

**BEFORE THE DECISION MAKERS APPOINTED BY
THE CANTERBURY REGIONAL COUNCIL**

IN THE MATTER OF The Resource Management Act
1991

AND

IN THE MATTER OF Resource Consent Application
CRC193563; CRC193564; and CRC193773 for SOL
Quarries Limited (the Applicant) for a land use consent to
undertake quarrying activities (extraction and
cleanfilling); discharge permit to discharge contaminants
to air; and a discharge permit to discharge contaminants
(cleanfill) onto and into land where it may enter water.

**Statement of Evidence of
Report of Rowan V. C. Freeman**

On Behalf of SOL Quarries Limited.

Introduction

1. Elrick & Co. have, on behalf of SOL Quarries Limited (SOL), applied for resource consent to undertake quarrying activities (extraction and cleanfilling) (CRC193563); for a permit to discharge contaminants to air (CRC193564), and a discharge permit to discharge contaminants onto and into land where it may enter water (CRC193773).
2. I have been engaged by Elrick & Co. to prepare contaminated land specialist evidence in relation to CRC193773 – ‘To discharge contaminants from cleanfilling onto and into land where it may enter water’.
3. An overview of the proposed activity and the associated resource consent application is laid out in the Application for Resource Consent dated March 2019 (Assessment of Environmental Effects, page 13) and the Section 42A (s42A) Officer’s Report prepared by CRC consent planner, Ms. Rubie McClintock (November 2020).

Qualifications and Experience

4. I am currently employed by Pattle Delamore Partners Limited (PDP) as Senior Contaminated Specialist and Service Leader. My office is located at Level 2, 134 Oxford Terrace, Central Christchurch.
5. I hold a Bachelor of Science in Geology from Tennessee Technological University and a Post Graduate Diploma in Science (Environmental Science) from the University of Canterbury.
6. I am a Certified Environmental Practitioner for Site Contamination under the Environment Institute of Australia and New Zealand and a member of the Australasian Land and Groundwater Association (ALGA). I previously sat on the Contaminated Land

Management Sector Group directed by the Waste Management Institute of New Zealand (WasteMINZ).

7. My career as a contaminated land specialist spans more than 16 years and I possess a good working knowledge and understanding of a broad range of environmental issues and the regulatory planning framework that governs contaminated land management and disposal of contaminated and potentially contaminated wastes in New Zealand.
8. My professional experience includes:
 - a) More than 5 years working in the northeast United States as a project geologist undertaking environmental investigations and remedial actions on industrial, oil refinery, utility, pharmaceutical, federal, municipal, and private sites, and
 - b) More than 10 years working within the Canterbury Regional Council Contaminated Sites Team (including 3 years as Principal Science Advisor – Contaminated Sites).
9. In October 2019 I returned to environmental consulting as a senior contaminated land consultant based in Christchurch City.
10. Relevant to my suitability to address contaminated land matters raised in the CRC s42A Officer's Report, I have undertaken and supervised (on behalf of CRC) detailed site investigations on residential and commercial premises (in accordance with relevant Ministry for the Environment (MfE) Contaminated Land Management Guidelines).
11. As a former senior member and principal science advisor for CRC's Contaminated Sites Team (2009 to 2019), I provided technical advice and reviews to internal and external customers for many years in relation to contaminated land investigations and management, resource consent applications (e.g. dewatering, passive discharge, and stormwater), and the fate of site generated contaminated waste and cleanfill.
12. I have previously provided expert witness testimony and have read the Environment Court Code of Conduct for Expert Witnesses and agree to comply with the code in providing my evidence.
13. My evidence is within my expertise. Where/if my evidence overlaps with matters better explained by another nominated expert, I have deferred to them.

Background

14. SOL currently operate a consented aggregate quarry at 81 Conservators Road and propose to expand that operation eastward to 93 and 133 Conservators Road ('the site') in 3 stages over a period of years. The proposed quarrying operation involves natural aggregate extraction, processing, haulage, and site cleanfilling and rehabilitation.
15. Based on the application for resource consent and AEE (Section 3.8) cleanfilling is an integral first step to enable progressive site rehabilitation.
16. In preparing this report, I have reviewed and/or considered the following:
 - a) Lands & Survey¹ (2019) - Application for Resource Consent: AEE SOL Quarries Ltd (2019)
 - b) The CRC Section 42A Officer's Report (2020) prepared by Ms. Rubie McLintock including:
 - i. Appendix 2: Addendum to the Section 42A Officer's Report – Ms Amber Kreleger, CRC Senior Scientist – Groundwater; and

¹ Now legally registered as Elrick & Co.

- ii. Appendix 3: Addendum to Section 42A Officer's Report - Ms Samantha Iles, CRC Senior Scientist – Contaminated Sites and Dr Michael Massey, Principal Science Advisor – Contaminated Land.
 - c) The evidential report of Mr. Peter Callander, Technical Director – Water Resources (PDP).
 - d) Ministry for the Environment (2002) - A Guide to Management of Cleanfills.
 - e) WasteMINZ (2018) - Technical Guidelines for Disposal to Land. Retrieved from: <http://www.wasteminz.org.nz/wp-content/uploads/2016/04/Technical-Guidelines-for-Disposal-to-Land-9Aug18-FINAL.pdf> on 19 November 2020.
 - f) WasteMINZ (2018) – Technical Guidelines for Disposal to Land – Appendices. Retrieved from: <http://www.wasteminz.org.nz/wp-content/uploads/2016/04/Technical-Guidelines-for-Disposal-to-Land-Appendices-9Aug18-FINAL.pdf> on 19 November 2020.
 - g) SOL Quarries Limited Cleanfill Waste Acceptance Declaration.
 - h) SOL Quarries Limited (2019) - 81 Conservators Road Quarry Management Plan.
 - i) The Canterbury Land and Water Regional Plan – Earthworks over Aquifers (p.156-157). Retrieved from: <https://www.ecan.govt.nz/your-region/plans-strategies-and-bylaws/canterbury-land-and-water-regional-plan/> on 19 November 2020.
17. Based on my review of the CRC s42A report, specifically relating to cleanfilling and site rehabilitation, concerns have been raised about potential impacts from materials brought into the site as clean fill.

Scope of Report and Format

- 18. My report addresses relevant matters raised in the CRC s42A Officer's Report. Specifically, my report specifically addresses contaminated land matters relating to cleanfilling activities and does not address any other matters.
- 19. Relevant to my evidence, is Appendix 3 of the CRC's s42A Officers Report prepared by CRC contaminated land specialists Mrs. Samantha Jane Iles (Ms. Iles) and Dr. Michael Stanley Massey (Dr. Massey).
- 20. Evidence reports prepared by Ms. Amber Kreleger (Ms. Kreleger) and Mr. Peter Callander (Mr. Callander) are outside the realm of my expertise; however, I refer to their evidence in my report.
- 21. My evidential report is laid out as follows:
 - a) Discussion of Assessment of Receiving Environment,
 - b) Discussion of Assessment of Effects on the Environment,
 - c) Proposed Mitigative Measures,
 - d) Response to Submissions, and
 - e) Conclusion.

Assessment of Receiving Environment

- 22. I visited 81 Conservators Road in November 2020 and was escorted around the operational quarry and rehabilitated cleanfilled areas by Mr. Simon Hedley (Mr. Hedley) of Elrick & Co. Mr. Jeff Bluett, Technical Director – Air Quality (PDP) was also present.

23. After viewing the operational quarry, Mr. Hedley showed the extent of the proposed quarry and cleanfill area at 93 and 133 Conservators Road (Lot 1 DP 82891) including a short drive northward along Conservators Road.
24. The overall description of the existing environment presented under Section 2.1 of the resource consent application and AEE is accurate.
25. The immediate receiving environment at the site is comprised of unsaturated gravels and the gravel aquifer beneath the quarry, as described in the evidence of groundwater specialists, Ms. Kreleger and Mr. Callander. The groundwater aquifer would be the most likely affected receptor from potential impacts associated with quarry cleanfilling, should this occur.
26. Secondary receptors could include users of the groundwater resource situated hydraulically downgradient of the proposed activity area; however, I defer to the evidence of Ms. Kreleger and/or Mr. Callander on this matter.
27. The site is situated within an area designated as the Christchurch Groundwater Protection Zone. Due to the high value of this area any activity undertaken that may release contaminants over or into it requires scrutiny.
28. My review of physical setting of the site and the surrounding area did not find any surface water bodies that would be hydraulically connected to primary receiving environment.

Assessment of Effects on the Environment

29. Adverse effects to ground water quality in the receiving environment could occur if contaminants associated with human activities are discharged directly into an excavation, or deposited into an excavation within the matrix of non-contaminating materials, or from a combination of both.
30. The Ministry for the Environment (MfE) has published a list of historical and current hazardous activities and industries (HAIL) conducted in New Zealand which generate contaminants that if released into this receiving environment could cause adverse environmental effects.
31. The most relevant mechanism for contaminant mobilisation into the receiving environment would be contaminant leaching by water infiltration through deposited materials leading to mobilisation of water-soluble contaminants.
32. Currently in New Zealand, the most prescriptive and widely accepted guidance for cleanfill is 'A Guide to the Management of Cleanfills' (hereafter, MfE 2002).
33. MfE 2002 is referenced in the plans, bylaws, and similar instruments used by regional and local authorities for Waste Acceptance Criteria (WAC) and management of cleanfills.
34. A draft 'Technical Guideline for Disposal to Land' has been prepared by WasteMINZ (2018) (hereafter WasteMINZ 2018) and other key stakeholders to supersede MfE 2002.
35. WasteMINZ 2018 proposes more prescriptive and conservative terms and definitions for cleanfill WAC compared to MfE 2002; however, in preparing my report I found no evidence that MfE has endorsed WasteMINZ 2018 to supersede MfE 2002. It is my understanding that MfE are intending to recommend amendments to WasteMINZ 2018.
36. I note numerous references to the WasteMINZ 2018 draft document in the evidence of Ms. Iles and Dr. Massey (e.g. para. 37, 38, 41, 42, etc. of Appendix 3 of the s42A Officers Report).
37. For clarity, I believe it is important to present the reader with the definition of "clean fill material" as presented in MfE 2002 and MfE 2018.

MfE 2002 definition:

Material that when buried will have no adverse effect on people or the environment. Cleanfill material includes virgin natural materials such as clay, soil, and rock, and other inert materials such as concrete or brick that are free of:

- *Combustible, putrescible, degradable or leachable components;*
- *Hazardous substances;*
- *Products or materials derived from hazardous waste treatment, hazardous waste stabilisation or hazardous waste disposal practices;*
- *Materials that may present a risk to human or animal health such as medical and veterinary waste, asbestos or radioactive substances;*
- *Liquid waste.*

WasteMINZ 2018 definition:

Virgin excavated natural material (VENM) such as clay, soil and rock that are free of:

- *Combustible, putrescible, degradable or leachable components;*
- *Hazardous substances or materials (such as municipal solid waste treatment, stabilisation, or disposal practices);*
- *Materials such as medical and veterinary waste, asbestos, or radioactive substances that may present a risk to human health if excavated;*
- *Contaminated soil and other contaminated materials; and*
- *Liquid waste.*

When discharged to the environment, clean fill material will not have a detectable effect relative to background.

38. I note that the WasteMINZ 2018 definition of clean fill material does not exclude inert materials.
39. WasteMINZ 2018 Table 2-2 lays out landfill class rationale. In Table 2-2, clean fill falls under Class 5, which highlights acceptable waste material as VENM; the material source as “slips/road clearance, construction site clearance, earthworks surplus”; and states that sediment contamination of surface water and dust are the contaminant risk.
40. In comparison, MfE 2002 states:

the primary source of waste is from the construction and demolition industry. Nearly all construction and demolition waste can be recycled or reused. Selective demolition or ‘de-construction’ of structures and good management of construction sites will result in a sorted, uncontaminated, and potentially valuable rather than a waste product.
41. WasteMINZ 2018 Table 6-1 lays out accepted waste types. For Class 5 (Clean Fill) it states waste types include:
 - *Non-contaminated soils, rocks, gravel, sand, clay, and other natural materials;*
 - *Maximum incidental inert manufactured materials (e.g. concrete, brick, tiles) to be no more than 5% by volume per load; and*
 - *Maximum incidental or attached biodegradable materials (e.g. vegetation) to be no more than 2% by volume per load.*
42. In Table 6-1, WasteMINZ 2018 also refers to its own Appendix I with respect to the Class 5 waste acceptance criteria, which the document highlights as being “based on maximum total concentration limits derived from the local/regional background, and limited organic compounds.” For the benefit of the reader, this should be Appendix H.

43. Under Appendix H, Table H-1, examples of regional background concentrations for inorganic trace elements are provided. However, I note that while values applicable to Auckland and Greater Wellington are included, there are no values included for Canterbury (and more specifically the area where the site is located).
44. Table H-2 under Appendix H is the first reference to a WAC for organic contaminants (petroleum hydrocarbons and total DDT). In my experience it is uncommon to encounter total DDT exceeding 0.431 mg/kg (as cited under para. 40 of Ms. Iles' report) or above 0.7 mg/kg as listed under Table H-2.
45. I am cautious about why WasteMINZ 2018 would include WAC for petroleum hydrocarbons when, in my experience, these compounds are among the most leachable through soil. Further, inclusion of this goes against stated accepted waste types stated in WasteMINZ 2018 under Table 6-1.
46. So while I agree with Ms. Iles' and Dr. Massey's sentiment that improvements to cleanfill management practices are need, I am concerned that WasteMINZ 2018 has not been refined to a point where it would be suitable guiding cleanfilling in New Zealand.
47. CRC's own Land and Water Regional Plan (LWRP)² only refers to MfE 2002 and further brings to question the driver(s) for enforcing WasteMINZ 2018.
48. Section 2.9 of the CRC LWRP defines cleanfill. The definition of cleanfill in the LWRP precisely mirrors the definition published in MfE 2002.
49. Based on my review of that document it is inconsistent in terms of messaging about what is or is not acceptable as clean fill material and contradicts itself in parts.
50. The WAC for "Class 5 Landfill" (reference for cleanfill in WasteMINZ 2018) is as follows:
 - a) *Virgin excavated natural materials (VENM), including soil, clay, gravel, and rock; and*
 - b) *Maximum incidental inert manufactured materials (e.g. concrete, brick, tiles) to be no more than 5% by volume per load; and*
 - c) *Maximum incidental or attached biodegradable materials (e.g. vegetation) to be no more than 2% by volume per load; and*
 - d) *Maximum chemical contaminant limits are local natural background soil concentrations.*
51. With respect to WasteMINZ 2018 WAC, requirements a) and c) seem fair and reasonable; however, b) and d) potentially problematic in terms of adherence to consent conditions and regulatory monitoring and compliance or even undertaking cleanfilling in the first instance.
52. Regarding WasteMINZ 2018 WAC requirement b) - cleanfill accepted into the site will be heterogenous in nature. I am not aware of any method or guidance that would accurately measure the percentage of inert material (e.g. concrete, tiles and brick) mixed in amongst a load of soil, clay, gravel, and rock.
53. Regarding WasteMINZ 2018 WAC requirement d) – the area where the site is located is considered "recent soil". These previously untouched subsoils are likely to hold trace elements but at very low concentrations making the expectation that clean fill materials received from sources outside the area will achieve site background levels unrealistic.
54. If inert materials (concrete, bricks, tiles) cannot be disposed of as clean fill, the only alternative for disposal would be to landfills consented to receive those materials (an option that is very limited in Canterbury). This could result in much greater haulage and

² Reference to LWRP Rules 5.177 and 5.178 (Approved in December 2018).

disposal costs, and potentially reduce the capacity of landfills (e.g. Kate Valley) to accept hazardous wastes they were designed to accept.

55. Notwithstanding these potential points of concern, I note the WasteMINZ 2018 Class 5 Landfill WAC has been referenced in the s42A Officer's Report (para. 271) citing advice from Ms. Iles and Dr. Massey. The reference to WasteMINZ 2018 Class 5 Landfill WAC is also highlighted in conditions attached to the s42A officers report in relation to CRC193773 and under Schedule 1 of CRC193563.
56. Paragraphs 272 – 274 of the s42A Officer's Report discusses CRC's expectations for screening and validation of "would be" cleanfill.
57. In a meeting (17 November 2020) between Ms. McIntock, Ms. Iles, Dr. Massey, Mr. Hedley and myself, the Mr. Hedley explained a decision process for the Applicant which excluded accepting potential cleanfill (including inert material) from any site suspected of being contaminated, known to be contaminated or holding any description on CRC's Listed Land Use Register (LLUR) in relation to HAIL³ activities.
58. Alternatively, Mr. Hedley, on behalf of SOL, proposed to only source cleanfill and inert materials for cleanfill (in accordance with MfE 2002) from sites not associated with HAIL.
59. Based on my observation, CRC did not entirely agree with Mr. Hedley's views, highlighting that a detailed site investigation (DSI) undertaken on a known or suspected HAIL site (if proven to hold soil that qualifies as cleanfill) would be the ideal.
60. I understand the Applicant has chosen to avoid HAIL sites, regardless of status, as a risk management strategy. I am not opposed to the Applicants proposed approach although, this decision may limit the volume of material they may accept.
61. During our meeting, I agreed with Ms. Iles, Dr. Massey and Ms. McIntock, that a piece of land or property could hold unacceptable concentrations of contaminants even if that piece of land or property is not included on the LLUR or known to be associated with a HAIL activity.
62. Ms. Iles and Dr. Massey have advised Ms. McIntock "...that only material from any kind of cleanfill source site that has been appropriately tested by a SQEP⁴ is deposited on-site".
63. In theory it would be ideal for every consignment into any cleanfill to be tested; however, the implications of this are:
 - a) Prohibitive costs to engage a SQEP for every site,
 - b) Potential adverse financial implications for a landowner if testing undertaken on their land finds contamination even marginally above allowable standards,
 - c) Long wait time for turnaround of laboratory analysis (2 – 10 business days, with shorter turnaround timeframes incurring a premium cost),
 - d) Potential stalling of work programmes and overall loss of productivity.

Mitigative Measures

64. CRC has consistently taken the approach that one of the requirements for cleanfill sites is that imported soil must hold contaminants at the background concentrations applicable at the receiving cleanfill.
65. Based on my discussions with Mr. Hedley and from my review of information in the application, the intent of the applicant is to adhere to CRC's expectations with respect

³ The Hazardous Activities and Industries List published by the Ministry for the Environment (2011) – Past or current activities which may cause contamination that could adversely affect environmental receptors and humans.

⁴ Suitably Qualified and Experienced Practitioner

to background concentrations at the site; however, the impact of having to meet the background levels of the recent soils beneath the site may significantly limit clean fill material sourcing options.

- 66. Based on my review of the resource consent application and personal communications with Mr. Hedley, the Applicant proposes that only “inert” materials will be imported as cleanfill to the site (as per Section 4.2.1 of MfE 2002). Materials identified as “conditionally acceptable materials” (MfE 2002 Section 4.2.2) and “unacceptable waste” (MfE 2002 Section 4.3.1) will not be accepted.
- 67. The Applicant appears to have taken reasonable steps to ensure the cleanfilling activity proposed under CRC193773 adheres to regulatory requirements for cleanfill. Particularly with adherence to MfE 2002 and voluntary exclusion of “conditionally acceptable” and “unacceptable materials” highlighted by MfE 2002 with reference to cleanfill WAC.
- 68. The Applicant already implements a Quarry Management Plan (QMP) and Cleanfill Management Plan (CMP) under the current resource consent for their existing operation at 81 Conservators Road. The Applicant proposes to extend that QMP to the site. The Applicant will prepare a new CMP to be incorporated into the existing QMP but with direct relevance to the cleanfill and rehabilitation proposed as per CRC193773.

Response to Submissions

- 69. Of the 12 submissions indicated in the CRC s42A Officers Report, I did not find any that are immediately relevant to my area of expertise. As such, I have not responded to any of these.

Conclusion

- 70. With respect to cleanfilling at this or any other site, CRC are right to be concerned about potential adverse environmental effects resulting from leaching of contaminants from clean fill but I am concerned about the regional council’s reliance on a guidance (i.e. WasteMINZ 2018) that has not been refined, finalised and endorsed by the MfE. A reliance appears to go against the CRC LWRP.
- 71. In my experience working for CRC, some historical cleanfill operations have not appropriately controlled the waste allowed to be deposited at their sites, resulting in a heightened degree of conservatism from the regulator.
- 72. However, I believe that for this application, the preventative steps, controls, and exclusions laid out by the Applicant (which adhere to LWRP requirements) reduce the risk to the receiving environment and are pragmatic. Furthermore, they exceed the bare minimum of compliance with MfE 2002.
- 73. Assuming the proposed cleanfill activity is undertaken as proposed by the Applicant, I consider the risk to the receiving environment would be less than minor.



Signed: -----

Date: 19 November 2020

Name: Rowan Freeman
Service Leader – Contaminated Land

Reviewed by:



Date: 19 November 2020

Scott Wilson

Technical Director – Contaminated Land