Roydon Quarry

Quarry Rehabilitation Plan

Roydon Quarry
220 Jones Road
Templeton

Revision	Description	Prepared By	Checked By	Reviewed By	Approved by
1	Draft for comment	SE	RS	CLG	SE
2	For Council Certification	SE	RS	SDC	RS
3	Certified 9/3/2022	SE	SDC	RS	SDC

Initials	Name	Company
SE	Stuart Edwards	Fulton Hogan
CLG	Community Liaison Group	
RS	Richard Smith	Fulton Hogan
SDC	Tiffany Peard	Selwyn District Council

Next review due – Nov 2022 (following quarry operations starting)

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1 INTRODUCTION

1.1 1.1 Background

Fulton Hogan Limited (Fulton Hogan) is a leading infrastructure, construction, roadworksand aggregate supplier in New Zealand. Fulton Hogan currently has three fixed aggregate quarries located in the greater Christchurch area and began its operations in the Canterbury region over 50 years ago. The Roydon Quarry site, located in Templeton,is proposed to be another long-term operation.

This Draft Rehabilitation Plan has been prepared to comply with resource landuse consent conditions granted by the Selwyn District Council and Environment Canterbury for development and operation of Fulton Hogan's Roydon Quarry. It has drawn on similarFulton Hogan operations, for which Rehabilitation Plans have been developed in accordance with Activity Specific Standard 17.8.3.14 'Quarry site rehabilitation' of the Christchurch District Plan. This Rehabilitation Plan has also been prepared giving regard to that standard, Policy 17.2.2.13 Policy - Quarry Site Rehabilitation, and the 'Draft Quarry Rehabilitation Plan Guidance' document prepared by Christchurch City Council and dated June 2018. Selwyn District Council (SDC) does not have a guidance documentfor writing quarry rehabilitation plans, therefore the relatively recently developed CDP standard has been used.

Table 1: Christchurch District Plan: Quarry Site Rehabilitation Plan Requirements.

Applicable to	Standard
All quarry sites	*a. A quarry site rehabilitation plan shall be:* *1. prepared by a suitably qualified or adequately experienced person(s);* *2. certified by Council as containing methods and processes capable of achieving full quarry site rehabilitation and containing the matters listed under clause iii.; and* *3. implemented by quarry operators; and* *b. The quarry site rehabilitation plan shall be submitted to Council for certification within 2 years of 12 August 2016, or for new quarries prior to commencement of quarrying activity; and* *c. The quarry site rehabilitation plan shall include:* *1. The quarry rehabilitation objectives for the site;* *2. A description of the proposed rehabilitation works, including:*

	A. The proposed final landform;

Applicable to	Standard
	B. Whether clean fill or other material will be used in the rehabilitation; *C. The type of land uses that the rehabilitated quarry could support following rehabilitation;* *D. The ~~patterns of~~ surface drainage and subsoil drains; and* *E. Any landscaping and planting.* *d. A program and reasonable timescales for progressive rehabilitation.* *e. Measures to mitigate any potential effects arising from undertaking rehabilitation other than those already addressed through quarry site mitigation.* *f. Measures to mitigate potential ongoing adverse effects on the stability of adjoining land and its susceptibility to subsidence and erosion.* *g. A process for review of the quarry site rehabilitation plan.*

1.2 Rehabilitation Objectives

Site rehabilitation will be implemented at the completion of each stage of extraction. Whilst timing of stage completion can adapt to fluctuations in aggregate demand, the sequence of extraction activity forms the basis for how rehabilitation efforts occur. Therehabilitation objectives are as follows:

- Reinstate, where possible, the productive capacity of the soil matrix by separatelymanaging the A and B soil horizons;
- Progressive rehabilitation of the site throughout the stages of extraction;
- Stabilisation of quarry faces and vegetating completed and restored extractionareas to create a free draining and stable landform
- Ensure any areas where works have been completed are left in a safe and stablecondition.
- Monitoring and controlling plant and animal pests during rehabilitation works;
- To reduce the footprint of open area as far as practicable.
- Sites are rehabilitated in a way which enables subsequent use of the land for anappropriate future land use.
- To mitigate any potential environmental effects.

The development of this plan has also been formulated by taking into account feedbackFulton Hogan has received, through the consenting process and consultation with the Roydon Quarry Community Liaison Group.

The rehabilitation plan will be strategically implemented contemporaneously with extraction, actively minimising exposed areas within the quarry footprint. This is consistent with Fulton Hogan's strategy to manage the aggregate resource over thequarry's lifetime in a coherent and sustainable manner.

1.3 Environmental Policy

Fulton Hogan seeks ongoing improvement in its environmental performance through an ISO 14001, certified environmental management system. Fulton Hogan's EnvironmentalPolicy is included as **Appendix 1**.

2 SITE CONTEXT AND OVERVIEW

2.1 Site Location

The site is located within a block of land bounded by Curraghs Road, Dawsons Road,Maddisons Road, and Jones Road (the western border of Christchurch City):approximately 170 hectares, as shown on Figure 1.

Table 1: Certificates of Title

Certificate of Title	Legal Description	Area in hectares
CB20F/554	Rural Section 6475 and Rural Section 6324	28.3
CB291/71	Lot 1 Deposited Plan 4031	81.0
CB39/215	Rural Section 6342	8.1
815228	Section 7 Survey Office Plan 510345	16.5
815227	Rural Section 5381 and Section 6 Survey Office Plan 510345	36.4
	TOTAL	170.3

2.2 Site Character and Activities

he existing site, comprised of multiple properties, is nearly all in pasture. comprising three residential dwellings and associated farm buildings Shelter belts exist along a number of the site boundaries including much of the northern boundary, part of the Dawsons Road boundary and along the entirety of the Curraghs Road boundary.. The dwellings and farm buildings would mostly be demolished to enable the quarry development, as would removal of surplus internal shelterbelts and trees not required inthe landscape management plan and consents to remain.

2.3 Surrounding Site Character

The surrounding area is generally rural in nature, although a number of indications of the Christchurch urban area are evident, including the site being within the noise contours associated with the Christchurch International Airport and the Christchurch Southern Motorway extension. Templeton township lies approximately 700 m east of the site.

Rural activities within the immediate vicinity include farming (both intensive and pastoral),horse training facilities and some forestry.

The neighbouring land to the east, adjacent to Dawsons Road is owned by Christchurch City Council and is in pasture. Fulton Hogan understands that the Council's longer-term plans for this land may include playing fields, urban growth, greenspace and 60 ha proposed for a future cemetery. South of the site is a thin strip of berm between Jones Road and the railway line. To the south of the railway line, between Main South Road, isan industrial yard (Farm Chief, 10 Curraghs Road), a there is a dwelling located at 1090 Main South

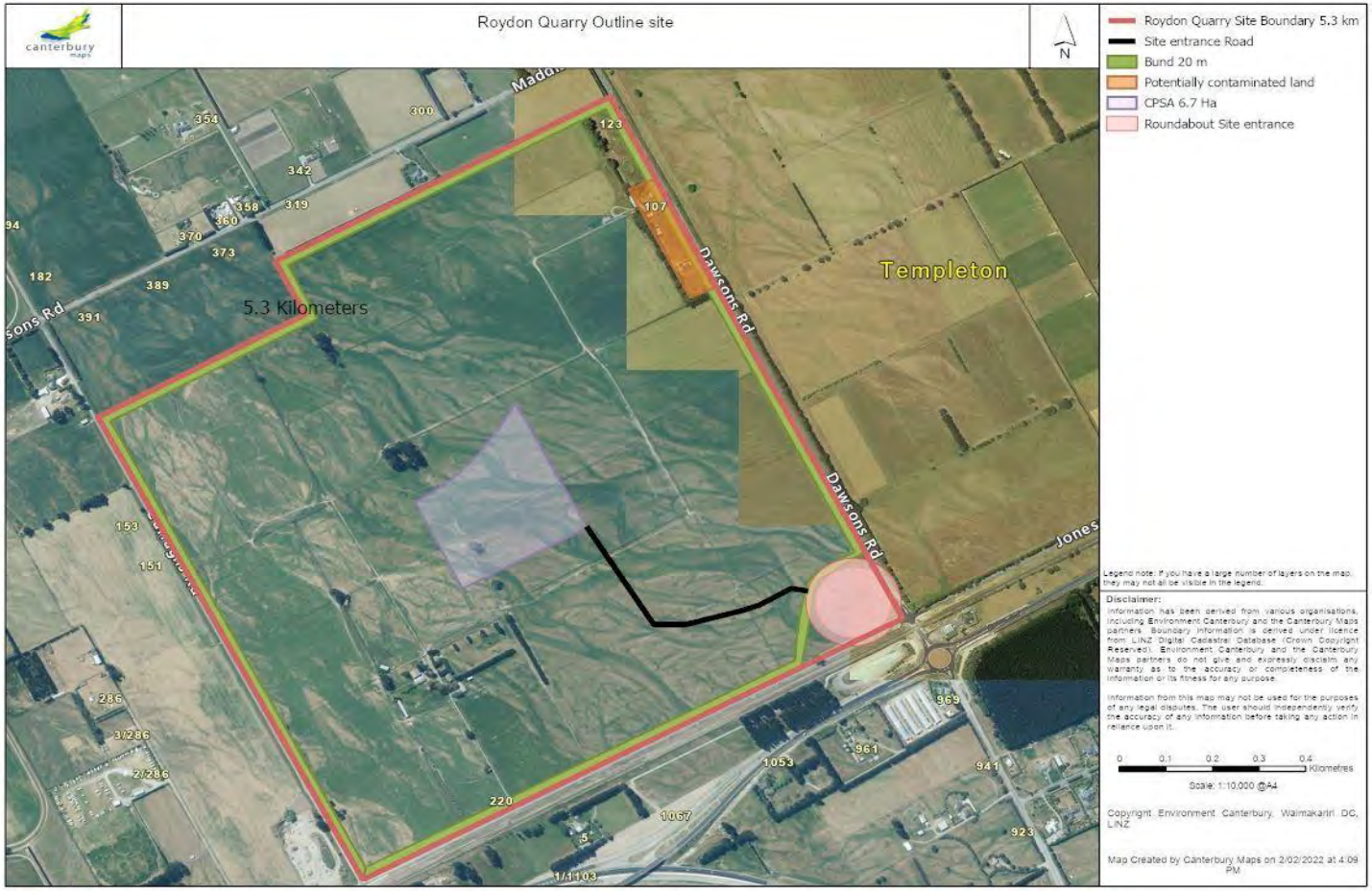


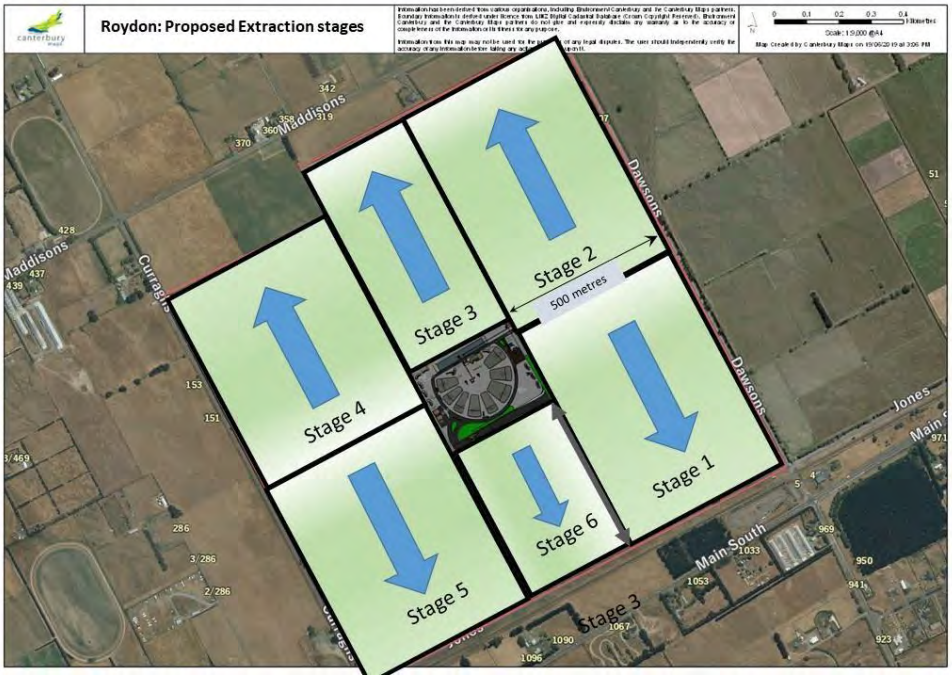
Figure 1 (Roydon Quarry - Site Location

3 REHABILITATION PROGRAMME

3.1 Site Preparation and Quarrying Activities

Development of the quarry involves a number of sub-projects, comprising the following activities:

- Excavation of the Central Processing and Stockpiling Area (CPSA) – including removal of topsoiland subsoil overburden material;
- Use of suitable on-site material to create perimeter bunds;
- Planting of landscape zone to establish boundary screening – pursuant to the consentedplanting/landscape plan;
- Construct facilities: roads, processing plant, sediment ponds, weighbridge, workshop and siteoffices etc;



- Figure 1: Roydon Quarry excavation staging plan

As part of its environmental management strategy for the quarry, Fulton Hogan will undertake preparatory work. This includes establishment of the boundary mitigation. This will be set up before resource extraction commences. The perimeter planting will afford the wider site with betterprovisions than what currently exists for the farming activities i.e. attenuating site noise, comprehensive mixed vegetation, visual screens for public roads.

3.2 Cleanfilling Operations

The quality of and management of any cleanfill deposited on site will be as per the CleanfillManagement Plan.

The depth of cleanfill and hence final contours will depend upon the rate of incoming cleanfillmaterial.

The rehabilitation will be progressed to ensure that the maximum open areas (refer table 1 below) are at all times complied with.

3.3 Remediation of Contaminated land.

Soil contamination has been identified around farm buildings located on Dawsons Road. A preliminary and detailed site investigation reports were prepared by Golder Associates and submitted with the consent applications for the Roydon Quarry consenting hearing.

The handling, and where appropriate reuse, of potentially contaminated material will be undertakenin accordance with a Remedial Action Plan prepared by and supervised by a Suitably Qualified and Experienced Practitioner.

A site validation report will be prepared following remediation and submitted to Selwyn District Council.

An Unexpected discovery protocol will be prepared and implemented before quarry activities are undertaken in the vicinity of the contaminated land

Table 1:Maximum open areas during Quarry operation

Purpose	Area Ha	Open area requiring dust suppression Ha
CPSA Plant and Stockpiles	7	2
Excavation in progress	5	1
Fill and Rehabilitation in progress	5	2
Site Roads-Unsealed	5	0

Field Conveyors, Service lanes	4	0
Total Active Area	26	5
The above areas exclude sealed roads and any buildings		

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3.4 Final Rehabilitation Requirements

Extracted areas of the quarry will be progressively rehabilitated such that exposed areas in the quarry are minimised. Extracted areas will be contemporaneously rehabilitated with extraction andvegetated: the final landform being naturally contoured to at least 1.3 metres above groundwater depth

Areas that must remain designated for production activity include:

- Aggregate processing areas;
- Aggregate stockpiles;
- Quarry haul roads;
- Stormwater treatment ponds;
- Vehicle parking and access;
- Offices, weighbridge, workshop.

Rehabilitation planning that is integrated with extraction sequences will ensure rehabilitation can commence, in areas where extraction activity has concluded, as described in Section 3.3. This willensure that vegetation can be established, or a return to other land use (e.g. pasture), as soon as possible rather than leaving a disused quarry area on part of the site. It also ensures that rehabilitation effort is not wasted on areas which will be disturbed again later.

Rehabilitated areas will be irrigated until vegetation is established then maintained on a drylandfarming methodology: it is not anticipated , initially, that rehabilitated areas will be grazed.

3.5 Rehabilitation Timescale

Time frames for rehabilitation of the site will be driven largely by the rate of extraction and will occur progressively over the site once areas of extraction have been completed. It is anticipated,that rehabilitation of each worked-out stage will be completed within twelve months of the stage being finished (i.e. within a year of the stage extraction activities concluding).

3.6 Surface Drainage Patterns and Subsurface Drains

The Roydon quarry site is located over an unconfined aquifer within the Springston Formation.

The Landcare Canterbury Soil Information database[1] describes the soils as 'Templeton moderatelydeep silty loam' in the north west part of the site and the 'Eyre shallow stony loam' in the south east of the site.

The following measures are proposed, to enhance the performance of natural stormwater drainagesystems on the site:

During extraction, the pit floor will be levelled to minimise ponding .;

In terms of enabling rehabilitation, Cleanfill materials will be deposited in a manner that encourages free draining of stormwater runoff into the permeable ground.

[1] Landcare Research S-map. http://smap.landcareresearch.co.nz

3.7 Proposed Final Landform

Excavated pit levels will guide the final land form of the rehabilitated site. The minimum finishedfloor level for the site, following operational rehabilitation and cleanfilling activities, will be at least

1.3 metres (m) above highest recorded ground water levels in the vicinity of the site, at the time ofbackfilling occurring. Where there is available Cleanfill material, parts of the site may be backfilled to a higher landform.

Following levelling the filled area will be finished by firstly spreading a layer of “B” horizon soils followed by up to 300mm of “A” horizon soils, replicating as close as is practicable the original soil matrix composition.

Topsoil will not be compacted when being used to raise the quarry floor. It will be loosely placedand spread by appropriate machinery e.g. grading to address high and low points.

Due to the nature of the high infiltration rates (>5,000 mm/hr for the deeper gravels and >100 mm/hr for the topsoil) and minimal rainfall, subsoil drains are not considered necessary, howeverthe quarry will undergo regular monitoring for drainage performance.

The final remediated landform will be irrigated to establish viable vegetative cover.

The sides of the extracted and remediated land will be finished with vegetated batted slopes variating form 1:3 to 1:6 slope (V:H) to effect some naturalisation of the remediated land. .Bundingis to be retained on the site with, over time, mature vegetation augmenting visual amenity and habitat values. Consequently, adjacent properties will not appear higher than the modified ground level of the internal rehabilitated quarry site. The bund strips are to provide a buffer of 20 m in width so could continue this function in perpetuity.

3.8 Land Use Following Quarrying

While the final use is unlikely to be determined until sometime in the future, Fulton Hogan will restore the site to a form whereby it can be used for a variety of permitted activities guided by the Selwyn District Plan. These range from farming to recreation, but also enable other activities should underlying zoning change over time as the greater Christchurch area experiences further growth into the Selwyn District.

3.9 Landscaping and Planting

Landscaping of the site is detailed in the granted consents and the Landscape Management Plan.

n summary, Fulton Hogan proposes to undertake extensive perimeter landscaping including planting of the landscape zone adjacent to the engineered earth bunds

The existing properties that collectively form the Roydon Quarry site have their external road boundaries characterised by large shelter belts of pine, macrocarpa and eucalypt species. These have, in many places, formed dense screens and served to limit views into the site from public roads. Inside of the properties, around the existing old dwellings, are mature exotic trees. Although these will be cleared in order to allow for quarry site development, the proposed plantingwill have the effect of improving the visual amenities and they will provide full screening of the workings within the site.

The majority of plants required for the bund landscaping will be locally-sourced as part of the Fulton Hogan "*Legacy Planting Project*". This plan seeks to improve biodiversity in the vicinity of worksites and is anticipated to provide a habitat for birds and invertebrates. Flourishing native floraproviding such habitat will particularly be the case with the outer rows of smaller native plantings.

Any overgrown trees or shrubs will be cut back; the dead, diseased, or damaged specimensreplaced with similar plants.

In terms of final landform (after operations), this mixed native and exotic planting can be remain around the site perimeter to provide permanent habitat for birds and invertebrates. It is possible to co-exist with future land uses on the 170 ha area.

4 ENVIRONMENTAL EFFECTS AND MANANGEMENT

4.1 Site Management

The overall management of site rehabilitation will be the responsibility of the Roydon QuarryManager or by delegated authority. Responsibilities include:

- Managing daily quarry operations – extraction and manufacturing of aggregates to supplyorders.
- Ensuring constant compliance with the conditions of all resource consents pertaining to thesite.
- Communicating resource consent requirements to staff, contractors and all other relevantparties.

- Overseeing compliant implementation of the Site Rehabilitation Plan and other managementplans and
- With respect to the site remediation, establishing and maintaining viable vegetative cover overextracted and remediated areas in the quarry.

4.2 Site Access

The main vehicle access to the site is proposed to be directly from, by way of a dedicated exit/entrance ,the Jones Road/Dawsons Road, roundabout

1 Management of Potential Effects

Potential effects, such as dust and noise that could emerge from major rehabilitation shall be addressed through general quarry site management and in compliance with any consent conditions, relevant legislative requirements and best practices. This will include implementing procedures and controls in the Dust Management Plan and the Noise Management Plan submittedseparately

5 DOCUMENT REVIEW

In order to provide a general update on rehabilitation-related activities, Fulton Hogan proposes to report on an annual basis. This includes covering circumstances arising during the gradual development at the Roydon Quarry site, which may alter the timing and staging of rehabilitation works. The Roydon quarry consents include conditions about management plan reviews and the need for updating site management plans, including the rehabilitation plan. In some years it may not be necessary to alter the contents of the plan if there are no unexpected occurrences, howeverin other years Fulton Hogan may wish to adjust their strategy. As a minimum for the Rehabilitation Plan, Fulton Hogan proposes to conduct a more thorough revision on a five-yearly basis. Should any of the following circumstances occur, this will trigger an unscheduled update (out of annual review timeframe):

- When there is a fundamental shift in operational activities (e.g. unscheduled move to a newarea);
- Following significant environmental incidents (e.g. flooding on the site, causing damage toassets);
- As a result of internal audits on rehabilitation outcomes.

In a scheduled review of the Site Rehabilitation Plan, it is proposed that the following matters beconsidered. This is in terms of suitability of existing content and whether new information is required:

- Outlining rehabilitation activities undertaken during the reporting period.
- Areas of the site to be quarried (extraction) over the next 12 months.
- Plans for earthworks, including overburden stripping and disposal, over the next 12 months.
- Areas of vegetation removed and areas planted during the reporting period.

Appendix 1: Environmental Policy