

BEFORE THE HEARING PANEL

IN THE MATTER of the Resource Management Act
1991

AND

IN THE MATTER of an application by Grenadier
Limited to the Manawatū-Whanganui Regional
Council (reference **APP-2020203164.01**) for the suite
of resource consents associated with the construction
and development of a proposed eighteen hole links
golf course and ancillary activities on land at 765
Muhunua West Road, Ōhau

REPORT TO THE COMMISSIONERS

MRS CHRISTINE FOSTER (CHAIR), DR FLEUR MASEYK AND MR REGINALD PROFFIT

SECTION 42A REPORT OF TRISHA SIMONSON – ON-SITE WASTEWATER

6 April 2022

A. INTRODUCTION

Qualification and Experience

1. My name is Trisha Simonson. I hold the position of Senior Engineering Geologist at Ormiston Associates Ltd, which is a consultancy specialising in on-site wastewater treatment and land disposal, geotechnical engineering, and geology; a position which I have held since October 2017. Immediately prior to this role, I worked as a Senior Resource Officer – Infrastructure at Waikato Regional Council, for nine years.
2. I have a Bachelor of Science in Earth Science and a Master of Science with First Class Honours in Earth Science from the University of Waikato.
3. I have 24 years of experience including the investigation and design of on-site wastewater treatment and land disposal systems for individual dwellings, subdivisions, commercial establishments and institutions, together with gaining resource consents.
4. I am regularly engaged to provide technical reviews of on-site wastewater designs for Horizons Regional Council, Waikato Regional Council and Bay of Plenty Regional Council, and also process Resource Consents as a Consultant reporting officer for the Waikato Regional Council.
5. I am a past member of the Technical Committee of the New Zealand Land Treatment Collective and a current member of the Water New Zealand Small Wastewater & Natural Systems special interest group. I am retained by WSP Training to present the regulatory aspects of their NZQA accredited training courses for on-site wastewater treatment and land disposal.
6. I have reviewed the application by Land Matters Ltd. on behalf of Grenadier Ltd. (Applicant) dated July 2021 (and associated attachments), and the s92 response dated September 2021, in particular, the Engineering Report dated 3 September 2021.
7. I confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014. My evidence has been prepared in compliance with those codes. In particular, unless I state otherwise, the evidence is within my sphere of expertise, and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

B. SCOPE OF REPORT

8. This evidence specifically covers the on-site wastewater treatment and disposal components of the application made by Grenadier Ltd to allow for the development and ongoing operation of the proposed golf course and ancillary activities.
9. In particular I will address:
 - a) The proposed on-site wastewater system design basis and appropriateness in relation to the relevant standards;
 - b) Potential effects of the discharges; and
 - c) Recommendation and proposed consent conditions.

C. DESCRIPTION OF THE ACTIVITY

10. Grenadier Ltd (the Applicant) propose to develop vacant rural land into a golf course, driving range and accommodation facility on the site located at 765 Muhunoa West Road, Ōhau. The legal description of the site is Lot 1 and Lot 2 DP51446, with a total site area of 107.2 hectares.
11. The application under assessment is to authorise three new on-site wastewater treatment and disposal systems on the property to treat and discharge domestic wastewater generated at the Owner's dwelling and stables, the clubhouse and accommodation facilities, the maintenance block; and three composting toilets located throughout the golf course at regular intervals. This assessment excludes any treatment and discharge of wastewater which is not considered domestic in origin.

D. RECEIVING ENVIRONMENT

12. Soil types at the site are described by the Applicant's Consultant as comprising up to 200mm depth of topsoil overlying sandy soils. The soils at the site are classified as category 1. The soil at this location is mapped in Horizons GIS as Foxton-Himatangi association with drainage described as class 5 – well drained.
13. The Applicant's Consultant has estimated that the groundwater table is greater than 1.9m depth in winter. The nearest water bore will be the proposed site bore. This is located approximately 140m from the nearest wastewater disposal area. The nearest mapped water course is the Ōhau River located approximately 450m to the south, from the nearest wastewater disposal area.

E. PROPOSED ON-SITE WASTEWATER TREATMENT AND DISPOSAL

Wastewater Discharge Volume and Rate:

14. The Applicant is seeking a total discharge quantity of 14,600 litres per day based on bore water supply to the clubhouse, accommodation units and driving range, with roof water supplying the other facilities, and on the basis of the following:
 - a) A four-bedroom manager's dwelling with an occupancy of six (6) people;
 - b) A garage sleepout with an occupancy of two (2) people;
 - c) A per capita flow rate of 145L per person per day for permanent residents;
 - d) Accommodation facilities comprising 10 x 2-bedroom units, each unit occupied by a maximum of four (4) people, with a per capita flow rate of 190 l/p/d;
 - e) A club house dining room with a maximum occupancy of 100 people using the kitchen facilities (this includes accommodation unit visitors as the units have no kitchens), with a per capita flow rate of 30 l/p/d;
 - f) Up to eight (8) on-site staff at the clubhouse, with a per capita flow allowance of 30 l/p/d;
 - g) Up to 50 visitors to the driving range, with a per capita flow allowance of 10 l/p/d;
 - h) Staff at the stables with a flow allowance of 100 litres/day; and
 - i) Sanitary wastewater from the maintenance blocks with a flow allowance of 2,000 litres/day.
15. Domestic wastewater is to be collected, treated, and discharged in three systems, due to the layout of the site, as follows:
 - a) System 1: The Owner's dwelling and sleepout, and stables domestic wastewater;
 - b) System 2: The clubhouse, accommodation blocks and driving range; and
 - c) System 3: The maintenance blocks.
16. Three composting toilets will be located on the golf course for visitors, in the north-western corner of the site, the south-western corner and the south-eastern corner.
17. Washdown water from the stables will be treated and discharged separately in a specifically designed system to be designed at a later date, hence is not included in this assessment, which addresses domestic wastewater only.

Table 1: Summary of domestic wastewater flow volumes

	Occupancy	Flow allowance (L/p/d)	Design Flow (L/d)	Volume per System and Total Design Flow
Dwelling – 4 bedrooms	6	145	870	
Garage sleepout	2	145	290	
Stables staff			100	System 1: 1,260 L/day
10 x 2-bedroom units	40	190	7600	
Clubhouse kitchen	100	30	3000	
Clubhouse staff	8	30	240	
Driving range visitors	50	10	500	System 2: 11,340 l/day
Maintenance sheds			2000	System 3: 2,000 l/day
Total				14,600 litres per day

Proposed Wastewater Treatment and Disposal Methodology:

18. The proposed wastewater treatment and land disposal systems comprise the following:

System 1: the owner’s dwelling and sleepout, and stables domestic wastewater (1,260 litres/day).

- a) 1 x Hynds aerated wastewater treatment system (or equivalent) providing primary treatment, aeration and clarification,
- b) 1 x pump chamber, fitted with high level alarm, pump dosing to,
- c) A pressure compensating dripper irrigation (PCDI) disposal area comprising 260 lineal metres of PCDI at 1m spacing equating to 260m² of disposal area loaded at 5 l/m²/day. The PCDI lines are to be buried to 100mm depth; and
- d) A 50% reserve disposal area is designated on the site plan.

System 2: the clubhouse, accommodation blocks and driving range (11,340 litres/day).

- a) Grease trap at the commercial kitchen,
- b) 1 x Hynds Oxyfix FIXEUC90 aerated wastewater treatment system (or equivalent) providing primary treatment, aeration and clarification,
- c) 1 x pump chamber, fitted with high level alarm, pump dosing to,
- d) A pressure compensating dripper irrigation disposal area comprising 2,200 lineal metres of PCDI at 1m spacing equating to 2,200m² of disposal area loaded at approximately 5 l/m²/day. The PCDI lines are to be buried to 100mm depth, and
- e) A 50% reserve disposal area is designated on the site plan.

System 3: the maintenance blocks (2,000 litres/day)

- a) 1 x Hynds aerated wastewater treatment system (or equivalent) providing primary treatment, aeration and clarification,
- b) 1 x pump chamber, fitted with high level alarm, pump dosing to,
- c) A pressure compensating dripper irrigation disposal area comprising 400 lineal metres of PCDI at 1m spacing equating to 200m² of disposal area loaded at 5 l/m²/day. The PCDI lines are to be buried to 100mm depth, and
- d) A 50% reserve disposal area is designated on the site plan.

Composting Toilets:

- a) These will comprise Sun-Mar Centrex 3000 Micro flush units or similar, to be maintained regularly in accordance with a management plan. The system is expected to evaporate the liquid component of the wastewater stream leaving little or no discharge, with the solids component composted and the compost managed through the maintenance plan.

F. ASSESSMENT OF ON-SITE WASTEWATER DESIGN

Discharge Volume

- 19. The Applicant has assessed the occupancy of the site in accordance with that stated in Table 3.1 Occupancy Allowances of the Manual for On-site Wastewater Systems Design and Management (Horizons Regional Council, 2010) ¹ for the residential uses, and on the basis of expected business for the operational occupancy.
- 20. The per capita flow allowances applied for the residential uses of 220 litres/person/day is equivalent to Table 3.2 Source A. Upmarket/Luxury and Motel/Hotel guests of the Horizons Manual. The rate used is also that as listed for Motel/Hotel guests in Table H4 of AS/NZS 1547:2012².
- 21. The permanent resident per capita rate of 145 litres/person/day (Source D, roof water supply, Horizons Manual) requires the use of full water reduction fixtures and this is noted in the recommended consent conditions.
- 22. The flow allowances for meals at the clubrooms and toilet use at the driving range are also in line with those listed in Table 3.2. The rate used for staff is slightly less than that recommended

¹ Manual for On-site Wastewater Systems Design and Management (Horizons Regional Council, 2010)

² Australian/New Zealand Standard 1547:2012 On-site domestic wastewater management

(30 l/p/d) while Table 3.2 indicates 40 l/p/d is appropriate for day staff. Nonetheless the rates are considered appropriate.

Wastewater Treatment

23. The proposal includes a grease trap at the commercial kitchen, but has not specified a volume. It is noted that the minimum recommended grease trap size in Auckland Council's TP58³ is 4,500 litres.
24. The Designer has selected the Hynds Oxyfix wastewater treatment system, or similar for the larger system (System 2). The Oxyfix wastewater treatment plant has not been tested in the National Testing Programme OSET-NTP treatment system trial. Treatment performance information is available from Hynds Ltd., which indicates that secondary treatment quality is achieved.
25. The Designer has indicated Hynds aerated wastewater treatment (AWTS) system will be utilised for the two smaller discharges (System 1 and 3). The Hynds Lifestyle Advanced AWTS system has been tested at the National Testing Programme OSET-NTP treatment system trial, and achieved secondary wastewater quality with the results are summarised below:

Performance Criteria	Hynds Lifestyle Advanced Median Concentration (mg/L)	Required Treatment Standards (mg/L)
cBOD ₅	4.9	20
Suspended Solids	9.85	30

26. Any secondary treatment system used on site must meet the required standards of 20 g/m³ cBOD₅ and 30 g/m³ Total Suspended Solids. Each system will dose load treated wastewater to the separate PCDI disposal systems.

Treated Effluent Land Disposal

27. Soil types at the site are described by the Applicant's Consultant as a category 1 sandy soil which is well drained. As noted in AS/NZS 1547:2012 Table M1 and Table 6.14 of the Manual, pressure compensating dripper irrigation (PCDI) is an appropriate disposal methodology for this soil type. Groundwater levels are not near the surface therefore no raising or mounding of a disposal system is required to achieve groundwater separation.

³ Auckland Regional Council Technical Publication No. 58, On-site Wastewater Systems: Design and Management Manual Third Edition 2004 (TP58).

28. The area of the total proposed systems equates to a loading rate of 5 litres/m²/day. This rate is that listed in Table M1 of the Standard and Table 6.2 of the Manual.
29. Pump dosed loading is proposed, which ensures equal loading of the entire distribution system and that effluent is distributed evenly across the entire infiltration surface.
30. A minimum 50% reserve disposal area for each system has been designated as recommended by Table 2.3 Reserve Land Application Area Requirements.

Composting Toilets

31. The Horizons Manual notes that composting toilets require regular maintenance and a detailed system management plan that details operation, maintenance and compost handling and disposal procedures. A condition of consent should be included to ensure this occurs.

G. ASSESSMENT OF EFFECTS

Groundwater Quality

32. The release of nitrates directly to groundwater can raise concentrations to levels with a potential to exceed drinking water standards. Ammonia, which is highly soluble and easily leached into groundwater, is toxic to aquatic life. Both nitrates and phosphates in soil or groundwater can reach water bodies such as streams, ponds and lakes. These nutrients can stimulate increased plant and algae growth and when present in natural water are significant factors in eutrophication. The die-off of additional vegetation or algal growth in the water; a result of the increased nutrient load, is then decomposed by bacteria that absorb oxygen in the water. This in turn has a significant impact on the degradation of water quality and alters sensitive aquatic ecosystems. To reduce cumulative adverse effects, wherever practicable and especially where nutrients may impact on natural ground or surface waters, nutrients and in particular nitrogen components should be reduced in wastewater via the treatment process. The proposed treatment systems include secondary treatment which will reduce nutrient effects.
33. In addition, the wastewater land distribution and application system methodologies should be designed to optimise further reduction in the soils prior to contact with water. To ensure this further reduction is achieved, Horizons Manual Table 2.2 Wastewater Quality and Recommended Minimum Separation Distances requires a minimum separation distance of 1500mm for secondary treatment systems in category 1 soils. The proposed PCDI disposal

systems are to be constructed to 0.1 m depth therefore requiring a minimum separation distance to groundwater of 1.6m. The composting toilets are not expected to discharge any liquids; however, an overflow trench is recommended in the application, which will also be shallow. Groundwater levels were not encountered to 1.9m depth on site, hence there is considered to be adequate separation distance available. Therefore, the proposal is expected to avoid direct discharge to water and is not expected to represent a risk of adverse effects to groundwater quality.

34. In terms of human health risk, the nearest water supply bore will be the site bore, to be located approximately 140 metres in distance from the closest disposal system, greatly exceeding the horizontal separation distances to a water bore recommended by Table 2.2 of 20 metres.
35. Therefore, given the separation distances available it is considered that groundwater quality is unlikely to be adversely affected by the proposed discharge.

Surface Water Quality

36. Wastewater discharges can cause water quality problems in aquatic environments when:
 - a) plant and weed growth accelerates in response to wastewater sourced nutrients,
 - b) aquatic organisms are adversely affected by oxygen levels being reduced by the BOD load from the wastewater,
 - c) aquatic organisms are adversely affected by the toxic effects of ammonia from wastewater, and
 - d) the presence of microbiological contaminants in wastewater can cause a risk to human and animal health.
37. Such outcomes are not necessarily attributed to any single on-site wastewater discharge, rather through the cumulative effects of discharges within a catchment. The on-site wastewater discharges represent a much lower impact in terms of contaminant discharge than farming activities, or even rural-residential subdivision, as most of the site is retained in vegetation.
38. In this case the nearest PCDI wastewater disposal system is located approximately 450m away from the Ōhau River. The composting toilets are also located more than 80m from the river, and represent a very small discharge. These distances greatly exceed the horizontal separation distances recommended by Table 2.2 of 20 metres. The setback distances along with the proposed high quality wastewater treatment, well drained soils and appropriate disposal

system loading rates combine to reduce the likelihood of the on-site discharges directly or indirectly impacting watercourses to very low.

Soil Quality

39. Treated effluent from the development is not expected to contain significant concentrations of heavy metals or environmentally harmful compounds. Hence the discharge is unlikely to lead to soil contamination or cause problems that would render the soil unusable.

Amenity effects – odour and public health

40. Wastewater discharges may contain very high concentrations of pathogens which may have human health-related effects if people are exposed to the effluent. Contact with effluent could occur if it were to run across the ground surface, or when partially treated effluent enters surface or groundwater. The potential for these types of effects typically arises when a system provides only limited treatment, when the system is not properly designed, installed or maintained, or a combination of these factors. It is considered in this case that public health effects have been limited by the proposed secondary quality wastewater treatment systems, and that the disposal systems will be subsurface. The disposal systems are not located in playing areas on site. Management of waste from the composting toilets will be carried by trained staff only. Offensive odours can emanate from processes which occur within both the treatment and disposal of wastewater. Should there be nuisance odour the treatment system vents can be fitted with carbon filters.

Summary

41. Overall, I consider the potential effects of the discharge on ground and surface water quality, soil and amenity are less than minor, providing conditions of the consent are met.

H. SUBMISSIONS

42. I have read the submissions that have been made on the applications. I could not identify any submissions which overlap with my area of expertise and hence have no comment to make.

I. RECOMMENDATIONS

43. The application is considered appropriate and in accordance with the recommended guidelines, however there are some aspects of the development which should be reflected in consent conditions, including:

- a) The wastewater disposal areas and reserve land application areas are to be located at least 20m from any watercourse and at least 20m from any potable water supply bore.
- b) A 1500 mm separation distance is required between the winter water table and the base of any disposal system.
- c) A Management Plan for the ongoing operation of all of the on-site wastewater systems and composting toilets is required.
- d) An 'as-built' plan of each wastewater system needs to be provided within 3-months of system installation.
- e) Six monthly maintenance inspections are required to maintain each secondary wastewater system and ensure they operate efficiently at all times.

J. PROPOSED CONSENT CONDITIONS

- 44. I have reviewed the conditions proposed by Ms Morton. I am satisfied that these conditions address the matters I have discussed in my report.

K. CONCLUSIONS

- 45. The on-site water treatment and discharge aspects of the application have been designed in accordance with the relevant guidelines and are expected to ensure effects on the environment are less than minor, providing the recommended conditions of consent are met.



DATED this 6th day of April 2022

Trisha Simonson