

**Before the Hearing Panel appointed by Canterbury
Regional Council**

IN THE MATTER OF The Resource Management
Act 1991

**AND
IN THE MATTER OF** Applications CRC204106,
CRC204107, CRC204143,
CRC211629 and RC205104 to
establish, operate, maintain
and rehabilitate an aggregate
quarry by Taggart Earthmoving
Limited

SUMMARY STATEMENT

**SECTION 42A REPORTING OFFICER
WAIMAKARIRI DISTRICT COUNCIL
PUBLIC WATER SUPPLY AND FLOODING – KALLEY SIMPSON**

DATED: 10 MAY 2021

INTRODUCTION

1. My name is Kalley Simpson. I am the 3 Waters Manager at the Waimakariri District Council.
2. While this is a Council Hearing, I acknowledge that I have read the Environment Court's Code of Conduct for Expert Witnesses as contained in section 7 of the Environment Court Practice Note 2014, and have complied with it in the preparation of this summary.

SCOPE OF REPORT

3. This report is an addendum to my primary Section 42A report which is included as Appendix 7 of the Section 42A Officer's Report circulated on 8 April 2021. The purpose of this addendum is to provide a summary of my report, respond to matters raised in the Applicant's evidence and respond to matters raised during the hearing.
4. In preparing this addendum report, I have reviewed the following information:
 - a. Statement of Evidence of Paul Taggart – Site Operator
 - b. Statement of Evidence of Tracy Singson – Quarry and Backfill Management
 - c. Statement of Evidence of Neil Thomas – Groundwater
 - d. Statement of Evidence of Benjamin Throssell – Flooding

SECTION 42A REPORT SUMMARY

5. In my Section 42A report, I have provided comments on public water supply and flood risk matters related to the proposed activities as set out in the application by Taggart Earthmoving Ltd.
6. In terms of public water supply, I concluded the application has not adequately assessed or addressed the risk the proposed activity would introduce to the Rangiora public water supply.
7. In particular, the following areas of concern remained to be addressed:
 - Fill quality needs to be rigorously assessed, including determination of the suitability of the source site to provide uncontaminated material, and sampling and verification of loads arriving at the quarry. These sampling requirements should be more rigorous than the WasteMINZ requirements, given the activity is within a Community Drinking Water Protection Zone (CDWPZ).
 - Stormwater management should be clearly addressed, and the impacts of traffic and other site use assessed in terms of potential contaminants.
 - The approach to spill management needs to be clear, including protocols for excavating contaminated material if needed.
 - There needs to be better understanding of groundwater levels and responses to heavy rainfall and increased flow in the Ashley River/Rakahuri.
 - A groundwater quality monitoring network should be set up, and sampling started before activities commence at the quarry site, in order to obtain data regarding background (existing) groundwater quality.
 - There needs to be consideration of how the applicant will deliver an alternative supply in the event that there is a transgression in terms of water quality.
8. In terms of flooding, I concluded that there are no significant impediments from a flood risk perspective for the proposed activity proceeding.

MATTERS RAISED

9. I provide the following comments on the evidence submitted for the applicant and matters raised during the hearing as it relates to the public water supply and flooding.

Public Water Supply

10. The areas of concern highlighted in my Section 42A report in terms of risks to the Rangiora public water supply relate to backfill quality, stormwater management, spill management and groundwater monitoring.

Backfill Quality

11. It is noted that Mr Singson's agreed during the hearing that all sites including greenfield and undeveloped sites should be assessed by a Suitably Qualified and Experienced Practitioner (SQEP) who is a certified contaminated land practitioner. I understand that this has now been incorporated into the recommended consent conditions.

12. I agree with the addition of this requirement to the pre-selection process of the backfill acceptance procedures. However even with site inspection and assessment, contaminated areas within a site still can get missed.
13. It is noted that the verification sampling of the backfill in accordance with WasteMINZ guidelines has been adopted as set out in paragraph 8.9.2 of Mr Singson's evidence.
14. In my evidence I stated that *"sampling requirements should be more rigorous than the WasteMINZ requirements, given the activity is within a CDWPZ, which is not anticipated by the standard WasteMINZ guidelines"*.
15. This is also supported by Ms Iles as in paragraph 6 of her Summary Statement she considers that *"waste acceptance procedures need to go beyond those outlined in the guidelines to provide sufficient protection for sensitive receptors"*.
16. Mr Thomas in paragraph 5.13 of his evidence supports higher standards as he states that CDWPZ *"are intended to prompt a higher level of management and monitoring with regards to activities within the zones"*.
17. The verification sampling proposed by the applicant is however based on the standard WasteMINZ guidelines, rather than proposing a higher level of verification sampling that would be expected for a site located within a CDWPZ. It is noted that the WasteMINZ guidelines do not cover additional testing requirements for areas within a CDWPZ.
18. Even with additional testing, contaminated material can get missed and once it is in the quarry it would be difficult address. Ms Kreleger points out in paragraph 53 of her Summary Statement that the *"deposition of any contaminant that occurs without witnesses will be hard to track back when contaminants exceed trigger levels in downgradient bores"*.
19. It is therefore still my opinion that the sampling requirements should be more rigorous than the WasteMINZ requirements and that the concerns raised about the backfill acceptance procedure in my Section 42A report have not been adequately addressed by the applicant.

Stormwater Management

20. The applicant has discussed managing the stormwater from the access road and I note that a stormwater discharge consent is now included in the proposed conditions.
21. There is no mention of how stormwater will be managed from the wider site including stormwater that may runoff directly into the quarry pit. Particularly given the use of the land immediately adjacent to the pit as a horse racetrack, there is a risk that contaminated stormwater could be discharged into groundwater if the site is not well managed.
22. I therefore consider that the scope of the QBMP as detailed in the draft proposed condition 13 for CRC204106 should include the requirement for details of onsite stormwater management to be addressed in the management plan.

Spill Management

23. It is noted that additional modelling of a fuel spill has been undertaken by Mr Thomas. Ms Kreleger has stated in paragraph 51 of her summary statement that she *"agrees with Mr Thomas that the risks for downgradient groundwater quality and drinking water users caused by an accidental fuel spill are relatively low"*.
24. I also note that the scope of the QBMP as detailed in the draft proposed condition 13 for CRC204106 includes the requirement for details of spill management and response to any spills to be included.

25. I therefore consider that the spill management concerns raised in my Section 42A report have been addressed.

Groundwater Monitoring

26. There are two aspects to the groundwater monitoring concerns raised in my Section 42A report, firstly understanding the rate of groundwater rise and secondly understanding and monitoring the background groundwater quality. I also provide comment on the additional modelling work undertaken on the microbial contamination of groundwater.

Rate of Groundwater Rise

27. Based on the table in paragraph 61 of Ms Kreleger's Section 42a report, I understand that the rate of groundwater rise of 0.5 m/day is likely to occur about twice a year on average and 1 m/day is likely to occur about once every 1-2 years or 10 times over the 15 year duration of quarry operations. It is my understanding that Mr Thomas agrees with the expected rates of groundwater rise.
28. Mr Taggart has explained that it is intended to backfill the quarry with stockpiled material, in order to maintain a minimum 1m separation of the base of the pit above the groundwater level.
29. As Ms Kreleger has set out in her in paragraph 39 of her summary statement, it would require 125 trucks per hour. This is one truck movement approximately every 30 seconds which does not seem to be a practical operation. Even if a truck and trailer containing 20 m³ and a smaller exposed excavation area of 5,000 m² were considered, the number of truck movements would still be 31 trucks per hour. This is one truck movement approximately every 2 minutes, which is still a substantial operation that may not be practical.
30. The alternative mentioned by Mr Taggart would be to collapse in the sides of the pit to prevent the groundwater from surfacing. Based on the frequency of rapid groundwater rise as detailed above this would likely need to be undertaken about 30 times over the life of the quarry operations, rather than as a one off emergency event due to extreme groundwater level rise.
31. I therefore consider that the backfill management procedures are not adequate, and potentially not practical, to ensure the groundwater level at the site does not rise above the excavation level.

Monitoring Groundwater Quality

32. As part of the expert conferencing on groundwater, a new condition (T2) is proposed to define the requirements for the 12 months of groundwater baseline level monitoring, which was agreed by experts. Additionally the conditions related to groundwater quality monitoring (conditions 9 and 26 to 32) were updated and agreed.
33. If the wording documented in the JWS from the expert conferencing on groundwater, is incorporated into the proposed conditions, this would address most of the concerns raised on groundwater quality monitoring.
34. The conditions as they stand do not include any allowance for event based sampling as part of the monitoring programme. After significant rainfall events there is an increased risk that contaminants may have entered the groundwater from quarry activities. It is therefore recommended that event based sampling is included in the proposed consent conditions. A trigger for undertaking event based sampling could be where the rainfall measured at the Rangiora rainfall gauge exceeds 40mm in the

previous 24 hours (which is approximately equal to an annual rainfall event over 24 hours).

35. This event based sampling should occur during the 12 month baseline monitoring period and continue in addition to the routine sampling for the duration of the remaining monitoring programme.
36. Dr Rutter has provided advice that even with this additional event based sampling contaminants can be missed spatially, as found by the research carried out by ESR at Burnham¹.
37. It is understood that a submitter, Mr Downes, raised some queries over the robustness of monitoring, particularly about the National Environmental Monitoring Standard (NEMS) requirements. For both water level measurement and water quality sampling, adhering to NEMS QC 600 standard would ensure that high quality data are collected. We consider that this is important due to the sensitive receiving environment.

Microbial Contamination of Groundwater

38. Mr Thomas has presented results from additional modelling work undertaken on the microbial contamination of groundwater, which suggest that values above drinking water standards can travel up to 150m from the site.
39. I understand that the assessment was based on a single event scenario, where there was exposed groundwater and birds had caused a contamination issue, rather than considering the cumulative effects.
40. Dr Rutter has provided advice that the microbial transport does not seem to have used conservative parameters, and no sensitivity analysis has been provided. She considers that the 150m appears to be a non-conservative estimate of microbial transport. In her opinion, even if lower faecal coliform concentrations without a factor of safety were assumed, and using the 0.003 log removal rates in Pang (2009)², it would be closer to 1,000m before you get down to less than 1 cfu/100ml.
41. From a public water supply perspective, bacterial contamination is not a high risk as chlorine disinfection treatment is provided. However, while chlorine is effective at treating bacteria it won't treat other microorganisms such as protozoa (i.e.: giardia and cryptosporidium).

Alternative Supply

42. The commissioners raised several questions to Mr Thomas on the Rangiora water supply, which I provide additional context on below.
43. The primary source for the Rangiora water supply is from five deep bores (approximately 150-190 m deep) located near Smith Street in Kaiapoi. Water is pumped to Rangiora via a 500 mm diameter pipe that is approximately 8 kilometres in length.
44. The Rangiora water supply has two backup supply sites, the Ayers Street wells and the Dudley Park wells, and one emergency supply site, the Western wells. The

¹ Dann, R.L., Close, M.E., Pang, L. et al. Complementary use of tracer and pumping tests to characterize a heterogeneous channelized aquifer system in New Zealand. *Hydrogeol Jour.* V 16, 1177–1191 (2008). <https://doi.org/10.1007/s10040-008-0291-4>

² Pang L, 2009, Microbial removal rates in subsurface media estimated from published studies of field experiments and large intact soil cores, *J. Environ. Qual.*; 38, 1531- 1559

Western wells pipeline is capped and some of the infrastructure has been removed, however it is in a state where it could be used at short notice. A schematic of the system is shown in Attachment 1, which is an extract from the Rangiora Water Safety Plan 2018. It is noted that this diagram shows that the first barrier in providing safe drinking water is to stop contamination occurring within the catchment.

45. The Ayers Street wells site comprises of two wells, M35/0216 which is 8.6 m deep and M35/0217 which is 13.7 m deep. The Ayers Street wells are located approximately 1.4 kilometres to the south east of the site, in line with the direction of groundwater flow from the site. The site is located within the CDWPZ for well M35/0216.
46. The Western wells site comprises of four bores, M35/0325 which is 10m deep, M35/4898 which is 12.5 m deep, M35/4899 which is 12.5 m deep and M35/5069 which is 10 m deep. The Western wells are located approximately 300m to the north east of the site. The site is located within the CDWPZ for well M35/0325.
47. For the backup supply site at the Ayers Street wells, sampling is currently undertaken every 6 months for E.coli and every year for a full chemical suite. If the backup wells were to be used this would require a much higher level of testing to be undertaken. Treatment equipment at the Ayers Street headwork site currently only includes chlorination, but may be upgraded to include UV disinfection, depending on changes to the drinking water standards and rules expected to be released by Taumata Arowai later this year.
48. Mr Thomas states in paragraph 7.8 of his evidence that *“management actions will include providing an alternative source of drinking water at affected bores”* if thresholds in the groundwater quality are exceeded.
49. For domestic water supply bores, Mr Thomas suggested at the hearing that this could include connection to the public water supply. For the 12 properties with domestic supply bore shown in Figure 8 of Mr Thomas’ evidence this is considered to be a feasible solution as the public water supply currently existing within the street. The indicative cost of connecting to the water supply is approximately \$20,000 per property, comprising of \$12,000 development contribution, \$2,000 boundary connection and \$6,000 for onsite pipework.
50. The work to provide an alternative supply for the Ayers Street wells, is much more complicated and likely to involve substantial costs and time to implement. Mr Thomas suggested at the hearing that this could include deepening the existing bores, however this may not achieve the same quantity of water at an appropriate water quality. It is noted that Council drilled several bores in the Southbrook area of Rangiora that were not successful before drilling at the bores at Smith Street in Kaiapoi, when the supply source was upgraded in 2010. The key reason that deep groundwater is sourced in Kaiapoi and pumped up to Rangiora is that suitable deep groundwater sources could not be found in Rangiora.
51. If the source water were to exceed 50% of the MAV of the drinking water standards for the Ayers Street wells, it would trigger the need for additional testing and also planning for upgrades, whether that be additional treatment or an alternative backup source, to ensure the MAV is not exceeded in the future. It is difficult to estimate the likely costs of any upgrades required without knowing the scale of the issue, but an alternative supply could be in the order of \$5-10 million.
52. The time to implement such an upgrade could take 1-2 years or even longer. If contamination were to occur due to the quarry activities, this would mean that the main backup supply for Rangiora (Ayers Street wells) would not be available for an extended period of time, and would leave the supply at a much higher risk of restrictions or supply outages if the Smith Street wells or the Kaiapoi to Rangiora

main were damaged or out of service. This would be an unacceptable level of risk to a water supply serving a population the size of Rangiora.

Flooding

53. I agree with Mr Throssell overall conclusion that the *“potential effects of the proposed acoustic bund and conveyance channel on flood depth and flood hazard as less than minor”*.
54. This holds true for the proposed bund and channel layout as shown in the application plan. Paragraph 5.4 of Mr Throssell’s evidence suggests that other layouts for the bund and channel were considered but not progressed as the flooding effects were not acceptable. I therefore consider that it is necessary to include a condition that require the construction of western channel and the acoustic bunds to be in accordance with the extents shown on the approved site plan.
55. There is also the possibility that flooding may be impacted by the location of stockpiles. Any temporary stockpiles particularly to the south of the quarry may divert floodwaters to areas currently not identified by the modelling. I therefore consider that it is necessary to include a condition that limits any stockpile to the two areas shown on the approved site plan.
56. I understand that the draft proposed conditions AJ and AK have been incorporated into the recommended consent conditions to address these matters. I consider that the wording of these conditions still needs to be modified to ensure the extents of the western channel and the acoustic bunds are as per the approved site plan and that any stockpiling is limited to the two stockpile areas shown on the approved site plan.

CONCLUSIONS

57. In terms of public water supply, I consider that the applicant has not adequately addressed the risk the proposed activity would introduce to the Rangiora public water supply.
58. In particular, I consider that the backfill verification sampling requirements should be more rigorous than the WasteMINZ requirements, given that the site is within a CDWPZ. I also consider that the backfill management procedures are not adequate, and potentially not practical, to ensure the groundwater level at the site does not rise above the excavation level.
59. In terms of flooding, I still consider that there are no significant impediments from a flood risk perspective for the proposed activity proceeding.

Signed:



Date:

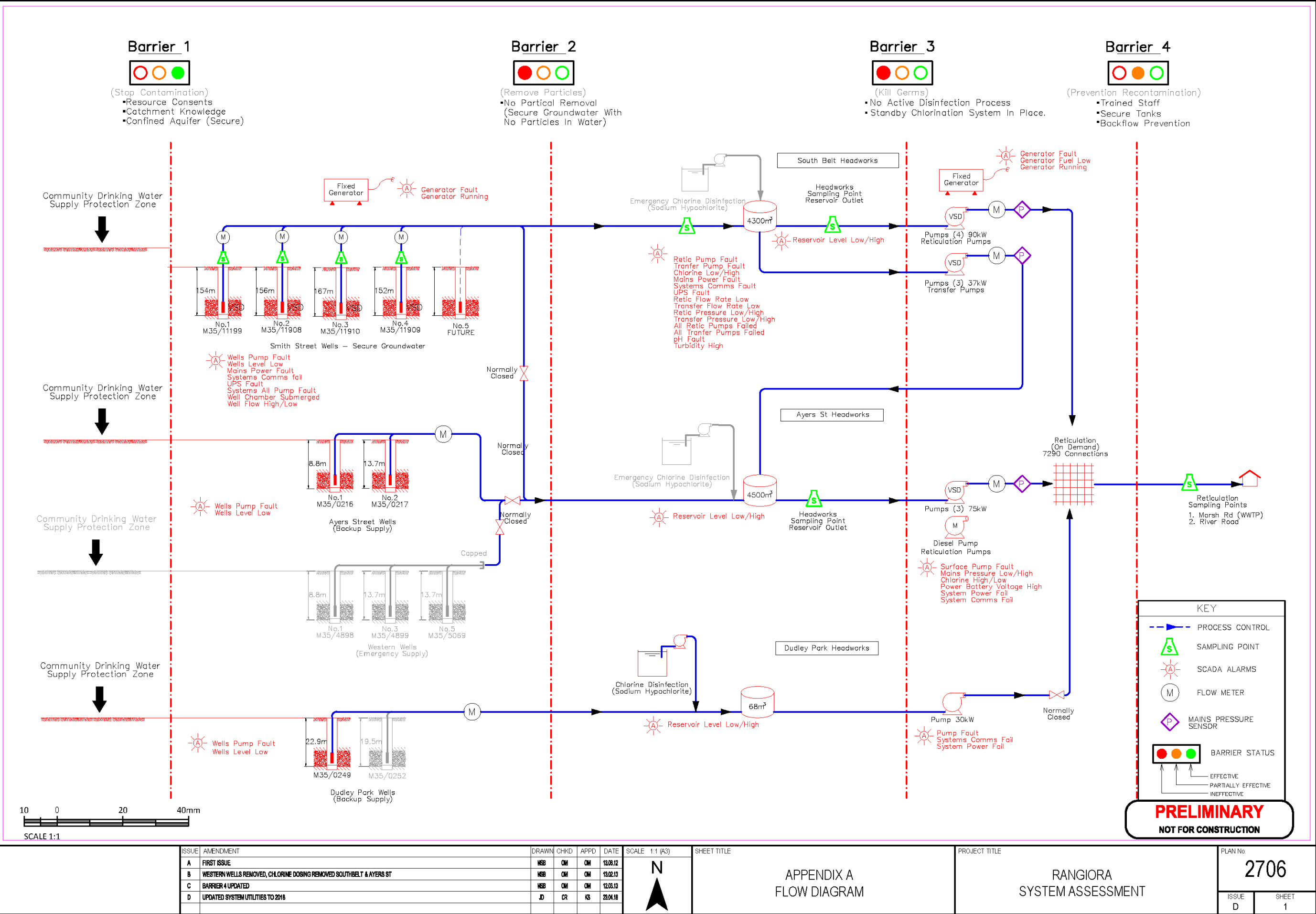
10 May 2021

Name:

Kalley Simpson

ATTACHMENTS

Attachment 1 – Rangiora Public Water Supply – Flow Diagram



Community Drinking Water Supply Protection Zone

Community Drinking Water Supply Protection Zone

Community Drinking Water Supply Protection Zone

Community Drinking Water Supply Protection Zone

Smith Street Wells – Secure Groundwater

Wells Pump Fault

Wells Level Low

Mains Power Fault

Systems Comms fail

UPS Fault

Systems All Pump Fault

Well Chamber Submerged

Well Flow High/Low

Ayers Street Wells (Backup Supply)

Wells Pump Fault

Wells Level Low

Western Wells (Emergency Supply)

Wells Pump Fault

Wells Level Low

South Belt Headworks

Headworks Sampling Point

Reservoir Level Low/High

Emergency Chlorine Disinfection (Sodium Hypochlorite)

4300m³

Retic Pump Fault

Transfer Pump Fault

Chlorine Low/High

Mains Power Fault

Systems Comms Fault

UPS Fault

Retic Flow Rate Low

Transfer Flow Rate Low

Transfer Pressure Low/High

All Retic Pumps Failed

All Transfer Pumps Failed

pH Fault

Turbidity High

Ayers St Headworks

Headworks Sampling Point

Reservoir Level Low/High

Emergency Chlorine Disinfection (Sodium Hypochlorite)

4500m³

Dudley Park Headworks

Chlorine Disinfection (Sodium Hypochlorite)

Reservoir Level Low/High

68m³

Pumps (4) 90kW Reticulation Pumps

Pumps (3) 37kW Transfer Pumps

Pumps (3) 75kW

Diesel Pump Reticulation Pumps

Pump 30kW

Fixed Generator

Generator Fault

Generator Fuel Low

Generator Running

Surface Pump Fault

Mains Pressure Low/High

Chlorine High/Low

Power Battery Voltage High

System Power Fail

System Comms Fail

Normally Closed

Normally Closed

Normally Closed

Normally Closed

Retiulation (On Demand)

7290 Connections

Retiulation Sampling Points

1. Marsh Rd (WWTP)

2. River Road

10

0

20

40mm

SCALE 1:1

KEY

PROCESS CONTROL

SAMPLING POINT

SCADA ALARMS

FLOW METER

MAINS PRESSURE SENSOR

BARRIER STATUS

EFFECTIVE

PARTIALLY EFFECTIVE

INEFFECTIVE

PRELIMINARY

NOT FOR CONSTRUCTION

ISSUE	AMENDMENT	DRAWN	CHKD	APPD	DATE	SCALE	1:1 (A3)	SHEET TITLE	PROJECT TITLE	PLAN No.
A	FIRST ISSUE	MSB	OM	OM	13.08.12					2706
B	WESTERN WELLS REMOVED, CHLORINE DOSING REMOVED SOUTH BELT & AYERS ST	MSB	OM	OM	13.02.13					
C	BARRIER 4 UPDATED	MSB	OM	OM	12.03.13					
D	UPDATED SYSTEM UTILITIES TO 2016	JD	CR	IS	28.04.16					

APPENDIX A

FLOW DIAGRAM

RANGIORA

SYSTEM ASSESSMENT

ISSUE

D

SHEET

1

PLOT DATE: 23/04/2018

FILE: J:\WDC DRAWINGS\2601-2800\2706\2706-SHT1-D.DWG