

ORC NOTIFICATION RECOMMENDATION REPORT

ID Ref: A1421820
Application No: RM20.360
Prepared For: Staff Consents Panel
Prepared By: Sarah Davidson
Date: 19 April 2021

Subject: Notification recommendation for application RM20.360

1. Purpose

To report and make recommendations under sections 95A-G of the Resource Management Act 1991 (the Act) on the notification decision for the above application.

2. Background Information

Applicant: Cromwell Certified Concrete Limited

Applicant's Agent: Landpro

Site address or location: 1248 Luggate-Cromwell Road

Legal description(s) of the site: Lot 3 DP 301379, Lot 5 DP 301379 and Lot 8 DP 301379

Map reference(s): NZTM 2000: E1305460 N 5017181

Consent(s) sought:

- RM20.360.01- Water permit to take and use groundwater for the purpose of gravel washing and dust suppression
- RM20.360.02- Discharge Permit to discharge contaminants to land to discharge water to land for the purpose of gravel washing
- RM20.360.03- Discharge Permit to discharge contaminants to air for the purpose of operating a quarry
- RM20.360.04- Land use consent to construct a bore for the purpose of excavating a quarry pit to a depth that intercepts groundwater

Purpose: For the purpose of gravel washing and dust suppression and the operation of Amisfield Quarry.

Current Consent(s):

- **RM16.108.01:** Water Permit to take groundwater
- **RM16.108.02:** Discharge Permit to discharge water to land for the purpose of gravel washing.

Section 124 timeframes:

- Application was lodged at least six months before the expiry date.

3. Description of Proposed Activity

The applicant, Cromwell Certified Concrete Limited (CCCL) currently operates a quarry on the subject site that extracts aggregate. The quarry has been operating on site since 1995. Consents were granted by ORC in 2016. It is these consents that are to be replaced and new consents are also sought.

The applicant has purchased adjoining land to the north of the existing quarry with the intention of expanding the quarry onto this land in time. The applicant advises the available consented gravel resource in the existing quarry is sufficient to meet local demand for the next five to six

years. Projected demand is such that the applicant considers it is necessary to expand the quarry. As a consequence, the applicant is seeking to replace the existing consents RM16.108.01 and RM16.108.02 and include additional consents in relation to the construction of a bore and the discharge of contaminants to air in relation to the quarry expansion. The extension of the quarry footprint is not a matter that is consented by ORC, instead this is a District Council matter.

The quarry currently operates with a pre-strip, active face and backfill configuration with each strip being approximately 50 metres wide. Overburden is used to backfill worked areas of the quarry. Gravel is extracted by traditional dump truck and shovel techniques. Dump trucks transport unprocessed gravel from the active face to the fixed plant identified in Appendix 1. Processed aggregate is stockpiled in areas within the existing quarry and stored accordingly to different grades of processed gravel. Areas of the quarry which have been worked are backfilled with overburden. Figure's 1 and 2 illustrate an active working face and the screening and washing plant with stockpiled washed aggregate.

3.1 Groundwater take

Under RM16.108.01 the applicant is authorised to abstract groundwater at a maximum rate of 46L/s from bores G41/0127 and G41/0456 for use in processing aggregate and suppressing dust. The applicant proposes to increase this take to 70L/s. Table 1 summarises the proposed groundwater take limits. Water is abstracted and will continue to be abstracted from the Pisa Groundwater Management Zone.

Table 1. Existing and proposed groundwater take limits (Source: Application)

	Current water take limits	Proposed water take limits
Instantaneous rate (L/s)	46	70
Daily rate (m ³ /day)	1,620	3,024
Monthly rate (m ³ /month)	50,220	93,744
Annual rate (m ³ /year)	453,600	846,720

Water abstracted is utilised for washing and screening aggregate and dust mitigation. The location of the washing and screening plants are identified in Appendix 1. Water from the existing bore is also utilised for potable water. An assessment of the breakdown of water use has been provided as part of further information received on the 2 December 2020. This is outlined in the following table.

Table 2. Breakdown of water use (Source: Application)

	Volume (m ³)/day	Percentage of total
Crushing Plant	2,768	91.5%
Water Cart	240 (20m ³ x 12 times/day)	8%
Irrigation	15	0.5%
Potable Use/Washdown	1 (rounding up)	Negligible
TOTAL:	3,024	100

3.2 Discharge to land

The applicant proposes to discharge contaminants to land associated with the washing and screening of aggregate and dust suppression that is currently authorised by RM16.108.02. Due to the increased water take and expansion of quarry, an increase in the discharge of contaminants is sought. The applicant proposes to discharge the same volume of water sought under Table 1.

3.3 Land use consent - bore

At present the quarry is consented under the land use consent with CODC to excavate to a maximum depth of 15 metres below ground level. The applicant now wants to excavate the gravel resource deeper to a maximum depth of approximately 30 metres below ground level. Given the proposed increase in the depth of excavation, it is likely that groundwater will be intercepted, so the pit acts as a bore. Where groundwater is intercepted, excavation of aggregate will involve the use of a mobile dragline machine. Consent is needed for this activity.



Figure 1. Photograph of active working face with load and trucks (Source: Application)



Figure 2. Photograph of screening and washing plant with washed aggregate in foreground (Source: Application)

The quarry will continue to incorporate the same extraction and processing techniques as existing. Material extracted from the expanded quarry will be transported back to the existing crushing and washing plant. No crushing or washing/screening will occur in the expansion area and this area will be limited to excavation and transportation of material.

Washwater from the crushing and screening plant is directed towards a soakage pond that allows sediment to be filtered as water is discharged via seepage. No additional water management infrastructure as part of the expansion is proposed. Stormwater is directly discharged to ground. Appendix 1 identifies the location of the soakage pond (settling pond) and Figure 3 illustrates an aerial of the soakage pond in relation to the screening and crushing plant.



Figure 3. Soakage Pond in relation to screening and crushing plant (Source: Otago Maps)

3.4 Discharge to air

The applicant proposes to extract 200,000 cubic metres of aggregate a year, which exceeds the 100,000 cubic metres permitted activity provision under Rule 16.3.5.3 of the Regional Plan: Air for Otago (RPA). The dominant air discharge contaminant from quarrying operations will be particulate matter in the form of dust. Products of combustion such as sulphur dioxide (SO₂), nitrogen oxides (NO_x) and carbon monoxide (CO) will also be discharged to air from the operation of machinery and vehicles.

3.5 Compliance with Current Consent

ORC's Compliance Team have reviewed the application and provided a summary of compliance history. The most recent audit was undertaken in 2016 where the consent holder was graded as compliant. Metering is undertaken as required by RM16.108.01 and all monitoring has been undertaken. Quarterly bore sampling of suspended sediment has been undertaken in accordance with Discharge Permit RM16.108.02.

The compliance team notes that no complaints have been filed in respect of existing quarry operations prior to 7 July 2016. ORC have received complaints on two separate occasions in 2020 raising concerns over dust.

3.6 Description of the Environment

The environment is adequately described in the application for consent and is not duplicated here. The description is adopted for the purpose of this report. The site is located at 1248 Luggate-Cromwell Road.

The key aspects of the environment are:

- Surrounding land use is a mixture of residential lifestyle properties, vineyards, unirrigated grazing land and a DoC Mahaka Katia Scientific reserve to the north of the expansion area;
- The expansion area of the quarry is currently bare land;
- The quarry and expansion area are located on the upper terrace of Lake Dunstan and is generally flat; and
- Soils mainly comprise of Mataura, Molyneux and Blackman Soils that all have a loam texture.

3.7 Groundwater

The proposed takes are from G41/0127 and G41/0456 in the Pisa Groundwater Management Zone. The bores are approximately 25-30 metres deep and are screened within gravel or sandy gravel strata. The location of these bores is identified in Figure 4.



Figure 4. Location of abstraction bores (Source:Otago Maps).

Static levels have been recorded at around 13.8 m and 7.1 m below ground level for the two bores, indicating that the piezometric surface lies within the gravel or sandy gravel strata. This information suggests that the aquifer targeted by the applicant's bores is likely to be unconfined.

The applicant has not submitted a recent aquifer pump test for the proposed increased take. This was requested as part of a further information request dated 12 November 2020. As part of the further information submitted by the applicant, they have provided an analysis of a previous pump test undertaken in the previous application RM16.108, along with reviewing aquifer test information of nearby bores. The applicant concludes the transmissivity value of 1,100m²/day used in the original application is appropriate. E3 Scientific have reviewed the application on behalf of ORC's Resource Science Unit (RSU) and concur with the applicant's assessment.

The Pisa Groundwater Management Zone is estimated to have a mean annual recharge of 6,500,000 m³. The available allocation is estimated to be 2,215,094m³ according to Otago Maps.

3.8 Surface Water

Lake Dunstan is located approximately 800 metres from the applicant's groundwater bores and approximately 900 metres from the soakage pond.

The main stem of the Amisfield Burn is located approximately 130 metres south west of G41/0127. This is illustrated in Figure 5 below.

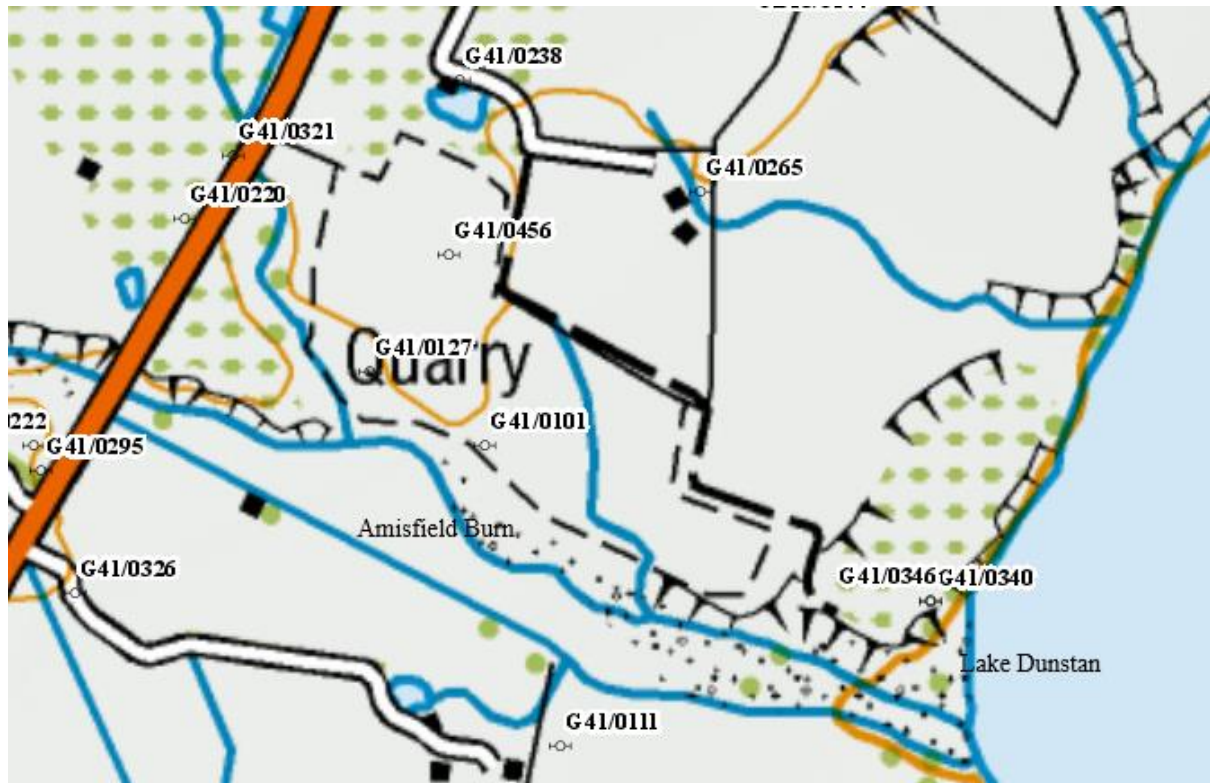


Figure 5. Location of nearby surface water bodies (Source:Otago Maps)

3.9 Schedule 1 of the Regional Plan:Water

The Regional Plan: Water for Otago (RPW) outlines the natural and human use values of various watercourses throughout the Otago Region. Lake Dunstan and Amisfield Burn are identified in this schedule. Lake Dunstan and Amisfield Burn are identified for the following natural and ecosystem values:

Table 3. Nearby water bodies that are identified in Schedule 1 identifying natural and human use values

<i>Water body</i>	<i>Ecosystem Values</i>	<i>Outstanding natural feature or landscape</i>	<i>Significant indigenous vegetation and significant habitat of indigenous fauna</i>	<i>Areas with a high degree of naturalness</i>
Clutha River/Mata-Au between Alexandra and Lake Wanaka	Psize, Prock, Pgravel, Hspawn(t&s), Hriparian, Hjuve(t&s), Trout, Eel, Salmon, Rarefish, Birddiv		Significant habitat for flathead galaxiid (tributaries).	

<i>Water body</i>	<i>Ecosystem Values</i>	<i>Outstanding natural feature or landscape</i>	<i>Significant indigenous vegetation and significant habitat of indigenous fauna</i>	<i>Areas with a high degree of naturalness</i>
Amisfield Burn	Weedfree, Rarefish		Significant habitat for koaro.	

Table 4. Codes for ecosystem values supported by lakes and rivers (Source: Regional Plan: Water for Otago)

Ecosystem Value	Code	Explanation
Physical Characteristics		
Size	Psize	Large water bodies supporting high numbers of particular species, or habitat variety, which can provide for diverse life cycle requirements of a particular species, or a range of species.
Unimpeded access	Ppass	Access within the main stem of a catchment through to the sea or a lake unimpeded by artificial means, such as weirs, and culverts.
Substrata: Macrophyte Boulder Gravel Sand Silt/mud Bedrock	Pplant Pboulder Pgravel Psand Psilt Prock	Refers to the bed composition of importance for resident biota.
Habitat Characteristics		
Spawning areas	Hspawn	Refers to presence of significant fish spawning areas: (t)=trout; (s)=salmon.
Juvenile rearing areas	Hjuve	Refers to presence of significant areas for development of juvenile fish: (t)=trout; (s)=salmon.
Riparian vegetation	Hriparian	Refers to presence of riparian vegetation of significance to aquatic habitats.
Freedom from biological nuisances	Exoticfree Weedfree Willowfree	Refers to absence of: exotic species of fish; aquatic pest plants (eg Lagarosiphon) identified in the Pest Management Strategy for Otago 2009; Crack willow.
Species Characteristics		

Ecosystem Value	Code	Explanation
Exotic game fish: trout, salmon	Trout Rtrout Salmon	Refers to significant presence of trout. Refers to regionally significant presence of trout. Refers to significant presence of salmon.
Fishery values: eels	Eel	Refers to significant presence of eels.
Indigenous fish diversity	Fishdiv	Refers to presence of a significant range of indigenous fish species.
Indigenous fish – rare species	Rarefish	Refers to presence of indigenous fish species threatened with extinction.
Indigenous waterfowl diversity	Birddiv	Refers to presence of a significant range of indigenous waterfowl.
Indigenous waterfowl - rare species	Birdrare	Refers to presence of indigenous waterfowl threatened with extinction.
Indigenous Invertebrates diversity	Invdiv	Refers to presence of a significant range of indigenous invertebrates.
Indigenous Invertebrates - rare species	Invrare	Refers to presence of indigenous invertebrates threatened with extinction.
Indigenous- aquatic vegetation	Sigveg	Refers to presence of significant indigenous aquatic vegetation.
Gamebirds	Gbird	Refers to regionally significant presence of gamebirds.

Schedule 1AA of the RPW identifies Otago resident native freshwater fish and their threat status. Lake Dunstan is known to provide habitat for Clutha flathead galaxias and Amisfield Burn is known to provide habitat for Koaro.

Schedule 1B of the RPW identifies rivers where the water taken is used for public water supply purposes and Schedule 1C identifies registered historic places. There are no Schedule 1B or 1C values in close proximity to the proposed activity.

Schedule 1D of the RPW identifies the spiritual and cultural beliefs, values and uses associated with water bodies of significance to Kai Tahu. Lake Dunstan is identified as having the following values:

- ***Kaitiakitanga***: the exercise of guardianship by Kai Tahu, including the ethic of stewardship.
- ***Mauri***: life force.
- ***Waahi tapu and/or Waiwhakaheke***: sacred places; sites, areas and values of spiritual values of importance to Kai Tahu.
- ***Waahi taoka***: treasured resource; values, sites and resources that are valued.
- ***Mahika kai***: places where food is procured or produced.
- ***Kohanga***: important nursery/spawning areas for native fisheries and/or breeding grounds for birds.

- **Trails:** sites and water bodies which formed part of traditional routes, including *tauraka waka* (landing place for canoes);
- **Cultural materials:** water bodies that are sources of traditional weaving materials (such as *raupo* and *paru*) and *rongoa* (medicines); and

3.10 Regionally Significant Wetlands

The Bendigo Wetland is located north east of the subject site, approximately 700 metres from the quarry area.

3.11 Climate and Soils

GrowOtago data indicates that the median annual rainfall at the site is between 401-450 mm and that the median potential evapotranspiration in January and February is 211-215 mm. S-Map Online indicates that the soils at the site are likely to be a combination of Cromwell moderately deep sandy loams and Molyneux very shallow sandy loams. These soils have moderate to high drought vulnerability and low plant available water. The applicant advises soils mainly comprise of Matura, Molyneux and Blackman Soils that all have a loam texture.

S-Map online indicates the quarry site comprises of Molyneux and Matura Soils that are moderately-well drained. The Matura soils are shown to have a moderate to low (60-89mm) profile available water (PAW) value. The Molyneux soils are shown to have a moderate PAW value (90-119mm).

The applicant does not measure meteorological variables on site. The applicant has relied on information supplied by Fulton Hogan who have a quarry located approximately 2km south of the applicant's quarry site. Beca have prepared a technical assessment of the potential discharge effects in support of the application and confirms the Fulton Hogan Site is a good representation of the wind conditions experienced on the applicant's site. A windrose prepared for the Fulton Hogan site in 2019 shows wind blows predominantly from the north to northeast and that the strongest winds also come from this direction. Secondary winds blow from the south-westerly quarter and winds from the east and west are rare.

The average wind speed measured during the 2019 monitoring period was 2.1 m/s at the Fultron Hogan quarry. The percentage of winds which exceed 5 m/s from all directions was 10.2% (the critical windspeed for the pickup of dust from unconsolidated surfaces). The figure below shows the wind rose prepared in support of the application based on data measured at Fulton Hogan Quarry. Further results and data from the Fulton Hogan Quarry have been provided in support of the further information dated 5 March 2021.

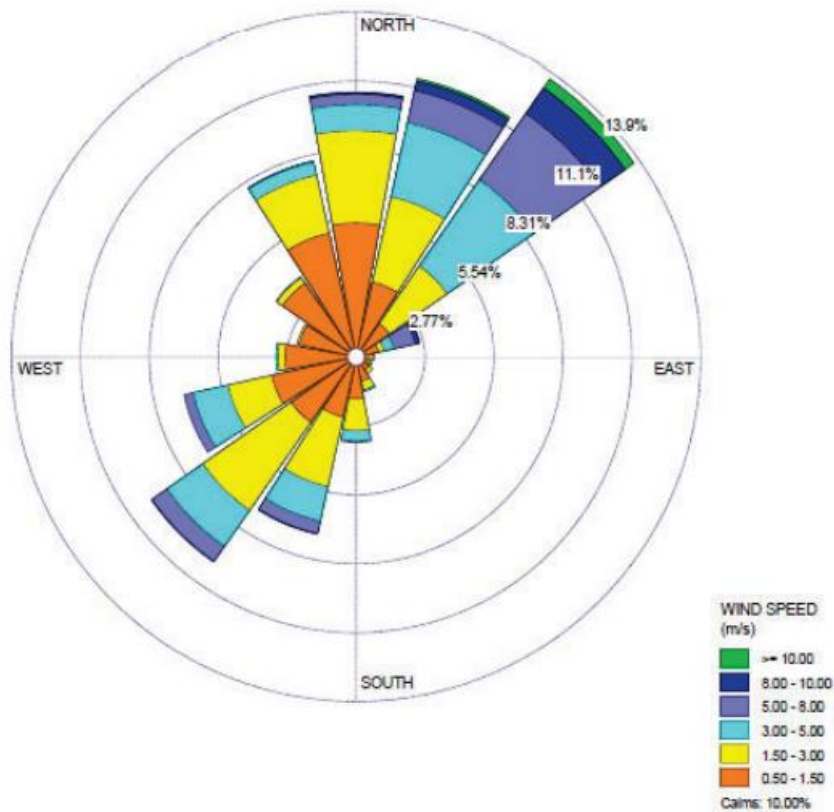


Figure 6. Annual windrose of hourly average windspeed and direction measured at Fulton Hogan's Parkburn Quarry (Source: Application)

3.12 Air Quality

There is no information available on ambient air quality for the site and surrounding area. The site is located in a rural environment and is expected to have good air quality. Predominant sources of air discharges in the area are quarry activity, traffic generation on unsealed roads, agricultural activities and natural sources such as dry unvegetated paddocks. During periods of low rainfalls and strong winds, background dust concentrations maybe relatively high due to the natural and agricultural sources in the area.

The quarry is located outside of any gazetted airshed as defined by the National Environmental Standards for Air Quality (NESAQ). The nearest gazetted air shed to the site is the Cromwell Air Zone, which is part of Air Zone 1 as defined in the Air Plan and Airshed 1 as gazetted in the NESAQ. The northern boundary of Airshed 1 is approximately 10.5 km to the south of the quarry.

Further information submitted by the applicant dated 5 March 2021 addresses the potential background dust levels in the area surrounding Amisfield Quarry. The applicant confirms the rural area surrounding the Amisfield Quarry is naturally dry and dusty and other land use activities regularly generate dust. A comparison has been made to a rural area around an open cast goldmine at Earnsclough in Central Otago. Dustfall data analysed by Beca, between May 2009 and May 2015, at nine sites in a rural area around an open cast goldmine at Earnsclough in Central Otago, averaged 1.0 g/m²/30 days but varied from near zero to 15.5 g/m² /30 days. The land uses on the Earnsclough Flats are characterised by orchards, vineyards and pastoral farms and mining activities were carried out relatively closely to these activities. The Earnsclough area has a low rainfall and low average wind speeds which is very similar to the Amisfield Quarry site.

The applicant advises the Ministry for Environment Good Practise Guide for Assessing and Managing Dust (GPG) reports that background Total Suspended Particulate (TSP) levels in “clean” environments are about 10-20 micrograms per cubic metre ($\mu\text{g}/\text{m}^3$) but can greatly exceed this in summer in rural areas due to agricultural activities and natural dust erosion. The average background TSP concentration measured at Earnsclough between May 2009 and May 2011 was $10 \mu\text{g}/\text{m}^3$ but this varied from nearly zero to a maximum 24-hour average value of $96 \mu\text{g}/\text{m}^3$.

3.13 Site Visit

A site visit was undertaken on the 9th December 2020 to gain a better understanding of quarry operations, including dust suppression measures and the soakage pond and to see the proposed expansion area in relation to dust receptors. Photographs were taken and are shown below:



Figure 7. Photograph showing settling ponds that soak water to ground via main pond



Figure 8. Photograph showing current dust suppression measures including irrigation of vehicular paths and truck with sprayer



Figure 9. Photograph showing irrigation sprinklers and piles of aggregate. Processed aggregate and crusher plant are in the background



Figure 10. Area of proposed quarry expansion with DoC Scientific reserve in background to the north, workers accommodation to the western boundary and vineyard to the eastern boundary

4 Status of the Application

4.1 Operative Regional Plan: Water for Otago (RPW)

Rule 12.2.3.2A confirms the following:

“Except as provided for by 12.0.1.3, 12.2.1A.3 and 12.2.3.1A, the taking and use of groundwater is a **restricted discretionary** activity, if:

- (a) The volume sought is within:
 - (i) The maximum allocation limit identified in Schedule 4A; or
 - (ii) 50% of the mean annual recharge calculated under Schedule 4D, for any aquifer not identified in Schedule 4A; or
 - (iii) That volume specified in an existing resource consent where the assessed maximum annual take of the aquifer exceeds its maximum allocation limit; and
- (b) It is subject to any aquifer restriction identified in Schedule 4B; and
- (c) Where the rate of surface water depletion is greater than 5 l/s, as calculated using Schedule 5A:
 - (i) Primary surface water allocation is available; and
 - (ii) For the Waitaki catchment, allocation to activities set out in Table 12.1.4.2 is available.”

The volume sought is within 50% of the mean annual recharge calculated under Schedule 4D and the rate of surface water depletion is less than 5L/s (this is further discussed in the assessment of environmental effects). The groundwater take is therefore considered a restricted discretionary activity under Rule 12.2.3.2A of the RPW.

Excavation is proposed that will intercept groundwater, which is considered a bore under the RPW. The construction of a bore is a controlled activity under Rule 14.1.1.1 of the RPW.

The discharge of water or contaminants from gravel washing operations is not provided for by any permitted activity rules within the RPW. The discharge of water or any contaminant from an industrial premise to water or to land is a discretionary activity under Rule 12.B.4.1.

4.2 Operative Regional Plan: Air for Otago (RPA)

The discharge of contaminants to air from the sorting, crushing, screening, conveying and storage of powdered or bulk products at a rate greater than 100 tonnes of material an hour is a discretionary activity under Rule 16.3.14.1 of the RPA. The following provisions of Rule 16.3.5.2 cannot be met:

- The crushing and screening of bulk materials is at a rate less than 100 tonnes an hour

The discharge of contaminants to air from mineral extraction and processing is a discretionary activity under Rule 16.3.14.1 of the RPA. The following provisions of Rule 16.3.5.3 cannot be met:

- The extraction of minerals from the surface or from an open pit at a rate less than 20,000 cubic metres per month and 100,000 cubic metres per year; and
- The crushing and screening of minerals at a rate less than 200 tonnes an hour.

Overall, the activity has a discretionary status.

4.3 Notified Plan Change 7 to the Regional Plan Water

On 18 March 2020, Council notified Plan Change 7 to the Water Plan. This plan change is part of the work being undertaken to give effect to the recommendations of the Minister for the Environment¹ in response to a review of Council's planning functions by Professor Skelton². One immediate issue facing ORC was developing a fit for purpose planning framework ahead of the expiry of deemed water permits on 1 October 2021. The purpose of Plan Change 7 is to provide an interim regulatory framework for the assessment of applications to renew³:

- Deemed permits expiring in 2021; and
- Any other permit to take and use surface water (including groundwater managed as surface water) expiring prior to 31 December 2025; and
- Provide direction on the consent duration for all water permits to take and use water.

As this activity is for a groundwater take that is not considered to be surface water under Policy 6.4.1.A(a), (b) or (c) of the RPW then the rules in the plan change do not apply.

4.4 Permitted Activity Rules

Stormwater from the site will be discharged to ground and will meet permitted activity Rule 12.B.1.9.

5 Assessment of Environmental Effects

¹ Letter from David Parker (Minister for the Environment) to Otago Regional Council Councillors regarding the Minister's investigation of freshwater management and allocation functions at the Otago Regional Council (18 November 2019).

² Peter Skelton "Investigation of freshwater management and allocation functions at the Otago Regional Council (18 November 2019).

³ Section 32 Evaluation Report – Proposed Plan Change 7, 18 March 2020, p 7.

5.1 Allocation Status

Maximum allocation limits (and aquifer restrictions, discussed below) are a means of managing the cumulative effects of groundwater takes on long-term storage of an aquifer and on outflows to surface water bodies, while avoiding contamination of groundwater and surface water resources, and permanent aquifer compression.

Policy 6.4.10A2 of the RPW states that 50% of the mean annual recharge calculated under Schedule 4D for any aquifer not listed in Schedule 4A is available for allocation. For the Pisa Groundwater Management Zone this equates to 2,215,094 m³/year (Mm³/yr). The applicant's assessed maximum annual take does not cause the maximum allocation limit of the aquifer to be exceeded.

5.2 Aquifer Restriction Levels

No restriction levels have yet been set in Schedule 4B of the RPW for the Pisa Groundwater Management Zone. The Council may review any consent under Section 128(1)(b) of the Act when a regional plan sets rules relating to minimum levels in aquifers. It is recommended that such a review condition is imposed.

5.3 Effects on Surrounding Groundwater Users

Abstraction of groundwater creates a cone of depression in groundwater levels (drawdown) that extends laterally from the pumping bore as water is abstracted. This may result in lowering groundwater levels in neighbouring bores. The lowering and/or consequent change in aquifer characteristics may prevent existing users from taking their authorised amount.

The applicant has relied on an aquifer pump test submitted in the previous consent RM16.108. An eight-hour constant rate test was completed in 2015 on G41/0455. Groundwater was pumped at a rate of approximately 2,203 m³/day (25L/s) and water levels were monitored in the applicant's bore throughout the test. A one hour recovery test was completed following the constant rate test. Drawdown stabilised at 2.2 m after around 5.5 hours of pumping, and remained at this level throughout the remainder of the test. One minute into the recovery test, drawdown in the pumped bore recovered to within 4 cm of the starting static water level.

The transmissivity values of 1,200 m²/day and 1,100 m²/day using the Logan formula and Theis Recovery methods respectively were used in the previous consent. The latter transmissivity value has been utilised by the applicant to assess drawdown effects in this application.

Under the previous consent, it was estimated that 30% of the take abstracted and through consumptive uses is not returned to the aquifer. This equated to an estimated 600m³/day being returned to the aquifer under the previous consent. The applicant has modelled bore interference based on two scenarios. The first scenario is approximately 30% (precisely 37%) of the daily take is used to estimate drawdown, as applied in the previous consent application. The second scenario is that no water is returned to the aquifer and the water take has a full drawdown effect. The modelled interference drawdown effects are summarised in the table below:

Table 5. Modelled bore interference drawdown effects (Source: Application).

Bores	Current water permit @600 m ³ /day =6.9 L/s for 360 days	Proposed water permit @1,119 m ³ /day =13 L/s for 280 days	Worst possible scenario @ 3,024 m ³ /day = 35 L/s for 280 days
G41/0238 (230 m)	0.22 m	0.40 m	1.1 m
G41/0321 (320 m)	0.19 m	0.34 m	0.92 m
G41/0220 (320 m)			

The previous assessment under RM16.108 indicates the drawdown effect at a rate of 600m³/day was less than minor due to the drawdown calculations in the closest bores being less than 0.2m for an unconfined aquifer. The increased take will see interference effects greater than 0.2m in the closest bores as identified in the table above.

Policy 6.4.10B and Schedule 5B of the Regional Plan: Water for Otago state that an acceptable magnitude of drawdown interference is less than 0.2 m for an unconfined aquifer. Interference effects in nearby bores are greater than this. The applicant in their assessment of effects has acknowledged this. The applicant advises the maximum drawdown under a worst-case scenario would be 1.1m or 11% reduction in the available drawdown at G41/0238.

The applicant advises in Canterbury considerable investment has been undertaken in developing guidelines for determining acceptable bore inference and have introduced a concept 'protected available drawdown' under the Canterbury Land and Water Regional Plan. Drawdown is considered significant if it exceeds 20% of the available drawdown. The applicant has estimated drawdown to be 4% using the parameters in the previous consent from the pumping test conducted on G41/0455. The applicant considers the 4% drawdown would be an acceptable negligible adverse effect and would not be noticeable by the neighbouring groundwater users in the context of natural groundwater variability.

E3 Scientific have undertaken a technical review of the application on behalf of Otago Regional Council's Resource Science Unit (RSU). E3 Scientific have reviewed the interference effects of the proposed increased take and the available drawdown effects on nearby bores that will likely experience interference effects greater than 0.2m. The bores that are likely to experience drawdown interference effects greater than 0.2m are identified in Table 6 below. The location of the affected bores are further illustrated in Figure 11, that shows the location of the bores in relation to the quarry and applicant's bores.

Table 6. Available drawdown of neighbouring bores (Source: E3 Scientific Technical Review)

Well Number	Owner	Take Consent	Depth	SWL (m.b.g.)	DrillDate	Drawdown	PumpRate	Pump Duration	ScreenFrom	ScreenTo	Available Drawdown (m)	Distance to G41/0127 (m)	Distance to G41/0465 (m)
G41/0101	Cromwell Certified Concrete Limited	2004.294.V1	10	0	1/09/1994		1296					182	257
G41/0111	MCTAINSH D		14.8	8.05	22/08/1995		114.9				3.75	559	669
G41/0127	Cromwell Certified Concrete Limited	RM16.108.01	25.92	13.8	16/09/1995		1296				9.12	0	187
G41/0220	Montero, J	2010.152.V1	36.55	22.22	17/11/2000	6.29	864	360	33.54	36.55	11.32	319	356
G41/0222	Hay R J Hay G J		40	0	12/01/2000		864					458	608
G41/0238	Prophets Rock Vineyard	2001.831	44.87	23.5	30/07/2001	1.75	13	330	41.76	44.76	18.26	404	231
G41/0245	Walnut Ridge Ltd		33.1	18.47	25/05/2002	0.33	112.32				11.63	499	344
G41/0295	Amisfield Farm Ltd	2003.363	30.17	19.83	20/09/2004	1.83	1771				7.34	457	614
G41/0321	Winslow Properties Ltd	RM14.211.02	31.76	20.65	6/03/2007	5.32	1641.6	150			8.11	339	316
G41/0326	Amisfield Road Partnership	RM12.514.01.V	25	0	1/10/2004		121					491	670
G41/0340	Stevinson D		15.2	3.5	15/12/2005	0.28	475				8.7	806	789
G41/0348	Dean Stevenson NZ Ventures LLC	2006.036	15.2	3.5	15/12/2005	0.28	475.2	90			8.7	804	787
G41/0456	Cromwell Certified Concrete Limited	RM16.108.01	28.82	7.1	19/11/2015	16.59	2203.2	4800	27.82	38.82	20.72	187	0

* The available drawdown doesn't include the depth required for a pump above the screen, and simply assumes a 3 m screen where it is not specified i.e. the available drawdown may be 1 – 2 m less.

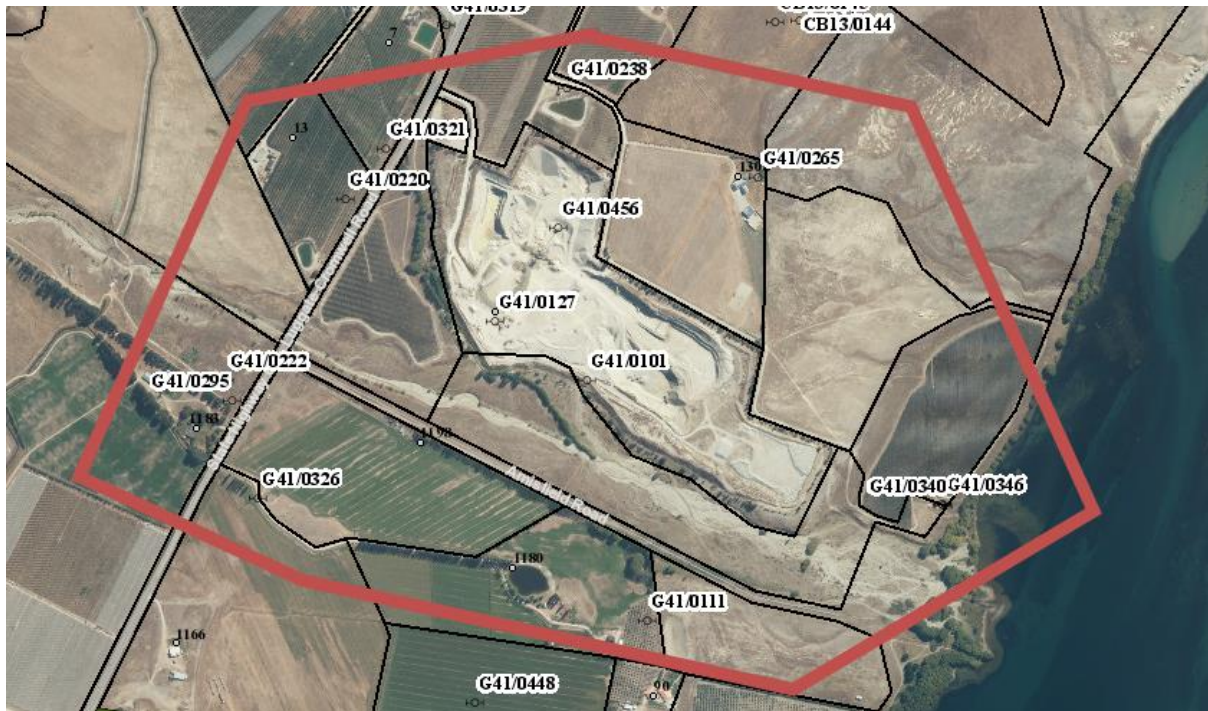


Figure 11. Location of bores that are likely to experience drawdown effects greater than 0.2m (Source: Otago Maps)

Section 104(1)(b)(vi) of the Act confirms when considering an application for resource consent, the Consent Authority must have regard to any relevant provisions of a plan or proposed plan. In this case the relevant plan is the Regional Plan: Water for Otago and the following policy applies:

***“6.4.10B In managing the taking of groundwater, to have regard to avoiding adverse effects on existing groundwater takes, unless the approval of affected persons has been obtained.*”**

Explanation

This policy recognises that the taking of groundwater from any aquifer can result in bore interference. Bore interference relates to the temporarily reduced ability of users in a localised area to take water due to the taking of water from another bore reducing the pressure or the level of groundwater. When considering the taking of groundwater, regard will be had to avoiding adverse effects on existing takes. Conditions on a resource consent to take groundwater may include limits on the instantaneous take of groundwater from the bore, in order to maintain existing access to water in neighbouring bores. Schedule 5 identifies formulae that will be applied in order to determine the acceptable level of bore interference.

Principal reasons for adopting

This policy is adopted to maintain, as far as possible, the availability of groundwater at existing bores. This will assist to avoid the potential for conflict among those taking groundwater.”

Policy 6.4.10B requires decision makers to have to regard to avoiding adverse effects on existing groundwater takes, unless the approval of affected parties have been obtained. This Policy identifies the appropriate formulae in determining the acceptable level of bore

interference under Schedule 5. For an unconfined aquifer this is less than 0.2 metres. As such it is considered the bores identified in Table 6 are likely to experience interference effects greater than 0.2m and are adversely affected. The Canterbury Land and Water Regional Plan is not relevant to this application that is based in Otago and the relevant Policy to consider is 6.4.10B and Schedule 5 of the RPW.

The applicant advises that the assessment of the level of drawdown almost certainly over-estimates the drawdown effects on neighbouring bores. The worst possible scenario as proposed and assessed by the applicant is unlikely given the proximity of the proposed take to Lake Dunstan, nevertheless it is possible that the worst possible case could occur (no water is returned to the aquifer) and the effects of this must be considered. In summary the effects on surrounding bores as identified in Table 6 are minor or more than minor.

5.4 Effects on Surface Water Bodies

When an aquifer is hydraulically linked to a surface water body, a groundwater take could affect flows, water quality, aquatic ecosystems, amenity values, recreational values, and the spiritual and cultural values of that water body.

The applicant has relied on the previous assessment to assess the potential adverse effects of the proposed increased take on the Amisfield Burn. The main stem of the Amisfield Burn is located approximately 130 metres from the applicant's bore G41/0127 and 315 metres from G41/0455.

Under RM16.108 stream depletion effects at the Amisfield were calculated using Jenkins equation as stipulated in Schedule 5A of the RPW. At this time with a mean annual abstraction rate of 460 m³/day, stream depletion after 365 days pumping was approximately 100 % (6.9 L/s). The increased proposed take will likely see a greater stream depletion rate. In accordance with Policy 6.4.1A of the RPW, a depletion effect of over 5L/s is considered potentially more than minor.

The recommending report of RM16.108 acknowledged at the time that the stream is decoupled from the groundwater system. Schedule 5A of the RPW states that stream depletion is unlikely if the stream is separated from the underlying water table by an unsaturated zone that could decouple the interaction between surface water and groundwater.

The applicant advises that the Amisfield Burn is approximately 20 metres above the groundwater table and is disconnected to groundwater as described in the 2016 consent. E3 Scientific have reviewed the application and confirm it is possible that as the Amisfield Burn flows towards Lake Dunstan, the depth to groundwater may decrease and it may become connected to groundwater. Further information submitted by the applicant dated 1 December 2020 confirms an assessment against stream depletion guidelines developed by Smith M (2009) indicate that the proposed abstraction will unlikely affect a stream so far above groundwater levels. The hydrogeological environment has not altered since the 2016 consent and the applicant considers there is no connection between the underlying groundwater and the Amisfield. Furthermore, the applicant has highlighted that the abstraction is located at a distance from Lake Dunstan that will not cause adverse stream depletion effects downstream of the Amisfield.

As part of the further information the applicant has provided a breakdown of water use and the operation of soakage pits that provides evidence of lower percentage of consumptive water use. E3 Scientific have reviewed this information and conclude based on this information there is a reduced likelihood of stream depletion.

Given that that the Amisfield Burn is likely to be decoupled from the groundwater system and the distance of the take from Lake Dunstan, effects on stream depletion are considered to be no more than minor. As noted in Policy 6.4.1 of the RPW, allocation quantities and minimum flows do not apply to water takes from Lake Dunstan.

5.5 Effects of the Take on Groundwater Quality

The cone of depression created by water abstraction may extend to areas where there could be the potential of groundwater contamination (i.e., from contaminated sites, landfills or effluent discharges), hastening migration or recharge of contamination through the aquifer.

It is noted that the applicant holds Discharge Permit RM16.108.02 and has applied to renew this permit. A discussion on the adverse environmental effects of this discharge is below. In terms of the take, due to the nature of the contaminated sites and the volume of the proposed groundwater take (which will influence the extent of the cone of depression), the risk that the proposed take will cause contamination of the aquifer is no more than minor.

5.6 Efficiency of Use

In the previous application, an assessment was undertaken by Pattle Delamore Partners Ltd that confirmed losses of groundwater during industrial processing meant the take cannot be considered entirely non-consumptive. Losses of groundwater could occur from one or more of the following processes:

- Evaporation from soakage pond;
- Evaporation from washed vehicles, stockpiles, road, or in the processing plant;
- Groundwater held within the washed aggregate when it is exported from the site, or by dust when groundwater is used for dust suppression; and
- Water lost through inefficient application.

Under the previous application approximately 30% of the water abstracted was determined to be lost and not returned to the aquifer. The applicant has provided a breakdown of water use outlined in the table below:

Table 7. Breakdown of water use (Source: Application)

	Volume (m ³)/day	Percentage of total
Crushing Plant	2,768	91.5%
Water Cart	240 (20m ³ x 12 times/day)	8%
Irrigation	15	0.5%
Potable Use/Washdown	1 (rounding up)	Negligible
TOTAL:	3,024	100

A significant proportion of water is used for the crushing plant. Water used for crushing operations is received by the soakage ponds. Runoff water is first directed to the smaller pond and then onto the western elongated pond. Sediment collected in the first pond is used for backfill on site or sold on.

Grow Otago estimates the soil moisture deficit to be an annual mean of approximately 420 mm and the total area of the soakage pits is approximately 4,140 m². On average the ponds will lose approximately 1,739 m³/year as evaporation.

In terms of the land application of water, the applicant estimates 11,100m³ of water is evaporated in the hottest month of the year based on an evaporation rate of 185mm. The applicant has estimated 12% of water applied to land would evaporate in the hottest month of the year and consumptive water use of the take represents less than 20% of the total take. The original 30% consumptive use estimate in the previous application is therefore a conservative estimate and it is considered that the take is an efficient use of water with most water being returned to the aquifer (approximately 88%).

5.6.1 Monitoring of the Take

The Resource Management Regulations 2020 came into effect on 10 November 2010. The Regulations require all consented water takes of 5 litres per second or more to be metered. Daily records are to be kept and provided to the Council by 31 July each year for the period 1 July to 30 June (or part thereof) of the previous year.

As this application is for a take of 5L/s, metering of the take is required and consent conditions have been recommended that reflect this. The Regulations require that the meter must accurately measure the water taken, be able to provide data in a form suitable for electronic storage, be suited to the qualities of the water it is measuring, be sealed and tamper proof, and be installed at the location from which water is taken.

To ensure the accurate and regular reading of the water meter it is recommended that a datalogger is installed (to achieve this a “pulse” water meter is required). A number of recommended consent conditions relate to achieving required technical specifications for accurate meter and datalogger installation and ongoing operation. The datalogger will require regular downloading (estimated at about twice a year although the exact frequency will depend on the type of datalogger purchased), and the data sent electronically to Council. It will need to be consistent with the format and specifications of Council’s databases. “Comma separated value” (csv) format is considered the simplest and most widely compatible file type for this purpose.

5.7 Water Take Use and Management

Water Management Groups are voluntary. They provide flexibility for two or more consent holders to cooperate in exercising their consents, but without the added formality associated with a water allocation committee. If a water management group is developed, the applicant should give consideration to joining, as they are a useful means of managing takes in a catchment to ensure the minimum flow is not reached.

5.8 Discharge to Land - Water Quality

The applicant wishes to replace RM16.108.02 due to an increase in the discharge of water. The contaminants in the discharge will be naturally occurring silts and sands from the washing of the gravel, and the majority of the sediment will be removed from the water column by settling in the pond and then by the filtering process as the water moves through the gravels.

The applicant notes there is a risk that the lowering of groundwater levels through increased abstraction will induce land surface contaminants to enter the groundwater resource. The applicant advises the soakage ponds are at or close to the groundwater level and the existing resource consent requires quarterly monitoring of suspended sediment at bores G41/0455 and G41/0101, and one upgradient bore for comparison, either G41/0220 or G41/0321. No

limits have been imposed for total suspended solids on the previous consent, however the latest monitoring results dated November 2020 shows the detection limits of less than 3 g/m³ have not been exceeded. Likewise, previous monitoring results have also not exceeded the detection limit. This indicates that the soakage ponds are performing as expected. The increased discharge is not expected to affect the capacity and performance of the soakage ponds. Contamination of groundwater from the discharge is expected to be no more than minor, provided that the applicant continues to maintain the soakage ponds and prevent overland flow to any surface water body.

5.9 Discharge of Dust

Prue Harwood of Beca Consulting has prepared a report in support of the application to assess the effects of the discharge of dust to air. The report has been reviewed by NZ Air on behalf of Council's Resource Science Unit. A further information request in relation to air discharge effects was sent to the applicant on 21 January 2021. A response to the further information request was received on 5 March 2021 and information submitted was further reviewed by NZ Air.

The application identifies the main receptors and provides a description of the surrounding environment in Section 2.1.2 of the report prepared by Beca Consulting. This information has been adopted for the purposes of this assessment. Figure 12 shows the location of sensitive receptors within the vicinity of the quarry and expansion area. The response to the further information request (RFI response), dated 5 March 2021, outlines the distances between the washing, screening and crushing plants and the offsite receptors.



Figure 12. Aerial photograph showing the location of the quarry in relation to neighbouring properties and receptors (Source: Application-Response to Further Information dated 5 March 2021)

In terms of the proposed expanded area, the working area will be setback from the boundary of the site by 25 metres, where the quarry adjoins land used for non-residential purposes and 50 m in the vicinity of the Clark's residence (1308 Luggate-Cromwell Road). Bunds will be constructed along the boundaries that will be 3 metres high by 6 metres wide. The existing working area of the quarry is located at least 12 metres at its narrowest point from the site boundary and a road is located between the boundary and adjoining properties to the north. The Amisfield Burn is located to the south boundary, acting as a natural barrier between the site boundary and proposed cherry orchards to the south.

The activities of the quarry that generate dust will be:

- Excavation and stripping of overburden;
- Extraction of gravel;
- Overburden stockpiling;
- Raw and finished material stockpiling;
- Loading and unloading of materials;
- Vehicle movements;
- Crushing and screening of gravel; and
- Backfilling of worked areas.

The predominant air discharge contaminant from the quarrying operations will be particulate matter in the form of dust. The products of combustion, such as sulphur dioxide (SO₂), nitrogen oxides (NO_x) and carbon monoxide (CO), will also be discharged in the emissions from the operation of machinery and vehicles. Dust particles will mostly be made up of larger size fractions greater than 10µm.

The report identifies and details the potential dust sources in detail and dust mitigation measures on pages 12-15. For the purposes of this report, this information has been adopted.

There are no New Zealand specific ambient air quality guidelines or standards for deposited dust. Beca note the Ministry of Environment have published the Good Practise Guide for Assessing and Managing Dust (GPG) that describes typical background concentrations of deposited dust for different environments. These are usually less than 1 g/m²/30 days for rural areas but Beca note for areas such as Central Otago, the background dust concentration can be up to 10 times this amount, especially during prolonged dry periods. As highlighted in Section 3.12 of this report, background dust concentration has been compared to a rural environment in Earnscleugh with the operation of an open cast mine.

Beca have assessed the sensitivity of the receiving environment. All the closest dwellings to the quarry are likely to have a "moderate to high" sensitivity to dust and the surrounding rural areas, that are not used for horticultural purposes, will have a "low" sensitivity. The commercial area of the Clark property that is used for storage has been assigned a "moderate" sensitivity, as the activity is considered to be less sensitive to dust than a dwelling, but more sensitive than the rural land that surrounds it.

It is noted to the north of the subject site is a DoC reserve. Beca have utilised the United Kingdom Institute of Air Quality Management (IAQM) that provides some guidance on the sensitivity of receptors to ecological effects. The IAQM recommends a sensitivity rating of medium for locations of important plant species. Therefore, this rating has been applied to the DoC reserve.

The GPG recommends a trigger level for deposited dust of no more than 4 g/m²/30 days above background levels and 2 g/m²/30 days in sensitive residential areas. The following

background deposition rates for dust have been assigned for the abovementioned areas surrounding the quarry:

- 4 g/m²/30 days for non-horticultural areas (low sensitivity areas);
- 2 g/m²/30 days in the vicinity of residences (high sensitive areas); and
- 3 g/m²/30 days for horticultural areas (moderate to high sensitive areas)

There are also no New Zealand specific ambient air quality guidelines or standards for total suspended particulates (TSP). The GPG Dust does recommend trigger levels for sensitive to insensitive areas and the following criteria has been applied based on the GPG:

- 60 µg/m³ (24-hour average) in the vicinity of the houses;
- 80 µg/m³ (24-hour average) in the vicinity of the horticultural areas;
- 100 µg/m³ (24-hour average) for non-horticultural rural areas; and
- short term 5 min average trigger level for TSP of 250 µg/m³ for areas with a high sensitivity such as residences.

Beca note that dust particles generated by quarrying activities generally fall into larger size fractions of 100 micrometres or greater. In steady wind conditions of less than 10 m/s (typical of the surrounding environment) and without vehicle movement, such particles would only travel only a few tens of metres from the source, however this can be influenced by local conditions such as re-entrainment of dust, terrain and effects of turbulent airflow. Beca note for this reason and the complexity of the terrain, areas within no more than 200 metres maybe potentially affected by dust. NZ Air Limited have confirmed the greatest risk for adverse off-site effects is from dust emitting activities which are proposed to occur within 100 m of off-site sensitive receptors, as intensities of dust deposition will be greatest within close proximity to the sensitive receptors.

The Beca report has relied on FIDOL Factors to assess the adverse effects of the discharge on receptors within the vicinity of the quarry. The GPG notes that the potential for a dust discharge to cause an objectionable or offensive effect depends on the following characteristics:

- The frequency of dust nuisance events;
- The intensity of events, as indicated by dust quantity and the degree of nuisance;
- The duration of each dust nuisance event;
- The offensiveness of the discharge having regard to the nature of the dust; and
- The location of the dust nuisance, having regard to the sensitivity of the receiving environment

In addition to using FIDOL factors, IAQM Risk assessment factors have been used. IAQM uses a series of uses a series of semi quantitative matrices to estimate the likelihood of dust reaching receptors based on the distance between the source and the receptor and the frequency of winds which blow in the direction of the receptor and combines these with the scale of the operation and the sensitivity of the receptor to produce an estimate of the potential risk of adverse effects arising. A summary of the assessment of effects from dust to the surrounding receptors is provided in Table 6-1 and the Appendix of the Beca Report based on the IAQM risk assessment. The Table has been reproduced below:

Table 8. IAQM Dust Risk Assessment for each receptor (Source: Application)

Receptor details and location	Location relative to nearest dust source	Frequency of winds >5m/s (%)	Residual source emissions	Pathway effectiveness	Dust impact risk	Receptor sensitivity	Magnitude of dust effect
Clark's residence	30 m west of boundary with expansion area and 80 m from workings	0.1	Medium	Ineffective	Negligible	High	Negligible adverse effect
Clark's residence	210 m north of existing quarry	1.7	Medium	Ineffective	Negligible	High	Negligible adverse effect
Clark's rural land	25 m northwest, west and southwest from workings	7.9	Medium	Moderately effective	Low	Low	Negligible adverse effect
Clark's rural land	15 m north of existing quarry	1.8	Medium	Ineffective	Negligible	Low	Negligible adverse effect
Clarks storage shed	30 m west of boundary with expansion area and 80m from workings	1.8	Medium	Moderately effective	Low	Medium to high	Negligible adverse effect
Clarks storage shed	45 m from boundary with existing	1.8	Medium	Ineffective	Negligible	Medium to high	Negligible adverse effect
Clark's vineyard at entrance	20 m west of site offices and yard area and 20 m north of main haul road entrance	1.7	Medium	Ineffective	Negligible	Medium to high	Negligible adverse effect
Residence at 90 Smiths Way	360 m south of workings	7.3	Medium	Ineffective	Negligible	High	Negligible adverse effect
Little's worker accommodation	150 m south east of expansion area	0.06	Medium	Ineffective	Negligible	High	Negligible adverse effect

Little's worker accommodation	190 m east of existing quarry boundary	0.01	Medium	Ineffective	Negligible	High	Negligible adverse effect
Little's eastern orchard	40 m east of expansion area and 65m east of workings	1.7	Medium	Ineffective	Negligible	Medium to high	Negligible adverse effect
Little's eastern orchard	40 m east and southeast of existing quarry and 65m southeast of workings	1.7	Medium	Ineffective	Negligible	Medium to high	Negligible adverse effect
Little's southern orchard	70 m south, south east and southwest of existing workings	8.3	Medium	Moderately effective	Low	Medium to high	Slight adverse effect
7 Mt Pisa Road	200 m north of quarry entrance	0.06	Medium	Ineffective	Negligible	High	Negligible adverse effect
13 Mt Pisa Road	280 m west to northwest of quarry	0.07	Medium	Ineffective	Negligible	High	Negligible adverse effect
Western vineyards	70 m west of eastern quarry boundary	6.1	Medium	Moderately effective	Low	Medium to high	Slight adverse effect
DoC Reserve	25 m from northern quarry boundary	1.8	Medium	Ineffective	Negligible	Medium	Negligible adverse effect

The magnitude of dust effects based on the pathway effectiveness and receptor sensitivity has been summarised in the table below:

Table 9. Descriptors for magnitude of dust effects (Source: Application)

Dust Impact Risk	Receptor Sensitivity			
		Low	Medium	High
High Risk		Slight adverse effect	Moderate adverse effect	Substantial adverse effect
Medium Risk		Negligible effect	Slight adverse effect	Moderate adverse effect
Low Risk		Negligible effect	Negligible effect	Slight adverse effect
Negligible Risk		Negligible effect	Negligible effect	Negligible effect

The Beca report note's the most sensitive area is Clark's residence, which is located within 100m of the quarry and is the closest residence. The Clark's residence is downwind of the quarry for less than 0.1% of the time.

Mitigation measures are proposed for sensitive areas when operating close to the boundary of these areas to minimise the potential of adverse dust effects occurring. The proposed mitigation and monitoring measures are outlined on pages 30-32 of the Beca Report and the RFI response. An extensive monitoring programme is proposed with frequent monitoring measures to ensure dust discharges beyond the boundary of the site will not be offensive or objectionable. In addition to this proposed mitigation measures also include reviewing dust mitigation measures or ceasing of dust generation activities within 200 metres of downwind sensitive receptors located within 100 metres of the quarry boundary when TSP concentrations have been exceeded. An extensive TSP monitoring programme is proposed that includes instrumental monitoring for TSP and windspeed utilising continuous real time data, to manage any discharge of dust beyond the boundary.

The RFI response provides a comprehensive assessment on the effects of the discharge on surrounding cherry orchards and vineyards.

The cherry orchard to the east of the proposed expansion area will be downwind under winds from the west through to the north. Results from the monthly windrose data at Fulton Hogan Quarry show that stronger winds (> 5m/s) from the west through the north are infrequent, occurring for ~3% of the time in October then reducing further through November and December. Winds from the west through north become very infrequent from December onwards. The applicant concludes the frequency of stronger winds blowing from the direction of the quarry site is low and diminishes to very low through the main harvest period of December and January. Ongoing dust mitigation is proposed to mitigate dust beyond the boundary. Due to the proximity of the operation to the orchard, dust discharge effects are considered to be minor.

There is a cherry orchard to the south of the existing quarry where the processing plant will be located. The RFI response provides an assessment of the dust discharge effects on this orchard. The RFI response notes the orchard is 100m from the existing quarry and at least 300m from the proposed expansion area. The existing quarry lies within the distance that dust could be transported under windy conditions. Mitigation and monitoring measures are proposed as outlined on Pages 30-32 of the Beca Report. Due the location of this orchard in relation to existing quarry operations and the increase in processing rates, it is considered dust discharge effects are minor.

The Beca report recommends the following mitigation measures to mitigate the adverse effects on the Western Vineyards:

- The sealed entrance way to the quarry is kept clear of deposited debris from trucks and unsealed sections of the haul road are kept damp to control dust; and
- Truckloads of fine dusty materials leaving the site are covered.

Further dust mitigation and monitoring is proposed as outlined in Section 7-3 of the Beca Report. The RFI response notes a number of vineyards that are relatively close to the existing quarry and may be vulnerable to dust deposition under relatively infrequent strong winds. As such the effects of dust on surrounding vineyards are considered to be minor.

There is potential for deposition of dust on the leaves and fruit of crops that could result in reduced plant growth rate and potential degradation of fruit quality. The RFI response provides an assessment on potential effects to crops and concludes that dust emissions from the quarry will be inert and will not result in significant chemical reactions with plant leaves and fruit which would result in direct plant tissue damage. The response also provides an extensive analysis of wind conditions which could result in effects on any given off-site cropping receptor. The existing environment has high variability in background dust deposit rates, as such the existing crops will already be exposed to dust deposition from natural and existing sources.

The RFI response acknowledges that particular attention to the mitigation of dust will be required during the higher risk months for horticulture between September and April. Grapes grown for wine productions are expected to be more vulnerable to excessive dust deposition during key periods October to Late April/Early May. Due to the risk of potential dust deposition on crops, the applicant is proposing real-time TSP monitoring and additional mitigation measures as set out in Section 7-3 of the Beca Report whenever there are discharges within 100m of cropping operations. NZ Air considers that the residual risk of adverse effects on crops within 100m of quarrying operations will be low with the mitigation measures proposed. As such the effects of dust discharges on crops within 100 metres of quarrying operations are considered to be minor.

The Beca report has highlighted potential health effects may arise from particulate matter generated on site in the form of PM₁₀ and PM_{2.5}. PM₁₀ concentrations downwind of a quarry can be elevated above background concentrations and effective dust control must be carried out to mitigate adverse effects, particularly when the quarry is operating within 100 m of residences located downwind of a quarry. The Clark's residence and worker accommodation are located within 100 metres of the quarry and are downwind of the quarry for less than 0.1% of the time. The risk of PM₁₀ discharges from the quarry causing adverse health effects is considered to be no more than minor. Due to the location of other residences within the vicinity of the quarry, adverse health effects on these are considered to be no more than minor.

Respirable crystalline silica (RCS) can be produced by the crushing and grinding of quartz rich rock. The RFI response notes the existing crushing plant is not proposed to be moved from it's existing position and is a considerable distance away from the nearest sensitive receiver (>250m). Prevailing wind conditions convey any dust discharges away from the nearest sensitive receiver. The applicant considers the separation distance and the mitigation and management measures proposed will minimise the effects of RCS and nuisance dust. Air NZ considers this assessment is accurate and the potential adverse health effects from the discharge of RCS is low to negligible. As such the adverse health effects associated with the discharge is considered to be no more than minor, with implementation of the mitigation and monitoring measures outlined in the Beca Report.

Correspondence from Central Otago District Council on the 12 November 2020 confirms there are two recently approved residential building platforms at 1286 Luggate-Cromwell Road to the east of the quarry on Lots 1 and 2 DP 508108. The report by Beca does not assess the effects of dust discharges on these platforms.

Resource consent is required to establish residential activity on these platforms under the Operative Central Otago District Plan as a controlled activity. Correspondence from Central Otago District Council dated 18 December 2020 confirms no resource consent has been lodged or approved for any dwelling on the platforms. Section 104(1)(a) of the Act directs Consent Authorities to have regard to any actual or potential effects on the environment of allowing the activity. The leading Court of Appeal case of what constitutes the environment for the purposes of Section 104 is *Queenstown Lakes District Council v Hawthorn Estate Limited* (2006, NZRMA 424). In *Hawthorn*, the Court held that:

“[84] ... In our view, the word “environment” embraces the future state of the environment as it may be modified by the utilisation of rights to carry out a permitted activity under a District Plan. It also includes the environment as it might be modified by the implementation of resource consents which have been granted at the time a particular application is considered, where it appears likely that those resource consents will be implemented....”

Therefore, it can be considered that dwellings will likely be established on the approved residential building platforms on Lots 1 and 2 DP 508108 in the future and that this forms part of the existing environment. In light of this, the receiving environment for dust discharges on Lots 1 and 2 DP 508108 are more sensitive. The Beca assessment notes that Little’s eastern orchard (Lot 1 DP 508108) is downwind of the quarry in winds from the southwest to west. Winds from these directions that exceed 5m/s occur is for approximately 1.7% of the time. The southern area of Little’s Orchard (Lot 2 DP 508108) is downwind from winds approaching from the east northeast through to west northwest. Winds from these directions that exceed 5 m/s are expected to occur for approximately 8.3% of time. There is small frequency of winds exceeding 5m/s at each of these locations, the adverse effects of dust discharges on these platforms is considered to be minor.

NZ Air concludes the greatest risk for adverse off-site effects is from dust emitting activities that are proposed to occur within 100 m of off-site sensitive receptors as intensities of dust deposition will be greatest within close proximity to the sensitive receptors. Mitigation measures have been provided including alarm trigger points which require contributing dust sources within 200m of sensitive receptors to cease. NZ Air considers the level of mitigation proposed by the applicant is appropriate and residential risk of adverse dust effects at residential and cropping receptors will be low post mitigation.

The effects on the wider environment are considered to be less than minor with the implementation of the monitoring and mitigation measures proposed by the applicant. The adverse effects are considered to be limited within a 100m radius of quarry operations, and landowners within this radius are considered to be affected by the activity in a minor or more than minor manner. These are outlined further below. The location of sensitive dust receptors that may experience adverse dust effects that are minor, or more than minor are identified in Figure 13 below.



Figure 13. Location of affected parties affected by adverse dust effects (shown as red points). The property the activity relates to is shown in red (Source: Otago Maps).

6 Notification and Written Approvals

6.1 Section 95A Public Notification

Step 1: Is public notification mandatory as per questions (a) – (c) below?

- (a) Has the applicant requested that the application be publicly notified? **No**
- (b) Is public notification required by Section 95C? **No**
 Has further information been requested and not provided within the deadline set by Council? **No**
 Has the applicant refused to provide further information? **No**
 Has the Council notified the applicant that it wants to commission a report but the applicant does not respond before the deadline to Council's request? **No**
 Has the applicant refused to agree to the Council commissioning a report? **No**
- (c) Has the application been made jointly with an application to exchange recreation reserve land under section 15AA of the Reserves Act 1977? **No**

Step 2: Is public notification precluded as per questions (a) – (b) below?

- (a) Is public notification precluded by a rule in the plan or a NES? **No**
- (b) Is the application for one or more of the following activities but no other activities:
- (i) A controlled activity? **No**
 - (ii) A restricted discretionary, or discretionary activity, but only if the activity is a subdivision of land or a residential activity? **No**
 - (iia) A restricted discretionary, discretionary or non-complying activity but only if the activity is a boundary activity? **No**
 - (iii) A prescribed activity (see section 360G(1)(a)(i)? **No**

Step 3: Does the application meet either of the criteria in (a) or (b) below?

- (a) Is the application for a resource consent for one or more activities, and any of those activities is subject to a rule or national environmental standard that requires public notification? **No**
- (b) Will the activity have or be likely to have adverse effects on the environment that are more than minor in accordance with Section 95D? **No**

The adverse environmental effects on the environment from the proposal are discussed elsewhere of this report. Based on this review, I consider that there will not be more than minor adverse effects on the environment (discounting the site and adjacent sites).

Step 4: Do special circumstances exist in relation to the application that warrant the application being publicly notified? No

6.2 Section 95B Limited Notification

Step 1

Section 95B(2) Are there any affected groups or persons identified under Section 95B(2):

- (a) Protected customary rights groups? **No**
- (b) Customary marine title groups? **No**

Section 95B(3)(a) Is the proposed activity on or adjacent to, or may it affect, land that is the subject of a statutory acknowledgement made in accordance with an Act specified in Schedule 11? **No**

Section 95B(3)(b) Is a person to whom a statutory acknowledgement is made an affected person under Section 95E? **No**

Step 2

Is Limited Notification precluded under Section 95B(6)?

- (a) Is the application for a resource consent for one or more activities, and each activity is subject to a rule or national environmental standard that preclude limited notification? **No**
- (b) (i) Is the proposal a Controlled Activity that requires consent under the District Plan (other than a subdivision of land)? **No**
- (ii) Is it a prescribed activity under Section 360H(1)(a)(ii)? **No**

Step 3

Having regard to Section 95E of the Resource Management Act, identify persons who would be adversely affected by the proposed activity by effects that are minor or more than minor, but not less than minor and give reasons why affected parties were identified.

The following parties have been identified to be affected parties due to available drawdown at the identified bores estimated to be greater than 0.2m for an unconfined aquifer in accordance with Policy 6.4.10B and Schedule 5 of the Regional Plan: Water for Otago.

In addition to this, properties located within 100 metres of the existing quarry and proposed expansion area may experience adverse dust effects on occasion that are considered to be minor or more than minor. As such the effects on these parties are considered to minor or more than minor for the reasons stated below. There are no circumstances that justify why it would be unreasonable to require these approvals to be obtained.

Affected Party	How they are affected
Lowburn Land Holdings Limited Partnership	This party is the consent holder for 2003.363, that takes and uses groundwater from G41/0222. Maximum interference effects are expected to be greater than 0.2m for an unconfined aquifer.
Lindsay Allan More	ORC records show the consent holder for G41/0111 is David McTanish. The land use consent (95653) for the bore was consented in 1995 and since this time the property has changed ownership where the bore is located. The bore is located on Lot 3 DP 26218. Interference effects are estimated to be greater than 0.2m. As such Lindsay Allan More (legal land owner) is considered to be an affected party. In addition to this, this person is also the legal owner of 13 Mount Pisa Road (Lot 2 DP 384908) where bore G41/0220 is located, and Lot 1 DP 384908, where bore G41/0321 is located.
Wanaka Road Wine Holdings Ltd	This party is the consent holder of 2010.152.V1, that abstracts water from G41/0220 on Lot 2 DP 384908. Interference drawdown effects are estimated to be greater than 0.2m (6.29m). Wanaka Road Wine Holdings Ltd are deemed to be an affected party.
Manukau Fifty Limited	This party is the consent holder of 2001.831 which abstracts water from bore G41/0238. Drawdown effects are estimated to be greater than 0.2m (1.75m). In addition to this, the vineyard on this property may experience adverse effects being within 100m of the existing quarry. Manukau Fifty Limited are deemed to be an affected party.
Jane Marie Miscisco	This person is the legal landowner of Lot 2 DP 26218, that contains land use consent 2004.853 and bore number G41/0326. Drawdown effects are estimated to be greater than 0.2m.
Felton Park Limited	This party surrendered 2006.036 that abstracts water out of G41/0346. The party may still be abstracting water out of this bore under permitted activity volumes. Drawdown effects are estimated to be greater than 0.2m, and therefore this party is considered affected.
Amisfield Orchard Limited	This company is the legal land owner of Lot 1 DP 508108 that contains bores G41/0346 and G41/0340. Drawdown effects are estimated to be greater than 0.2m. In addition to this, the property is located within 100 metres of the proposed expansion area

	and may experience adverse dust effects. Amisfield Orchard Limited are considered to be an affected party.
Irrigation and Maintenance Limited	This party is the consent holder of RM14.211.02 that abstracts water from G41/0321. Interference effects are estimated to be greater than 0.2m and therefore this party is considered affected.
Bryson David Clark	This person is the legal landowner of Lots 2 and 7 DP 301379 (1308 Luggate-Cromwell Road) where bore G41/0265 is located. Interference effects are expected to be greater than 0.2m on this bore. In addition to this adverse dust effects on this property are expected to be minor or more than minor due to the proximity of the property to the existing quarry and the property being classified as a sensitive dust receptor. This party is therefore considered to be affected for the reasons outlined.
Malcom James Little	This person is the legal landowner of Lot 2 DP 508108. A residential building platform has been approved on this Lot, and the property is located south of the existing quarry area. Adverse dust effects on this property are expected to be minor or more than minor due to the proximity of the property to the existing quarry and the property being classified as a sensitive dust receptor.
Department of Conservation	A scientific reserve owned by the Department of Conservation is located north of the proposed quarry expansion area. The DoC reserve has been classified as a medium receptor in the Beca Report. Due to the location of the DoC reserve being located within 100 metres of the expansion area and the potential presence of nationally threatened species, the adverse dust effects on the reserve are considered to be minor or more than minor.

The following parties have been assessed as not affected:

Aukaha	It is acknowledged that Lake Dunstan is identified in Schedule 1D of the RPW as having Kai Tahu values. The Amisfield Burn is located to the south of the existing quarry. The groundwater takes and the discharges associated with quarry activity are not anticipated to have adverse effects on
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	cultural values of surrounding water bodies as outlined in Section 5.4 of this report.
Otago Fish and Game	The primary function of Fish and Game is to manage, maintain and enhance sports fish and game resources in the recreational interest of anglers and hunters. The adverse effects of the activity are not expected to affect habitat of fish and games species.

Have all persons identified as affected under Step 3 provided their written approvals?
No

Step 4 Further notification in special circumstances

Do special circumstances exist in relation to the application that warrant notification of the application to any other persons not already determined to be eligible for limited notification under this section (excluding persons assessed under Section 95E as not being affected persons)? **No**

If notification or limited notification is required then has the applicant paid the additional notification fee? Not applicable

NOTIFICATION RECOMMENDATION:

In accordance with the notification steps set out above, it is recommended that the application proceed on a limited notified basis under Section 95B to the following parties:

- Lowburn Land Holdings Limited Partnership;
- Lindsay Allan More;
- Wanaka Road Wine Holdings Ltd;
- Manukau Fifty Limited;
- Jane Marie Miscisco;
- Felton Park Limited;
- Amisfield Orchard Limited;
- Irrigation and Maintenance Limited;
- Bryson David Clark;
- Malcom James Little; and
- Department of Conservation

Name: Sarah Davidson

Title: Senior Consents Officer

Date: 19 April 2020

DECISION ON NOTIFICATION

Sections 95A to 95G of the Resource Management Act 1991

Date: 20 April 2021

Application No: RM20.360

Subject: *Decision on notification of resource consent application under delegated authority*

Decision under Delegated Authority

The Otago Regional Council decides that this resource consent application is to be processed on a **limited notified** basis in accordance with sections 95A to 95G of the Resource Management Act 1991.

The above decision adopts the recommendations and reasons outlined in the Notification Recommendation Report above in relation to this application. We have considered the information provided, reasons and recommendations in the above report. We agree with those reasons and adopt them.

This decision is made under delegated authority by:



Joanna Gilroy
Manager Consents

Appendix 1

