



Waka Kotahi research summary

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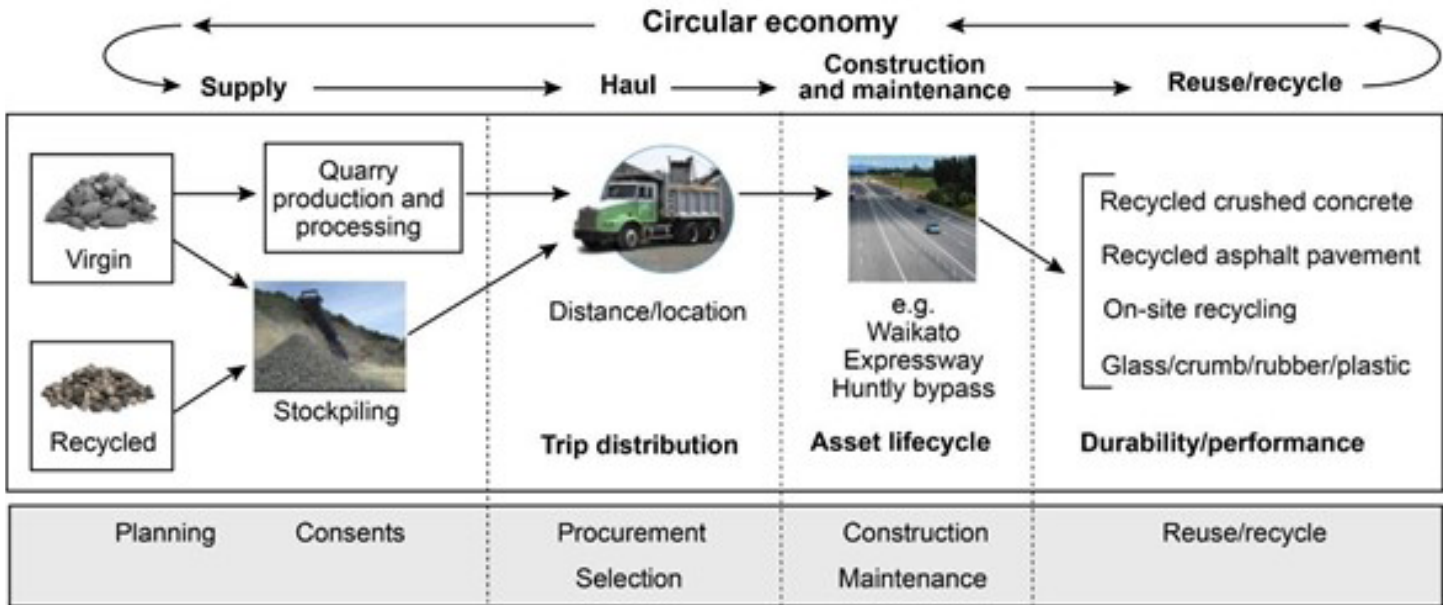
Aggregate supply and demand in New Zealand

The aggregate market matches aggregate supply with demand for maintaining land transport infrastructure and constructing New Zealand's built environment. While aggregate is a key raw material for building and housing, the transport sector accounts for up to 50% of demand in this country.

Overall, New Zealand has a good supply of aggregates but it's unequally distributed. In addition, many historical uses haven't been adequately monitored or regulated, resulting in poor environmental, community and cultural outcomes. Although we know its recovery can negatively affect waterways and ambient air quality, the overall effects of its extraction aren't well understood.

This research focuses on planning for the sustainable extraction and use of aggregates as non-renewable mineral resources.

Aggregates life cycle decision-making process



Aggregate supply and demand

In the aggregates market, both supply and demand are site specific, and issues are therefore region specific. Some regions can't sustainably source premium aggregates to meet demand, but transportation cost is a major factor in determining supply price – so it pays to locate quarries close to the demand. Large public infrastructure projects can also outstrip previous demand levels within a region, reducing supply.

Data on demand is difficult to get because of the multiple agencies and industries involved, as well as the use of non-integrated asset systems. Not understanding the patterns of supply and demand means there are uncompensated costs of long-haul transport, such as increased fuel use, CO₂ emissions, accelerated damage to transport infrastructure and increased traffic congestion. Understanding these factors, as well as addressing the barriers and risks involved, will all contribute to policy that improves market performance.

Sustainability

The aggregates sector needs to be more sustainable in its planning and sourcing of aggregates, and managing the land use and environmental effects of extraction. Some of the issues include:

- not understanding the influences on aggregate supply and demand
- industry decision making about the use of aggregate products and methods of extraction

- perceptions that recycled materials are inferior, as well as organisations' risk averseness and reluctance to share risk
- little long-term planning and forecasting of demand requirements
- community and cultural sensitivities about quarrying, extraction practices and land use (especially within Māori communities) and stakeholders not understanding the need for partnerships.

Research key objectives

The researcher's five key objectives were to:

1. understand the current and predicted national picture for aggregate supply and demand in transport and construction, to inform the development of a national sustainable aggregate-sourcing strategy
2. understand how aggregate supply and demand forecasting data is currently collated and reported, to inform decision making
3. establish a baseline of the current use of different aggregate materials, including recycled and re-used materials
4. inform the development of methodologies and tools to enable robust collection/forecasting/reporting and geospatial representation of national supply and demand
5. recommend ways to improve access to, and supply of, sustainable aggregate resources.

Key recommendations

These were the researchers' key recommendations (objective 5):

- Develop an aggregate data integration framework to improve the supply information (both quantity and quality) at the national and regional levels.
- National agencies and regional and local authorities should forecast regional demand and plan for aggregate resources at least 50 years ahead so that land use areas can be designated for quarrying/ extraction purposes in line with forecast demand.
- Develop a strategic supply and sustainability strategy as part of the government's minerals and petroleum resource strategy, and aligning with the New Zealand Infrastructure Commission's *Rautaki Hanganga o Aotearoa: New Zealand Infrastructure Strategy 2022-2052*.
- Introduce mandatory quarterly reporting to New Zealand Petroleum and Minerals, as well as to regional and local authorities, on national usage of resources for public infrastructure (by product quality and purpose).
- Identify and target regions where there are opportunities for increased use of recycled materials (eg large urban areas), as well as areas with significant supply constraints.
- Road Controlling Authorities and their consultants should encourage an increase in the appropriate use of re-usable and recycled materials before using virgin materials, and by using appropriate local treatment strategies (eg in-situ stabilisation).
- For all potential land use and quarrying consent applications, develop best-practice aggregate consent application templates, guidelines and checklists, via a key stakeholder working group across central and local government, in partnership with Māori.
- Waka Kotahi should establish a national infrastructure resource quantity and pricing database for each Waka Kotahi region and integrate it into a national database, to improve understanding of aggregate demand by infrastructure typology and maintenance activity.
- Expand the Infrastructure Commission's Forward Works Programme so future demand can be broken down by region, and include primary raw materials in it.
- To prioritise low-carbon-emission options, Road Controlling Authorities should actively encourage and lead in the use of sustainability rating schemes that promote using recycled and re-used materials.
- Waka Kotahi should commission a Training Needs Assessment regarding the levels of training required across their infrastructure delivery activities to build the capacity and skills to use aggregate resources more sustainably.
- Establish a working group to encourage collaboration and cooperation among the key central infrastructure agencies, local government, industry and researchers, to develop various aspects of the above recommendations.
- Do research to investigate how aggregates (and other key raw resource materials) could be tagged, identified and electronically tracked from origin to destination.
- Do research on infrastructure sensing that would allow remote data analytics and infrastructure condition monitoring to be developed throughout the life cycle of aggregates, from origin to destination, to allow the sustainable use of aggregates.
- Do further research on aggregate quality, to inform building databases, costing analysis, planning and strategic policy development.



RR 693: *Aggregate supply and demand in New Zealand*, Waka Kotahi NZ Transport Agency research report. Available at www.nzta.govt.nz/resources/research/reports/693