**0.9**	**0.8**	**21.5**
Lifecycle Employment Impact (FTEs)				
Direct Employment	242.2	-	-	**242**
Indirect Employment	353.0	24.6	22.9	**400**
Induced Employment	592.3	27.0	28.1	**647**
Total	**1,188**	**52**	**51**	**1,290**