WASTEWATER MANAGEMENT REPORT
FOR
BE JOHNSON

Our Ref: 27543
Date: October 2023

davidson group
PROJECT PLANNERS
RESOURCE MANAGERS
CIVIL & STRUCTURAL ENGINEERS
BUILDING DESIGNERS
ENVIRONMENTAL ENGINEERS

Our Ref: 27543

24 October 2023

WASTEWATER MANAGEMENT REPORT FOR BE JOHNSON

CONTENTS

1. BACKGROUND

The subject property is on the eastern side of Onahau Bay, Queen Charlotte Sound / Totaranui. The legal description is Lot 1 DP 441804. It can be accessed only by boat and is fronted by jetties and a boatshed.

Location Plan

The property has a land area of 8,060 m^2 and has moderate to steep terrain falling towards the foreshore. The vegetation on the slopes is regenerated native bush with some grass immediately around the house and along the cablecar route.

There is a three-bedroomed pole floor dwelling sited partly on cut in the lower half of the property and it has a cable car connection to the boatshed and jetty. All wastewater is collected and treated and then pumped to a land application area (LAA) on the southwest side of the house on a densely vegetated slope, in a dry elevated position. The modern development of the site was assessed by this office in 2007 including for wastewater management purposes.

The existing on-site wastewater system was consented under Resource Consent U080112. The Resource Consent expired on 1 June 2023. The installation was inspected by this office and as-built information gathered. The system is Biolytix BF6 treatment pumped to drip irrigation and has had ongoing maintenance attention from Morgan Plumbing.

We have been engaged to carry out an investigation and provide an engineering review and information to support the Resource Consent Application to revalidate the wastewater discharge consent. This requires an assessment of the system capacity in terms of current design requirements. Our work has included reviewing the original design and consent documents, and an inspection of the wastewater system along with the facilities connected to it.

Site location (looking west from within Onahau Bay)

2. CONSENTED SYSTEM

The original system was designed by Davidson Partners Ltd in 2007 in accordance with AS/NZS 1547:2000.

The design basis was as follows:

- Soil type — Silty Clay
- Soil Category — 5
- Design Irrigation Rate (DIR) — 2.9 mm/day
- Water supply — Stream
- Number of bedrooms — 3
- Number of people — 6
- Wastewater allowances — 180 litres/person/day
- Daily Flow — 1,080 litres/day maximum
- Treatment — Secondary, Biolytix BF6
- Application type — 375 m^2 dripfield
- Distribution — Pump from within the treatment tank

3. EXISTING CONSENT CONDITIONS

The Resource Consent (U080112) which permits the discharge of wastewater to land is subject to compliance with the following conditions:

3.1 *The Biolytix BF6 wastewater management system shall be constructed and operated in general accordance with the details provided in the application and held on Council file U080112, date stamped as received 18 March 2008, except where required otherwise by the following conditions.*

The system was installed in general accordance with the application.

3.2 *This resource consent shall expire on 1 June 2023.*

Application for a new Resource Consent was lodged in December 2022, but updated documents and the processing deposit fee are now being attended to.

3.3 *The volume of wastewater discharged shall not exceed 1 080 litres per day and the maximum rate at which wastewater is applied to land shall not exceed 2.9mm per day.*

We have assessed the current design loading at less than this amount.

3.4 *The wastewater treatment unit to be installed shall produce wastewater quality equal to or better than the following standards:*

(a) 20 g/m 3 8005
(b) 30 g/m 3 Total Suspended Solids

The record on file from Hill Laboratories, dated 22 February 2013, shows that the wastewater quality was 3 g/cubic metre for Total Suspended Solids, and 2 g/cubic metre for BOD_5.

3.5 *The wastewater treatment unit must be capable of treating domestic wastewater to a secondary standard under variable and intermittent loading conditions.*

An accepted passive secondary treatment system is in place.

3.6 *If the aerated wastewater treatment system contains a blower or pump, then these components shall be fitted with an alarm system, with the alarm activating in the event of either component failure.*

The system includes a pump which has an alarm associated with it.

3.7 *The installation of the wastewater management system shall be certified by the designer upon completion of the installation. The certification shall confirm that the wastewater management system has been installed and is functioning according to design. The discharge shall not commence until such time as that certification has been received by the Manager, Compliance, Marlborough District Council.*

There is no record of certification on Council Property Files.

3.8 *A maintenance schedule for the system shall be supplied to the Manager, Compliance, Marlborough District Council before the system becomes operational. Thereafter the wastewater management system shall be maintained in an efficient operating condition and in accordance with the maintenance schedule.*

The system has been regularly maintained by a trained service person.

3.9 *The consent holder shall enter into and retain a maintenance contract with the supplier of the treatment unit, or a recognised maintenance contractor, for the duration of the consent.*

As above.

3.10 *Wastewater shall not be visible on the ground surface above or in the immediate vicinity of the land application area.*

There were no indications of wastewater surfacing issues.

3.11 *The consent holder shall provide an appropriate sampling point for the collection of wastewater samples. An appropriate sampling point is one that allows wastewater to be collected following secondary treatment but prior to it being discharged to land within the land application area. The consent holder shall notify the Manager, Compliance, Marlborough District Council of the location of the sampling point prior to the discharge commencing.*

The sampling point is an integral part of the Biolytix system.

3.12 *The consent holder shall sample wastewater from the sampling point provided in accordance with condition 11, annually in February for the first 3 years after the consent becomes active. The wastewater shall be analysed for the following parameters:*

(a) Five Day Biochemical Oxygen Demand
(b) Total Suspended Solids

The results of this monitoring shall be forwarded to the Manager, Compliance, Marlborough District Council no more than 5 working days after the receipt of the results.

As per 04.

3.13 *In the event that there is a non-compliance with the standards identified in condition 4, the consent holder shall review all data and present a report acceptable to the Manager, Compliance, Marlborough District Council within two weeks of the non-compliance being detected, which must:*

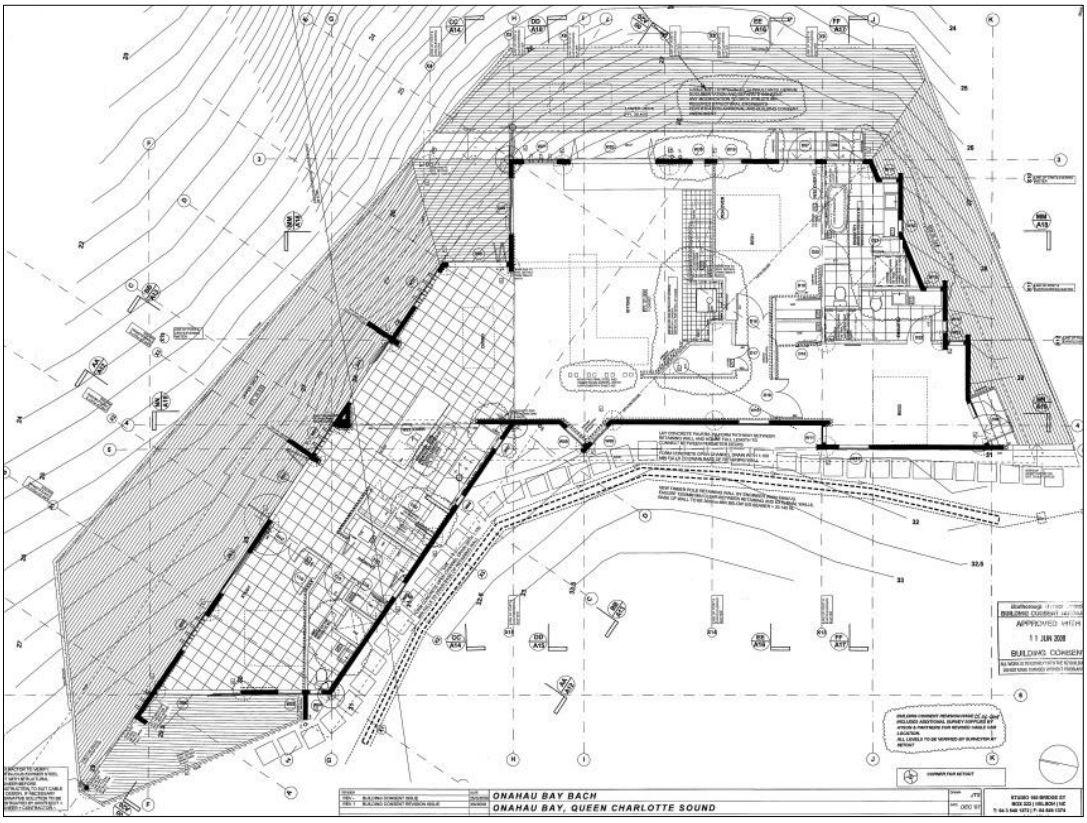
(a) Review all relevant matters which have influenced the non-compliance;
(b) Identify any necessary changes to the wastewater treatment system or its management to rectify the non-compliance.

As per 04.

4. SITE INSPECTION

We visited the property with the Property Manager on 28 September 2022 and had full access to the house and wastewater system.

The facilities were inspected and the flows from all appliances were measured and noted. The dwelling has three bedrooms, and this matched the building drawings on file with Council. Wastewater from the building is directed to an on-site wastewater treatment system, as shown on the plan attached.



Floor Plan

4.1 Flows and Fixtures

Water supply is provided via stream water stored in large water tanks uphill. The flows in the house were recorded as follows:

- Kitchen 18 litres/min
- Bathroom 10 litres/min
- Shower 9 litres/min
- Laundry tub 15 litres/min

Fixtures include:

- Toilet cisterns Dual flush (6/3 litres)
- Washing machine Small top loader < 90 litres/load
- Bath Yes

Except flows in the kitchen and laundry tub, the above is in accordance with the definition for water-reduction on all devices as outlined in AS/NZS 1547:2012 standards due to having small dual flush toilets, a washing machine using <90 litres per load and the shower flow rates being less than 9 litres/minute. A design flow calculation is appended.

4.2 Treatment

The wastewater from the house discharges to a Biolytix BF6 secondary treatment system and then via a filtered outlet to the irrigation dripfield.

The tank is only accessible for servicing on foot. On inspection we noted there was a delay in water flow entering the tank from the house which can be fixed by readjustment on the inflow pipework to ensure fall towards the tank.

The Owner has not reported any issues with the system since its installation. The maintenance is carried out on a yearly basis by experienced service contractor.

Biolytix tank location

Treatment media inside Biolytix tank

4.3 Land Application Area (LAA)

The LAA is located on a well vegetated, moderate slope with a north-east aspect and good exposure to wind and sun. The vegetation is well established native tree bush species providing good evapotranspiration assistance.

The as-built plan shows an automatic flush valve and air valve. Manual flush valves provide better flushing and modern practise is a flush valve for every 100 m of dripline, well-marked for maintenance use. We recommend the Owner discuss a flushing upgrade with the service contractor and have this done at the next service.

There were no environmental issues noted within the LAA. The lines are mostly covered with organic material and difficult to follow. It is a good practice to mark the extend of the effluent field to make people on the property aware of its location and for inspection and maintenance purposes.

Existing driplines

The landform exhibits good long-term stability and there are no concerns for the continued discharge from a geotechnical perspective. The overall area appears the same as was described at the time of the original development

4.4 Soil Category

The original subsurface soil investigation was carried out by Davidson Partners Ltd and determined that the soil was Category 5 Silty Clay.

Soil Profile

The upper 600 mm of the soil profile in the land application area consists of native bush organic cover layer over dark grey-brown, slightly moist, firm silty loam with roots and is underlain by yellow-brown, slightly moist, stiff silty clay loam.

A test sample was taken during our site visit and found the soil was a silty clay LOAM. Ribbon lengths of 40 - 50 mm were achieved as shown below which confirms that a Category 4 soil is appropriate for this site.

Ribbon Test Results

5. SYSTEM VS. CURRENT STANDARDS (AS/NZS 1547:2012)

5.1 Design

5.1.1 Loading

The current wastewater allowance for a stream water supply and the fixtures currently in place, in accordance with AS/NZS 1547:2012 and local practise, should be based on;

- 3 bedrooms, or 6 people,
- full water use at all faucets (conservatively at > 14 litres/min),
- low water use showers (< 9 litres/min),
- small dual flush toilets,
- washing machine using less than 90 litres/load,
- a bath.

This equates to a daily load of 6 people at 160 litres/p/d = 960 litres, which is an 11% decrease of the 2007 design load of 1,080 litres/day (6 people at 180 litres/person/day).

5.1.2 Treatment

Secondary treatment is appropriate with drip irrigation as the land application method. Treatment systems need careful operation and maintenance to perform adequately and reliably.

The Owner has been keeping the system in a working condition and no issues occurred. Ongoing maintenance is outlined in Section 5.3 and the appended Maintenance Schedule.

5.1.3 Land Application Area (LAA)

The current code Design Irrigation Rate (DIR) is 2.8 mm/day for secondary treated effluent in a Category 4 soil after adoption of 20% slope reduction. This is slightly less than 2.9 mm/day in the original design.

Comparison of the original design to current codes is shown in the table below.

5.1.4 Design Summary

	Amended Original Design	Current Codes	Difference Summary
Number of people	6 (3 bedrooms)	6 (3 bedrooms)	No change
Water Supply Source	Stream supply	Stream supply	No change
Loading (litres)			
▪ per person/day	180	160 (with current fixtures in place)	12% decrease
▪ total/day	1,080	960	12% decrease
Treatment	Secondary	Secondary	No change
Soil Category	5	4 Confirmed via soil assessment	
Design Loading Rate (DLR) (mm/day)	2.9	2.8	3% decrease
Land Application Area Required (m)	375	343	9% decrease

5.2 Risk Assessment

The system has been assessed with regard to the guidelines and recommendations in AS/NZS 1547:2012 to determine the risk to the environment and people, noting that *'resources are not wasted in protecting against risks which are negligible'* (AS/NZS 1547, cl 2.1).

Our assessment first assesses the risk to the environment and people as a result of a catastrophic failure in the wastewater system, and then seeks to find the residual risk according to existing mitigating or adverse factors and recommends additional work if considered necessary.

In the event of a catastrophic failure of the wastewater system and assuming no mitigating factors, our assessment of adverse environmental effects on the occupants, surface water and neighbours is **LOW**.

Further mitigating factors include:

- Effluent is treated in a secondary system and dose loaded to drip irrigation.
- Elevated dry site with very low land application rate.
- Loading Certificate to be displayed in the house to advise occupants of the on-site wastewater system capabilities and consequences of misuse.
- Regular maintenance by a Service Provider (at least annually).
- Any hydraulic failure will inhibit the use of the property as the house is near the LAA. The property and occupants will be affected before any environmental issues and will force the occupants to reduce wastewater discharge until the area has dried/recovered.

Note that some design parameters used may differ from the guidance in AS/NZS 1547:2012, but given that the Standard is a 'performance' based document, we have used our experience of working extensively throughout the Sounds area to make some modifications and are satisfied that any increased adverse risk to the environment is less than minor, as described above.

6. MONITORING

AS/NZS 1547, cl 6.3.5.2 says that *'The monitoring frequency shall take into account the type and age of the systems, experience with the performance of similar on-site systems, any recent history of poor maintenance on a particular (or similar) site, sensitivity of the receiving environment and approval conditions of the system. The frequency of monitoring shall be informed by the risk assessment and reviewed as part of each monitoring inspection.'*

Appropriate installation, operation and maintenance of the overall wastewater system is paramount to its performance, and ongoing maintenance is needed. Service records should be lodged with Council noting the servicing tasks undertaken and any remedial works carried out. Email records should be sent to monitoring@marlborough.govt.nz noting the owner, address, property number (PN534456) and Resource Consent number.

Servicing shall be carried out as described below and detailed on the attached Maintenance Schedule:

Annual

Checks of tank, pump operation and alarm, and operation and flushing of the land application system. Carried out by a Service Contractor, with a written report lodged with Council describing the findings of the service and any remedial work undertaken / needing to occur.

7. CONCLUSION

The existing treatment capacity and size of the LAA is compliant with current standards. We therefore consider that the existing on-site wastewater treatment system is suitable for continual use for the next consent period, provided the following recommendations are adhered to:

a) Engage a trained serviceperson to undertake the following tasks:

- Install an irrigation filter on the discharge pumpline.
- Install manual flushing valves on the dripfield.
- Flush and flow test the dripfield.
- Provide an updated as-built of the effluent field layout.

b) The extent of LAA should be suitably identified with permanent markers.

c) Annually a Service Contractor is to provide a service report to Council for the wastewater treatment and land application systems in line with the manufacturers' guidelines. The Contractor is to also inspect and flush the dripline irrigation field.

d) Current good practice is to have a 'Loading Certificate' on display somewhere prominent in the house. This summarises the wastewater system for the property and reminds occupants, particularly visitors, about the limitations of it. A copy is attached.

8. REFERENCES

- Crites, R and Tchobanoglous, A (1998). 'Small and Decentralized Wastewater Management Systems'.
- ARC Environment, Technical Paper No. 58, Third Edition 'On-Site Wastewater Disposal from Households and Institutions'.
- AS/NZS 1547:2000 'On-Site Domestic Wastewater Management'.
- AS/NZS 1547:2012 'On-Site Domestic Wastewater Management'.
- Proposed Marlborough Environment Plan.
- Davidson Partners Ltd (December 2007) 'Engineering Report for B E Johnson & D H Wale, Onahau Bay'.
- Information on property files with the Marlborough District Council relating to Resource and Building Consents.

DAVIDSON GROUP LTD

R W Davis

RWD: LW

A. APPENDICES

- Wastewater Flow Calculation
- Wastewater Loading Certificate
- Wastewater Maintenance Schedule
- Aerial Mark-up Plan

davidson group		**On Site Wastewater Design**			**Job No**	27543
	Client	B Johnson			**Sheet No**	1
	Location	Onahau Bay			**Name**	LK
					Date	29.9.2022
		FLOW ALLOWANCES				

REFERENCES : ARC TP # 58 Third Edition
2 AS/NZS 1547:2012 "On Site Domestic Wastewater Management"
3 ON-SITE NewZ Special Report - 97/1
4 MDC,11 July 2005,"Guidelines for New On -Site Wastewater Systems"

		Appliance / Fixture per Capita Daily Flow Allowance				Total per Capita Flow (l/p/d)
		Toilet	Washing Machine	Shower	Basin (kitchen, bathroom, laundry)	
1	**Households with standard fixtures**	11 litre cistern	>120 litres/load	*flows > 14 litres/min*		
		60	25	85	30	30
		60	*25*	*70*	*25*	
	Blackwater only	60				
		60				
	Greywater only		25	85	10	
			20	*65*	*5*	
2	**Households with standard water reduction fixtures**	*11/5.5 dual flush*	*<120 litres/load*	*flows < 14 litres/min (may need shower flow restrictors or aerator taps)*		
		40	20	80	25	
		40	*20*	*65*	*20*	
	Blackwater only	40				
		40				
	Greywater only		20	80	10	
			15	*60*	*5*	
3	**Households with full water reduction facilities**	*6/3 dual flush*	*<90 l/load*	*flows < 9 litres/min (may need aerator taps and flow/pressure control valves on all outlets)*		
		35	15	75	20	125
		35	*15*	*55*	*15*	
	Blackwater only	35				
		35				
	Greywater only		15	75	10	
			10	*55*	*5*	
4	**Bath**	*add extra 5 l/p/day for a bath as per original Gunn calcs*				5
	Design wastewater flow per person per day					**160**
	Number of Bedrooms					**3**
	Equivalent Occupancy					**6**
	Design Daily Wastewater Allowance					**960**

NOTE Figures in *italics* are for roof water supply. Other values are for creek, community and/or bore water supply (see also Note 6, Table H3, 1547).

Our Ref: 27543

24 October 2023

WASTEWATER MAINTENANCE SCHEDULE

- **Location** — Lot 1 DP 441804, Onahau Bay
  Property Number 534456
- **Owner** — Bryan Johnson
- **Treatment System** — Biolytix BF6
- **Land Application System** — Drip irrigation
- **Land Application Area** — 375 m^2
- **Annual Servicing** — Service Contractor to (as a minimum):
  - walk over the siter to check for any surfacing of the discharge, any damage, any land movement or change since previous inspections,
  - check tank lid and confirm suitable, secure access to tank,
  - verify operation of aerator and pump alarms,
  - confirm adequate aeration is occurring,
  - clean irrigation filter,
  - check air release valve,
  - open each of the flushing valves in turn and run for as long as required to flush sediment from the distribution lines,
  - complete the service, run the pump a full cycle and confirm all parts of the system are operating without fault or leaks,
  - refit lid and ensure the system is left secure and tidy,
  - follow manufacturers maintenance guidelines.
- **Reporting** — Service Contractor to;
  - prepare written reports for each service noting the tasks undertaken and any remedial works carried out,
  - email reports to monitoring@marlborough.govt.nz referencing the Owner, address, property number (PN534456) and Resource Consent number.

Our Ref: 27543

24 October 2023

WASTEWATER LOADING CERTIFICATE

- **Location** — Lot 1 DP 441804, Onahau Bay
  Property number 534456
- **Owner** — Bryan Johnson
- **Number of bedrooms** — 3
- **Number of People (Maximum)** — 6
- **Maximum Daily Wastewater** — 960 litres (160 litres/person for 6 people).
- **Wastewater Reduction Facilities** — Low water use fixtures are installed and include;
  - low water use washing machines (< 90 litres/wash)
  - showers, less than 9 litres/minute
  - dual flush toilet cisterns
- **Water Supply Source** — Stream supply
- **Treatment System** — Biolytix BF6
- **Land Application System** — Drip irrigation
- **Land Application Area** — 375 m^2
- **Overloading the System** — Overloading the system may result in;
  - inadequate treatment and/or odour
  - saturation of the soil in some areas of the Land Application Area (LAA)
  - seepage from the LAA
  - odour from the LAA
  - spread of infectious diseases
  - breeding of mosquitoes and attraction of flies and rodents
- **Good Practice** — To keep the bacteria working in the treatment system and LAA;
  - use biodegradable soaps
  - use low-phosphorus detergent
  - use detergents in recommended quantities
  - do not use powerful bleaches, whiteners, nappy soakers, spot removers and disinfectants, and
  - do not put oil, chemicals or paints down the drain
- **Maintenance** — Annual servicing and reporting by trained Technician.

  Refer to the Wastewater Maintenance Schedule.


27543
BE Johnson
RWD DGL
December 2022
Lot 2 DP 441804
534457
Lot 5 DP 4495 534452
Lot 1 DP 441804
534456
253805
Biolytix BF6 treatment system. To be serviced and irrigation filter installed
Existing dripfield (approx.). Lines to be flushed, tested and have 4 manual flush valves installed. Provide updated asbuilt plan
Lot 1 DP 302285
113881
0 5 10 20 m
Smart Maps Pro Print
1:500
19/12/2022