

APPENDIX 7: BACKGROUND REPORT ON ISSUES FOR THE MANAGEMENT OF POTENTIAL AGGREGATE RESOURCES

DPR Rural Chapter – Rural Q Zone:	Background Paper – Key Issues for the Management of Potential Aggregate Resources
Purpose of Report:	To inform Replacement District Plan
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1.0 PURPOSE OF REPORT

- 1.1 This report provides an overview of the background and issues around providing for aggregates in the District and for and managing quarrying activity over the short to medium term through the Replacement District Plan.

2.0 BACKGROUND

- 2.1 A sustained supply of aggregates is essential to provide for a community's social, economic and cultural wellbeing. Being able to secure aggregate resources at reasonable cost is important to the recovery and rebuilding efforts associated with the Canterbury Earthquakes, to provide for major infrastructure projects such as motorways, and for the business-as-usual demands of the construction, roading and development sectors. Whilst Christchurch is fortunate to have a local supply of aggregates available, access to the finite resource could be sterilised by incompatible land use and development or restrictive land use controls, necessitating access to more distant and costly resources to meet the District's economic needs. The efficient utilisation of these resources is therefore a significant resource management and recovery issue for the District Plan Review.
- 2.2 A large amount of work has been undertaken around the issue of aggregate need over the past 5-10 years prompted initially by the Environment Court¹ in 2006, and later the earthquakes of 2010 and 2011. The Court found in the Road Metals case that the underlying assumptions used in the City Plan to inform policy and land use provisions for quarries were flawed, placing an over-reliance on river based sources to meet aggregate demand and consequently over-estimating the District's available resource supply. Further, the Court opined that the Council ought to be planning for the needs of a 50-100 year horizon, of which the then projected ten year supply fell well short.
- 2.3 The Road Metals decision prompted a Council investigation into the issue and which confirmed both a limited (zoned) dry-land based resource supply, along with very limited options available for new large quarry sites. The only two areas of reasonable size identified in 2007, having regard to a range of locational criteria, were the 'Rural 6 Grasslands' zoned land between Yaldhurst and McLeans Island and the 'Rural 2 Templeton-Halswell' zoned land associated with the Christchurch Prison. Neither of

¹ Road Metals v Christchurch City Council and Canterbury Regional Council (2006) (C Env 163/05 1)

these land areas were considered likely to come forward in the short to medium term, if ever. The map at **Appendix 1** shows the existing (and proposed) quarry areas in the context of these and other key land use constraints.

- 2.4 A detailed independent review was subsequently undertaken by Twelfth Knight Consulting² to determine future aggregate resource need to 2041 and identify constraints to resource use which would inform further investigation of alternatives for potential aggregate supply across the wider region. A regional focus group comprising of representatives from Waimakariri and Selwyn District Councils and Environment Canterbury was established to further this objective, but with progress halted by the Canterbury Earthquakes in 2010 and 2011.
- 2.5 The Twelfth Knight Review identified a significant resource shortfall of approximately 40 million tonnes to 2026 and calculated that the land based quarries within Christchurch District would be exhausted by 2020. In light of the new supply that has since come on-stream via resource consents in recent years both within and outside the District, along with the new demands generated by the Canterbury Earthquakes, the Council commissioned a further report³ by the same author, to inform the District Plan Review. Twelfth Knight Consulting (2014) concludes that “the overall quantity of material currently available within the study area⁴ is theoretically capable (i.e. without regard to location) of satisfying demand until approximately 2036” (existing supply in Christchurch District is projected to be exhausted by 2031”. **An additional 40 million tonnes would be required to satisfy the remainder of demand to 2041**, meaning that new sources of aggregate in the District and beyond would need to be found if the Council is to address the shortcomings identified by the Environment Court in 2006.

3.0 DISTRICT PLAN REVIEW – ISSUES IDENTIFICATION

- 3.1 A range of sources have been used to identify relevant resource management issues of significance to the District Plan Review. In 2009, the Council had embarked on a review of the rural quarry zone provisions⁵ in response to concerns raised by both the Yaldhurst Rural Residents Association and the aggregate industry, about the appropriateness and efficacy of existing quarry zone provisions. Issues that this review sought to address included:
- Screening provisions (too onerous and impractical for operators);
 - Definition of ‘mineral extraction activity’ (currently allows for importation of aggregates for processing with the potential to prolong the life of quarries – see below for discussion on this issue); and
 - Rehabilitation provisions (to ensure satisfactory and timely restoration of quarried land).

² Twelfth Knight Consulting (2009), Demands, Resources and Constraints.

³ Twelfth Knight Consulting (2014) Aggregates: Demands and Resources.

⁴ Includes the districts of Christchurch, Selwyn and Waimakariri

⁵ Proposed Plan Change 40

- 3.2 More recently⁶, the Canterbury Aggregate Producers Group (CAPG) requested that Council review current district plan controls which limit quarry operating hours and truck movements; and a number of Environment Court cases in recent years have considered issues of interpretation of City Plan rules and definitions. The definition of ‘Mineral Extraction Activity’ in particular has generated significant debate – particularly around whether the activity, as currently defined, extends to the processing of natural sands, rocks and gravels extracted from other sites and / or the processing of recycled materials such as concrete, which in both circumstances has the potential to prolong the lifespan of a quarry to a practically unlimited extent (discussed further below).
- 3.3 A report prepared in 2011 to evaluate the effectiveness and efficiency of operative city plan provisions⁷ is silent on quarrying provisions on the basis that a detailed review of quarrying provisions was underway at that time.
- 3.4 In addition to the above, the key resource management issues relating to quarrying activities that the District Plan Review seeks to address are summarised below.

RESOURCE MANAGEMENT ISSUE 1: Access to a local supply of aggregates is presently constrained which may result in inefficient use of natural resources

As discussed in Section 2.0 there is a forecast shortfall of gravels for aggregates within the District between 2031 and 2041. The shortfall results not from a lack of quality resource but from the numerous factors constraining its availability or extraction viability, including:

- **Proximity to sensitive uses** resulting in particular from land fragmentation into smaller lot sizes, increasing the surrounding residential density and thereby the prevalence of activities sensitive to quarrying activities. These activities often then seek to constrain existing quarry activities by making complaints or opposing future land use consents (reverse sensitivity effects). Quarry operators have long advocated for greater protection of the industry from reverse sensitivity effects and which has led to greater recognition of the issue in regional planning policy.

The District Plan currently seeks to address the issue of reverse sensitivity largely through performance standards for the quarry activity itself (setbacks, screening requirements and noise rules) and by restricting residential activity within 200m of a quarry zone (non-complying activity).

- **Distance from demand.** In a highly competitive market, this is one of the most important determinants of the economic viability of a quarry. The aggregates industry operates on tight margins, which is good for the consumer and for earthquake recovery, but which means that the economic viability of a potential quarry site is easily eroded to the point where it is not feasible to access the resource regardless of its quality or volume. For instance, a quarry operator is not likely to establish a quarry

⁶ Christchurch Aggregate Industry (May 2012), presentation to CERA, ECan and CCC

⁷ Response Planning (2011), “Evaluating the Effectiveness and Efficiency of the Christchurch City Plan”.

outside of the District to serve the Christchurch market, when other operators have quarries closer to the market and therefore have the competitive (price) advantage.

Industry figures suggest that the total delivered aggregate cost / tonne doubles for every 30km of transportation distance⁸. This cost can either render aggregate resources further afield uneconomic to extract from a commercial perspective, or result in increased cost to consumers. Richard English, an industry expert, claimed in 2011⁹ that if new quarries needed to be developed at a 30 kilometre radius from the City (double the current distance from resource to market), the additional cost to Christchurch over the next 30 years would be at least \$500 million, even without quantifying the additional environmental costs. Conversely, if the existing high quality resources available close to the main sources of demand are able to be worked, the Region would continue to benefit from aggregates which are significantly cheaper than in many other areas of New Zealand, providing an economic advantage to the Region.

- **Protected landscapes, flora and fauna** most notably in the Christchurch context rural grasslands and the Port Hills.
- **Significant cultural values to be protected;** including waterways, indigenous vegetation and other wāhi tapu that may be present and thereby affect the ability to extract aggregates.
- **Protection of groundwater.** The importance of maintaining high quality groundwater for the economic and social wellbeing of the city is recognised in all levels of planning policy. Both the district and regional councils contain policies and rules which seek to manage the potential effects of land use activities including quarrying and filling close to or within groundwater.

Both the district and regional council promote retention of a 1m buffer between the base of a quarry pit and the highest recorded groundwater level. This, in combination with the commercial reality that aggregate depths of less than 5m are generally considered to be uneconomic, results in a 6m minimum gravel depth to groundwater requirement for quarry viability¹⁰.

It is generally accepted that the greatest risk to groundwater is not from the excavation of gravels but from the backfilling of quarried land.

- **Size, function, intensity or character of activities.** Whilst not having an effect on the overall supply of aggregates, on a day-to-day basis the supply of aggregates to the market is also limited by the scale, function, intensity or character of activities permitted. For example, permitted activities can be limited in order to manage effects

⁸ R. S. English (2011), "Statement of Evidence on behalf of Fulton Hogan Limited, Winstone Aggregates Limited and the Aggregate and Quarry Association of New Zealand in respect of the Proposed Canterbury Regional Policy Statement" (page 18, para 82).

⁹ Ibid.

¹⁰ English, R (2011) "Brief of Evidence on behalf of Fulton Hogan Ltd, Winstone Aggregates Ltd and the Aggregates and Quarries Association on the Proposed Canterbury Regional Policy Statement".

including maintenance of rural amenity and character (e.g. limits on operating hours) and transport network safety and efficiency (e.g. trip generation thresholds).

- **Land ownership.** Industry competition is strong with around seven or eight key players all looking to secure sufficient quarry sites to maintain continuity of business operations. This has resulted in new quarry sites being sought out-of-zone despite significant unworked landholdings remaining within the quarry zones. Potential 'land-banking' and an uneven distribution of landholdings will likely continue the pressure for out-of-zone quarries under the current planning framework.
- **Competing uses.** The ever increasing scarcity of natural resources such as minerals, water and land for primary production, brings with it competition within and between some resource economies, requiring strategic choices to be made to anticipate constraints in resource availability. There are other competing land uses of note in west Christchurch - particularly the Christchurch Prison and Christchurch International Airport (both designated) which currently have significant rural landholdings in locations of significant underlying high quality gravel resource (refer to Appendix 1). Christchurch West also contains significant utility infrastructure including Transpower's high voltage transmission line corridor and Environment Canterbury's Waimakariri stopbanks, which have the potential to be undermined by quarrying activities (dust and structural stability).

Latest research indicates that there is currently sufficient zoned / consented gravel resource to meet projected demand over the next 10 year (District Plan) period, including the additional demands generated by the Canterbury earthquakes.

Indeed, the current consented or zoned resource is not expected to be exhausted before 2035 (study area) or 2031 (CCC). On face value, there is no urgent (including earthquake related) need to provide for new quarries, and to restrict quarrying to existing zoned or consented locations may help to ensure that current sites are fully utilised before extraction commences elsewhere. However this would not give effect to the Environment Court direction that a longer planning horizon be used and it would fail to recognise the need of quarry operators to plan well ahead for continuity of operations. A more enabling approach to quarrying in the rural environment would address this and ensure that there were no significant policy barriers to resource availability – enabling the 40MT deficit (50MT deficit for CCC) between 2035 and 2041 to be met through 'windfall' quarry proposals. This would also address issues of a small number of operators holding the zoned / consented resource resulting in continuing pressure for new sites by other quarry operators.

Whilst the Council has not undertaken any further investigation to quantify the contribution that a more enabling policy approach may make to meeting the projected supply shortfall; these seems unnecessary, because this approach combined with the potential to make more efficient use of existing resources (e.g. an ability to excavate deeper and reduced setbacks), is considered to be the most efficient and effective means of enabling greater resource supply. Beyond this, supply would need to be imported from outside of the District.

RESOURCE MANAGEMENT ISSUE 2: Quarrying activities can have significant adverse effects on the environment which need to be managed.

While high quality gravel resources are a strategically important natural resource, the extraction and processing of these can have adverse effects on high class soils, significant landscapes and ecological values, waterways and groundwater, rural amenity and infrastructure such as road networks. The scale and type of effect depends on the characteristics of the extracted material, the technical used and the sensitivity of the surrounding environment.

The environmental effects of quarrying activity that the district council manages primarily include:

- Noise;
- Dust;
- Land and vegetation disturbance;
- Storage of hazardous substances;
- Protection of groundwater (albeit that the regional council has primary responsibility for this function);
- Traffic (particularly heavy vehicle) effects;
- Landscape, visual and amenity effects;
- Impact on cultural and historic heritage values;

Noise

Noise is key determinant of amenity values with excessive noise being one of the environmental indicators that is most commonly recorded in complaints about adverse effects of quarrying activities. Noise levels experienced beyond a quarry site can vary depending on climatic conditions (wind direction), the type of activity being undertaken (e.g. blasting, processing and excavation), and the location or siting of the noise source within the site. Traffic movements are also a source of quarry noise.

Vibration

Vibration has nuisance effects similar to noise, and can have major effects upon people's enjoyment of their property, particularly for residential properties, although they are more likely to result from hard rock quarrying (involving blasting) than from the quarrying of alluvial gravels and sands. Vibration can occur to a lesser extent from truck movements, particularly when residential properties are located close to internal haul roads and along external traffic routes.

Dust nuisance

Quarries have the potential to generate fugitive dust, predominately from the processing of rocks, sands and gravels (crushing and screening), stockpiling of materials and the movement of heavy vehicles within and outside the site. Generally all sand, aggregate and road base products that are stockpiled on site have initial water content. However when products are stored for long periods in high temperatures and low humidity, stockpiles may need to be treated for dust suppression. Wind is a major carrier of dust, however vegetation over bunds and shelter belts can help reduce the exposure to, and velocities of, wind dust.

Dust can be a particular nuisance to any nearby sensitive receptors such as residential properties and can also cause nuisance for other activities such as horticulture (dust over crops), equine activities (respiratory problems) and electricity infrastructure (transmission lines). The dust effects of quarrying proposals are typically assessed via regional resource consents (discharge to air).

Land and vegetation clearance

Quarrying involves land and vegetation clearance which can cause erosion and soil stability effects and sedimentation into waterways.

Storage of Hazardous Substances

Quarry infrastructure including processing plant and heavy vehicle fleets necessitate the storage and use of hazardous substances, primarily diesel. There is the potential for accidental spills to occur although spills kits can localise the effects in such instances.

Heavy Vehicle Traffic

Quarrying activities can generate high levels of heavy vehicle movements, which can result in adverse effects on the road network (road safety, maintenance and efficiency) and neighbour amenity. In the Christchurch context, damage to roads and safety to road users as a result of trucks churning up road berms continues to be an issue, particularly around the Old West Coast Road area. Many of the existing quarries are located with good access to the strategic road network administered by NZTA, who has an interest in ensuring that the network remains safe and efficient. High road speeds in these areas often necessitates particular access arrangements including separate turning lanes and wide visibility splays. Council transport engineers have raised concerns about the suitability of some existing quarry accesses to accommodate increased (or even existing) levels of truck movements.

Landscape/Visual/ Amenity Effects

Quarrying activities can have a marked impact on their pre-quarrying landscape both over the short term (during quarrying activity) and long after the activity ceases. Quarry operations often contain significant infrastructure (machinery, buildings), vehicles and ancillary structures which can appear out of context in some (particularly rural) contexts. Quarry sites are typically barren environments, stripped of any vegetation and topsoil and exposed to the elements. Depending on their location, gravel quarry pits can be between 2 and 15 metres deep. Some sites can be difficult to rehabilitate – particularly those that are very deep and narrow and those constrained further by facilities like stop-banks or transmission pylons (e.g. former Fulton Hogan quarry at Leggetts Road, see photograph below). Available clean fill for quarry rehabilitation is very limited¹¹ meaning that some sites are incapable of remediation to enable subsequent re-use or the timescales for doing so would be extremely long - many decades.

¹¹ Twelfth Knight Consulting (2014), "Quarry Rehabilitation: Background Report prepared for Christchurch City Council District Plan Review".



The other obvious landscape change arises from the permanent alteration to land form. In the Christchurch context this would typically involve a change in land form from flat open rural land consistent with surrounding ground levels, to one in which the farmed landscape and farming activities following site rehabilitation would inevitably occur at lower levels (anywhere between 2 – 15m below natural ground levels depending on location / depth to groundwater). These 'holes' or depressions in ground level can often be incongruous in the otherwise flat landscape and unless well screened will serve as a very visual reminder that the landscape has been significantly modified by extensive earthworks.



Above: Aerial of Miners Road Quarry Zone - Google Earth 04/10/2013

Screening measures such as tree planting or bunding are often used to reduce the visual impact of quarrying activities. In May 2014 the Council undertook a review of the City Plan quarry screening provisions¹² concluding that they were generally effective in their screening function but that planting / bunding could in themselves cause a detraction in visual amenity through the planting of inappropriate tree species and poor maintenance:

“Appropriate landscape screening interventions in this landscape are confined to earth mounding, shelterbelt planting and open grassed frontages, recreating those landscape features already present. Mounds planted thickly with native planting, while providing some bio-diversity, appear at odds with their surroundings and are not naturally occurring in this landscape. Solid timber fences sitting on top of mounds, while possibly providing some noise attenuation, again are at odds with the surrounding rural character and are inappropriate in this landscape”.

There is the potential to amend the screening provisions to provide more flexibility to quarry operators by allowing a number of screening options whilst also seeking improvements to the quality of visual effects mitigation measures (type and maintenance).

Impact on cultural or heritage values

Quarrying activity may conflict with the maintenance or protection of cultural or heritage values such as wahi tapu or wahi taonga or European heritage features or items.

Protection of Airport Operations

¹² CCC, Capital Programme Group, Review of the Quarry Zone Screening Provisions (May 2014)

Protection of Christchurch International Airport Limited has long sought greater protection from the bird-strike risk associated with large areas of ponded water (including stormwater treatment facilities) in the vicinity of the airport. Particular concerns for quarrying activity relate to the potential ponding of water at the base of quarry pits and the species of grass sown as part of rehabilitation – both of which could be significant bird attractors if not appropriately managed.

RESOURCE MANAGEMENT ISSUE 3: Lifespan of quarries, rehabilitation and end use

The need for, and means of achieving quarry rehabilitation and a return to an appropriate alternative end use has been an ongoing issue for the District over successive plan reviews since the 1970s. Plan provisions have been altered over the years with very limited effect – very few zoned quarries have been rehabilitated despite policy and rules requiring staged restoration (Ibid). On at least one occasion, a quarry has been sold on, without any rehabilitation having occurred. The local community has become increasingly concerned¹³ about the range of activities undertaken in the Rural Quarry Zone and the implications of this for prolonging the lifespan of a quarry (to a practically unlimited extent) and consequently prolonging the negative effects of quarrying on rural amenity and character. The quarry operators on the other hand have invested heavily in operations and seek to maximise use of zoned land and sunk infrastructural costs; reluctant to bring operations to a conclusion and remediate their quarried land. Essentially this is creating a shift in focus from extraction and processing towards more of a processing and related activities focus.

Quarrying established in the Yaldhurst area in the 1960s, prior to most rural residential development around it. That said, it is clear that the environmental results anticipated for the zone have consistently sought that the resource would be extracted, the land rehabilitated, and returned to at least a pastoral farming landscape and that the local rural residential community expects that to be realised. The reality is that business operations have changed considerably over time such that:

- The intensity of, and investment in, quarrying activity has increased significantly.
- Quarriers are seeking to diversify the range of other related (industrial) activities undertaken on their sites including processing of recycled aggregates (e.g. concrete crushing), concrete batching, asphalt mixing plants, HGV servicing / repairs etc.
- As the 'zoned' resource is exhausted, new quarries have been granted consent in surrounding rural zones, some of which seek to utilise existing zoned quarry sites / infrastructure for the processing of these materials, further prolonging the lifespan of the original quarries.
- Quarries increasingly process materials brought in from elsewhere (from river and other land based extraction sites). This has resulted in part from wide interpretation of the definition of 'mineral extraction activity'.

¹³ See Yaldhurst Rural Residents Association Incorporated v Christchurch City Council and Blackstone Quarries Limited (2012), NZEnvC 039.

The main issues that arise from allowing unrestricted processing of imported materials are:

1. Potential conflict with the direction of planning policy (including higher order planning documents) which seek to maintain a clear distinction between urban and rural uses (urban consolidation) and maintain rural amenity and character values. Essentially, the potential for rural quarry zones to take on a quasi-industrial character with a type and scale of activities not anticipated for the rural environment, when the current policy direction is that activities in rural zones should be limited to those that require a rural location, are dependent on rural resources and are of a scale, type and intensity commensurate with rural amenity and character..
2. That it could prolong the lifespan of a quarry to a practically unlimited extent, consequently prolonging the associated effects of industrial type activities upon surrounding communities and the environment. And that:
3. Both extending the life of a quarry by allowing processing of imported materials and supporting high value uses on rural land, would hinder (longstanding) anticipated rehabilitation objectives for the rural quarry zone.

The District Plan Review provides the opportunity to clarify and clearly set out what type of activities are appropriate in the quarry zone through activity status and definitions. The Canterbury Regional Policy Statement (CRPS) provides the starting point for considering the appropriate range of activities to be provided for in the rural quarry zone. The CRPS identifies 'quarrying and associated activities' as legitimate rural activities, however it doesn't further define 'quarrying'. It is therefore up to territorial authorities to adopt their own interpretation and application of the term.

It is noted that the Oxford and Merriam-Webster dictionaries define quarrying as the act of *extracting* rock, not the processing of extracted rocks. It is not unreasonable to conclude that mineral *extraction* is a legitimate rural activity by virtue of being *directly dependent* on the rural resource, and that the *processing* of those extracted materials is also a legitimate rural activity as an activity *directly associated* with the materials that have been extracted. Without this direct association, processing could be considered an industrial activity and may more appropriately be undertaken at the point of extraction or outside of the rural environment, most notably in industrial zones. That is not to say that all processing of imported materials would be considered unacceptable, but rather that it is appropriate to consider such proposals on their merit having regard to matters such as urban form, traffic and rural amenity effects, the rehabilitation outcomes sought for the rural quarry zone and a timely and cost effective earthquake recovery.

The activity of processing recycled aggregates, concrete crushing and asphalt plants could be treated in a similar way (assessed as discretionary activities), acknowledging the appropriateness of locating these activities on the same site as quarrying in circumstances where there is a direct linkage between activities, where mineral extraction remains the principle activity undertaken on site and where the activities would not undermine the rehabilitation objectives of the zone or wider rural amenity and character and urban form objectives.

RESOURCE MANAGEMENT ISSUE 4: Identifying desired extent of quarry rehabilitation and intended end use

Restricting activities which may otherwise affect the ability of a zoned quarry to be rehabilitated is only one part of the equation. The Plan then needs to facilitate the effective and timely rehabilitation of quarried land, establish the appropriate standard of rehabilitation and avoid past scenarios whereby quarries have been sold without having undertaken any rehabilitation.

The operative City Plan anticipates that quarry sites will be rehabilitated (Policy 13.1.10) and includes a rule requiring the staged restoration of quarried lands as follows:

Rule 3.2.3

*Any mineral extraction activity which results in an area of completed excavation exceeding 2ha in area and/or has been discontinued for a period of more than three years, without being resoiled and left with an established vegetative cover, shall be a **controlled activity** unless the Council has approved a rehabilitation plan for the site(s).*

This rule was established by the 1985 Papanui District Scheme which sought to include basic rehabilitation requirements as an interim control method whilst the Council carries out a study to identify potential future uses of quarried land. The Council prepared the first stage of this study - but planned subsequent stages never eventuated. The rehabilitation requirements remained in this 'interim' state.

The anticipated outcome is for quarry sites to be progressively rehabilitated by means of top-soiling and grassing, restoring the land to at least a pastoral standard. The intent of this rule was to require the progressive restoration of quarried land to a state where visual amenities are enhanced and the land is capable of sustaining at least pastoral farming, or other uses compatible with surrounding rural amenities, and excluding activities of an industrial or a noisy recreational nature. However, the reality is that **very little rehabilitation has been undertaken to date**. For industry, there is currently little incentive to rehabilitate quarries as this would preclude ongoing industrial activities on site including a current quarry deepening proposal to excavate below the one metre groundwater buffer¹⁴.

The District Plan Review offers an opportunity to revisit the rehabilitation outcomes sought and the methods for achieving these.

Level of Backfilling

Most quarry sites undertake some form of clean-filling operation in conjunction with their quarrying activity however very few quarry sites have made any significant progress towards rehabilitation. This can be attributed to the sheer size of the quarries to be rehabilitated, limits on the amount of clean-fill material available for filling and a lack of Council enforcement to date with regard to staged restoration requirements. Very few quarries have sought resource consents to backfill despite the current City Plan limit of 2,000m³ per

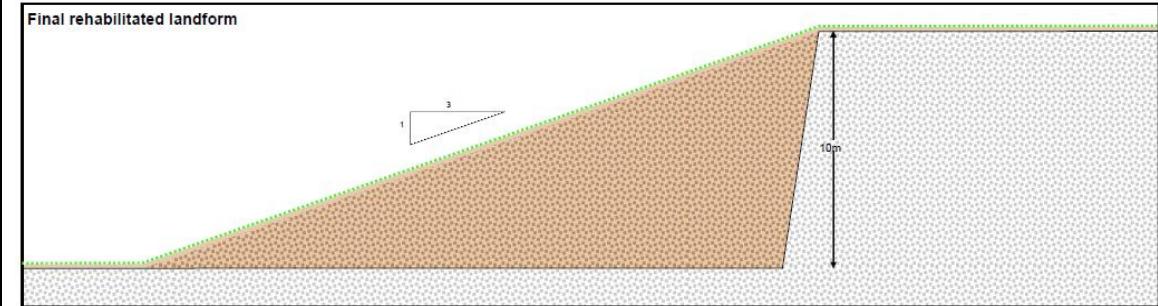
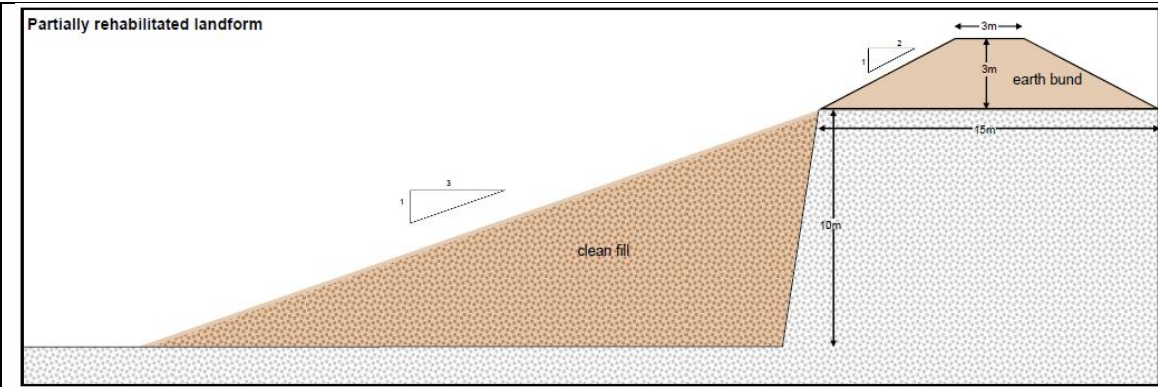
¹⁴ Canterbury Aggregate Producers Group, RMA92028401 lodged January 2015.

hectare set out in the earthworks section of the City Plan, notwithstanding that the definition of Mineral Extraction Activity permits (unrestricted) filling as a permitted activity by virtue of its inclusion in the definition of 'mineral extraction activity'. The Plan Review provides an opportunity to clarify the consenting requirements for earthworks in quarries.

The Rural Quarry Zone currently extends over some 1100 hectares and up to 15 metres below ground level. **A recent study concludes that there is a significant lack of available clean fill to enable quarry sites to be backfilled to the level that existed prior to excavation**¹⁵. Fill rates are also heavily dependent on aggregate sales (i.e. no sales = no backfilling) such that filling is unlikely to occur on sites where the resource is exhausted. The filling of sites may take many decades with consequential effects on timescales for rehabilitation and end use and on prolonging the adverse amenity effects on other rural land uses (particularly visual amenity, dust nuisance, noise and traffic effects). It is also widely accepted that the greatest risk to groundwater comes from backfilling quarry sites rather than the extraction activity itself albeit that clean fill by definition should be free of contaminants.

There is no one size fits all approach to rehabilitation. Shallow excavations such as occurs around McLeans Island (2-5m deep) may require no or little filling and can be returned to light pastoral farming use with minimal intervention. For other sites, such as in the Miners and Pound Road areas, which are very deep but wide, backfilling through modest re-battering of slopes may achieve a final landform not too incongruous in the landscape and where farming could subsequently be undertaken without difficulty (as illustrated below). Full backfilling to the natural groundwater level that existed prior to quarrying would take many decades.

¹⁵ Twelfth Knight Consulting (2014), "Quarry Rehabilitation: Background Report for Christchurch City Council District Plan Review"



The District Plan review offers the opportunity to clarify the anticipated rehabilitation outcomes to:

- Enable sites to be rehabilitated quickly with minimal requirements for fill material.
- Require that filling be undertaken concurrently with the quarrying activity (i.e. progressively)
- Ensure that the final landform is appropriate in the context of the site
- Require that the final landform is capable of supporting a productive rural use
- Provide flexibility so as not to preclude other types of rehabilitation being undertaken at a later date.

APPENDIX 1 – QUARRY CONSTRAINTS