

**Before Independent Hearings Commissioners Appointed by Canterbury  
Regional Council and Selwyn District Council**

**In the matter of**            The Resource Management Act 1991

**And**

**In the matter of**            Applications by **Fulton Hogan Limited** for all  
resource consents necessary to establish, operate,  
maintain and close an aggregate quarry (**Roydon  
Quarry**) between Curraghs, Dawsons, Maddisons  
and Jones Roads, Templeton

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**SUMMARY OF EVIDENCE OF MICHAEL OLIVER CHILTON  
ON BEHALF OF FULTON HOGAN LIMITED**

**AGGREGATE DEMAND AND SUPPLY**

**DATED: 13 NOVEMBER 2019**

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## **Introduction**

1. My name is Michael Oliver Chilton. I have been asked by Fulton Hogan Limited (**Fulton Hogan**) to provide evidence in respect of its application for resource consents to establish, operate, maintain and close the proposed Roydon Quarry (**Proposal**). My expertise is in the area of aggregate demand and supply.

## **Scope of Evidence**

2. In this summary of evidence I will address the key items in my evidence dated 23 September 2019 relevant to the Roydon Quarry application and summarise my rebuttal evidence dated 21 October 2019.

## **The importance of aggregate to society**

3. Aggregates are fundamental to the lives of New Zealanders. Roothing, building and agriculture rely on the continuing supply of suitable quality aggregates from a quarry source close to the area of demand.
4. New Zealand has one of the highest rates of aggregate consumption per capita in the world, at around 8-10 tonnes per person per annum.
5. Ensuring sources of aggregate supply are located close to the end user ensures they are cheaper and cleaner to deliver to the customer. Ideally, a quarry is located in an area of high-quality rock, close to transportation infrastructure and the end users that it serves.
6. The realisation of the importance of aggregates, combined with the negative effects of reverse sensitivity have led many authorities to protect potential future aggregate sources from conflicting land uses.

## **The essential features of the Proposal in terms of resource**

7. The proposed Roydon Quarry is intended to benefit the people of Christchurch City, Selwyn District and (to a comparatively lesser extent) Waimakariri District (**Greater Christchurch**) by enabling Fulton Hogan to continue provision of high-quality topcourse, basecourse and sub-base aggregate close to their points of need.
8. The site is ideally located to provide supply to urban growth areas particularly in Selwyn District and Southwest Christchurch. Other benefits of the

proposed site are proximity to high volume roading, good quality of resource and large parcel size.

### **The contribution of Pound Road quarry to date**

9. The Proposal is designed to be a replacement for the existing Pound Road quarry. The top course / basecourse / sub-bases that are produced from Pound Road will be able to be produced at Roydon Quarry if consented. The manufactured quantities proposed for Roydon are expected to match or exceed those from Pound Road.

### **Forecast local demand for aggregate**

10. My forecasting looked at historic trends for aggregate consumption in Christchurch and concluded the most reasonable average consumption per capita going forward was 9.6 tonnes per annum per person. This was based on the average consumption between 2000 and 2017.
11. I used Christchurch's "Our Space" document to see forecasted growth of 150,000 people in Greater Christchurch between 2018 and 2048. I then matched growth with the aggregate consumption per person, giving aggregate demand of a low of 5.1 million tonnes per annum (**Mtpa**) in 2021 up to 6.3Mtpa in 2048.
12. I also calculated the area of land required to provide for this aggregate consumption, noting that Christchurch's land-based gravel extraction is shallow (average 8m depth) to protect the underlying water table. To 2048, almost 1000ha is required at the predicted rate of 9.6t per person (roughly twice the size of the Christchurch CBD).
13. Roydon quarry's proposed 150-170ha if consented would only add 5-6 years to the aggregate supply for Greater Christchurch. While this may seem like a short duration on its own, it increases the current 25-year supply duration by 22% and provides additional time for new resources to be found, consented and developed.

### **How that demand could be met**

14. I am aware of four quarries fully consented since Mr English's work in 2015 when he calculated 130Mt of aggregate resource remaining. These four new consents have added a total of 17Mt to the consented gravel volume in the Greater Christchurch area.

15. If no further quarries are consented in Greater Christchurch and aggregate demand continues as forecast, the total supply of aggregate is likely to run out around 2044. However, this does not highlight the imbalance of resources. As quarries with shorter lives are exhausted, the sites with larger reserves are put under pressure as demand on them increases. For example, the last two quarries supplying greater Christchurch would have the highest sales volumes in New Zealand. Ironically, the area of Christchurch with the least proximate aggregate reserves is its south-west (Halswell, Prebbleton, Lincoln and Templeton) which coincides with strong housing demand.
16. If a 30Mt resource like Roydon were consented in say 2020, the predicted exhaustion of aggregate supply is around 2049. A site located similarly to Roydon in the southwest of Christchurch also helps to address the imbalance of consented aggregate resources.
17. River extraction is likely to continue to provide only a small portion of Greater Christchurch's aggregate needs. I have estimated 0.5Mtpa for my forecasting. River extraction is less reliable than land-based extraction due to flooding and bird nesting.
18. Recycled aggregate is unable to provide a large proportion of aggregate demand due to lack of input materials. Even during the post-earthquake demolition and reconstruction, Mr English found only about 25% of quarries' output was coming back as fill. The European Aggregate Union UEPG estimates only 14-20% of aggregate demand can be met by recycling 100% of Europe's waste streams.
19. Other options to provide for Greater Christchurch's future aggregate needs are to consent other more-remote resources or even bring in aggregates from outside the area. This is much less desirable as it decreases cartage efficiency, contributes greater air pollution and leads to higher costs to consumers.

#### **Assessment of the benefits of the Proposal in meeting that demand**

20. Mr Stewart has discussed how looking for the proposed Roydon Quarry commenced in 2012, meaning that if consented, the entire planning and development process will have taken in the order of 8 years. This demonstrates the length of time it takes to develop greenfield quarry

resources required to extend the supply of aggregate into Greater Christchurch.

21. Planning, consenting and making significant investments in site infrastructure and plant is typically only suitable for long-term quarry options. This site was considered to have a sufficient quantity of aggregate to warrant investment as discussed by Mr Stewart.
22. This proposal not only extends Greater Christchurch's aggregate reserves, it meets several other criteria making it highly desirable as the location for a quarry:
  - (a) It is close to the concentrations of end users, i.e. Templeton, Prebbleton, Christchurch City;
  - (b) It is close to highway transport and power infrastructure;
  - (c) The resource is of suitable quality;
  - (d) The parcels of land are large enough to warrant the large investments involved;
  - (e) There are limited neighbours within close proximity to the site; and
  - (f) There are no significant heritage, cultural or ecological overlays or values pertaining to the site.

### **Rebuttal Evidence**

23. In my rebuttal evidence I addressed the submissions of Mr Arthur Oliver Turner (Civil Contractors New Zealand Inc.), Mr Wayne Scott (Aggregate and Quarry Association of New Zealand), Mr Robert Campbell Officer (Allied Concrete Ltd) and Mr Martin Flanagan.
24. Mr Turner addressed the importance of extending the supply life of aggregates for maintaining well-being and infrastructure for greater Christchurch which is consistent with my primary evidence. He then stressed the importance of maintaining aggregate supply certainty for CCNZ's members to continue their contracting work in the medium to long term. This is also addressed in my primary evidence that without further aggregate resources consented, greater Christchurch will have exhausted its reserves in about 25 years. Finally, Mr Turner addresses the importance of proximity of quarries to their intended markets to minimise transport costs, specifically

mentioning the growth areas in west and southwest Christchurch that could be serviced from Roydon Quarry.

25. Mr Scott explains the importance and wide range of uses for aggregates and that demand is “essentially driven by population growth and infrastructure development and maintenance”. This is consistent with my previous evidence and was the basis for my aggregate demand forecast. Mr Scott also lists the reasons why consented aggregate supplies are dwindling. I note he mentions sterilisation of resources by encroachment of urban development. The solution for this is forward planning to identify and protect strategic resources such as is mentioned in my primary evidence.
26. Mr Officer’s primary concerns were the downstream effects of changes in aggregate supply to the readymix supply. He mentioned emissions, cost and quality. He noted that although the proposed Roydon Quarry is intended as a replacement for Pound Road and not as a supplier of concrete aggregates, if Roydon is not consented then the basecourse demand will need to be met from a concrete aggregate producing site such as Miners Road, placing stress on the concrete supply chain. I agree with his statement.
27. Mr Flanagan addresses the softening of aggregate demand, saying there will be an “ongoing net reduction in quarry related work”. I agree that there will be a reduction in aggregate demand compared to the post-quake demand and that there will be a return to a more “business as usual” scenario, resulting in greater Christchurch’s aggregate resource exhaustion in around 25 years if no further quarries are consented. I noted that in that period, the tens of thousands of homes required to be built would be likely to sterilise future quarry resources, making it important to identify and protect future aggregate sources before they are sterilised. If extraction can come before building then the land can deliver on two important uses.
28. Mr Flanagan also calculates the increased cost to a Canterbury resident of an equivalent quarry 10km further away. The other concerns with moving to a more remote source are loss in productivity (i.e. less loads delivered per day) and driving heavy vehicles on less suitable rural roads.

## **Conclusion**

29. Roothing, building and agriculture rely on the continuing supply of suitable quality aggregates from a quarry source close to the area of demand. It is

important to identify and protect future aggregate resources from conflicting land uses so the land can deliver on more than one important use.

30. Ensuring sources of aggregate supply are located close to the end user ensures they are cheaper and cleaner to deliver to the customer. Ideally, a quarry is located in an area of high-quality rock, close to transportation infrastructure and the end users that it serves.
31. If no further quarries are consented in Greater Christchurch and aggregate demand continues as forecast, the total supply of aggregate is likely to be exhausted around 2044 (approximately 25 years). Noting my comments in paragraph 15, the aggregate resource exhaustion rates are unevenly spread around greater Christchurch, with a particular need in the southwest.
32. The Proposal will extend the life of the total consented aggregate supply within Greater Christchurch by about 5-6 years, increasing the current supply duration by 22% and providing additional time for new resources to be found, consented and developed.
33. The Proposal will benefit the people and communities of Greater Christchurch by enabling Fulton Hogan to provide high-quality topcourse, basecourse and sub-base aggregate close to their points of need.

#### **Correction to Evidence**

34. In my evidence dated 23 September 2019, I said:

45 *There have been three quarries consented since Mr English's work in 2015 when he calculated 130Mt of aggregate resource remaining. These three new consents have added a total of 7.9Mt to the consented gravel volume in the Greater Christchurch area.*

35. The 7.9Mt figure was corrected to 9.1Mt in the annexure to my rebuttal evidence dated 21 October 2019 due to a property size error.

36. Since conferring with Mr English, I have discovered one of the recently consented quarries at McLean's Island was not included in his original resource summary. Therefore paragraph 45 should read:

45 *There have been **four** quarries consented since Mr English's work in 2015 when he calculated 130Mt of aggregate resource remaining. These **four** new consents have added a total of **17Mt** to the consented gravel volume in the Greater Christchurch area.*

37. This consequently changes the predicted life of greater Christchurch's resources to 25 years instead of 24, meaning predicted exhaustion of reserves is 2044 not 2043. This changes Figures 10 and 11 as shown below.

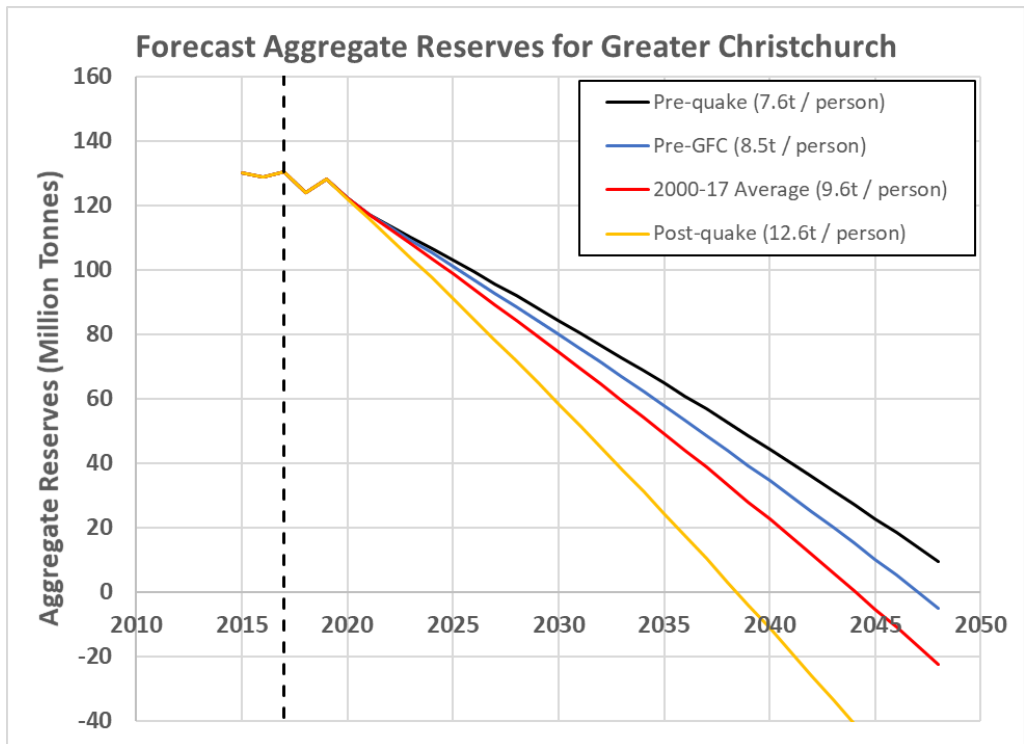


Figure 10 - Forecast aggregate reserve depletion

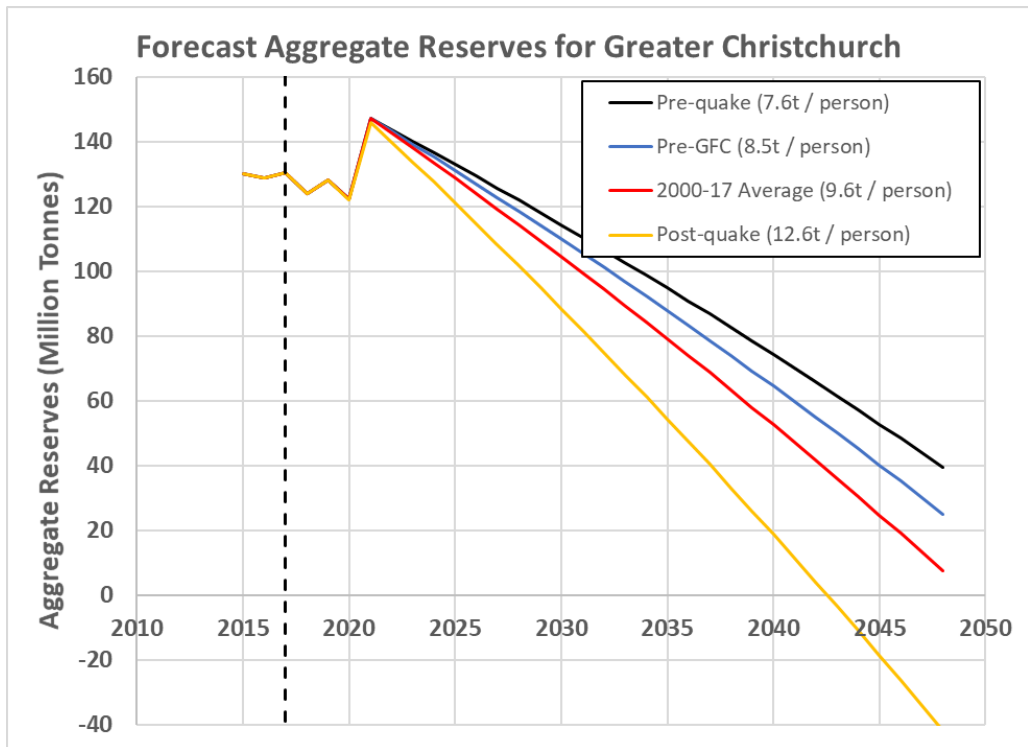


Figure 11 - Effect of consenting a 30Mt resource in 2020

Michael Chilton

13 November 2019