REPORT ON REVALIDATION OF AN EXISTING WASTEWATER SYSTEM FOR S RYAN & C DAVIES

Our Ref: 26355
Date: February 2018

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

Our Ref: 26355

20 February 2018

REPORT ON REVALIDATION
OF AN EXISTING WASTEWATER SYSTEM FOR
S RYAN & C DAVIES

1. BACKGROUND

The property is located at 31 McCormicks Road in Whatamango Bay, legal description Lot 13 DP 3341. The existing house was built in 2003 and is serviced by an on-site wastewater system which was consented under Resource Consent U030882. This expires on 10 October 2018.

We have been engaged to carry out an investigation and provide information to support the Resource Consent Application to revalidate the wastewater system.

2. CONSENTED SYSTEM

The wastewater system was designed by D Cromarty and consists of secondary treatment to drip irrigation, for which a Resource Consent was obtained in accordance with AS/NZS 1547:2000 'On Site Domestic Wastewater Management'.

The system was completed under Building Consent BC031396.

The relevant design basis used was as follows:

- Soil type — Clay LOAM
- Soil Category — 3
- Water supply — Roof
- Number of bedrooms — 3
- Number of people — 5
- Wastewater allowances — 140 litres/person/day (700 litres/day)

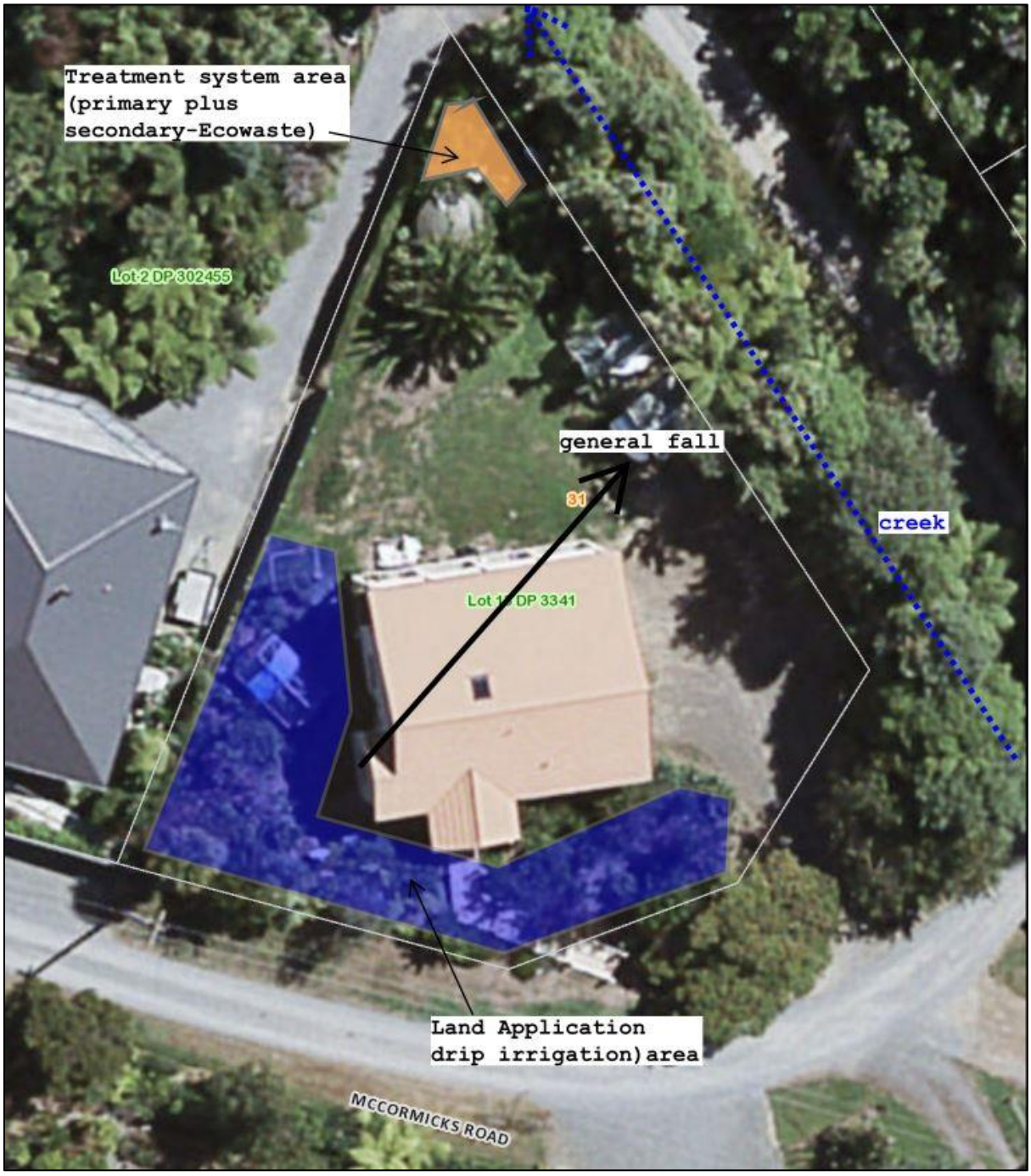
ACENZ

Davidson Ayson House, 4 Nelson St
PO Box 256, Blenheim 7240, NZ
T: 03-579 2099
E: service@DavidsonGroup.co.nz
W: DavidsonGroup.co.nz

Principals
Ross Davis, CPEng, MIPENZ, BE
Stephen Sheat, CPEng, MIPENZ, BE
Leigh McGlynn, CPEng, MIPENZ, BE

3. SITE INSPECTION

We visited the site on 12 February 2018 and report as follows:



Site Plan

3.1 Flows and Fixtures

The house has a roof water supply but is pumped into the house.

The flows to the taps were recorded as follows:

- Laundry 10 litres/min
- Kitchen 16 litres/min

- Studio kitchen 12 litres/min
- Shower 6 litres/min

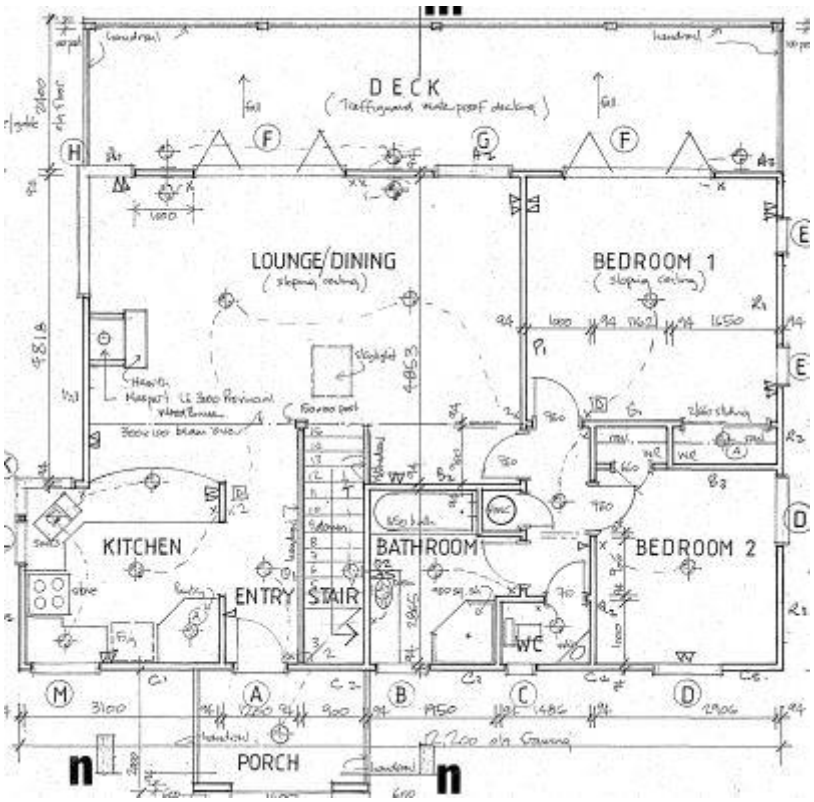
These equate to moderate flows (generally 9 - 14 litres/min).

Fixtures in the house include:

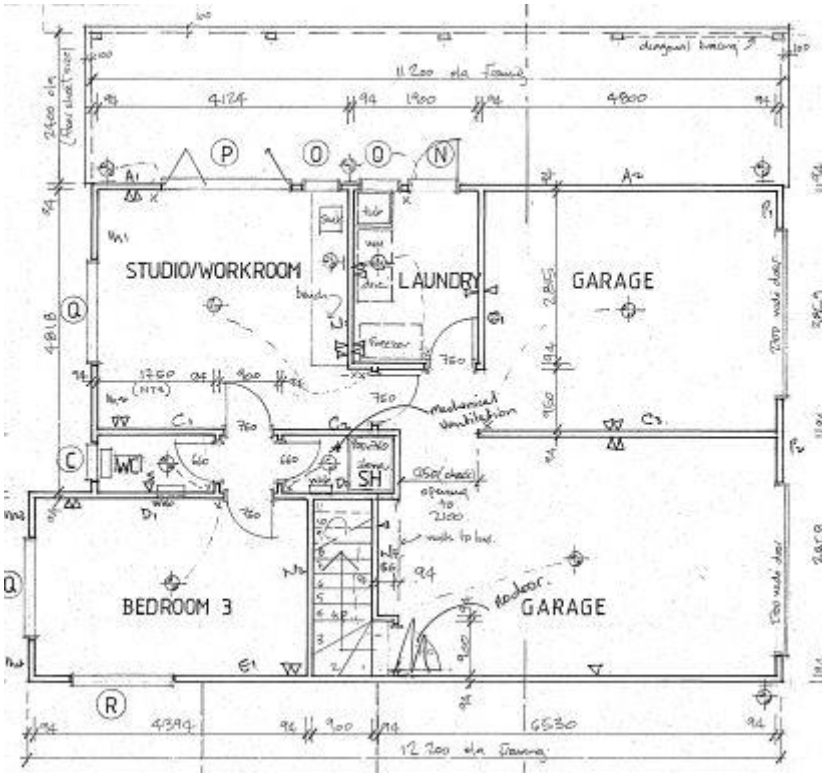
- Toilet cisterns - Dual flush (6/3 litres)
- Washing machine - Bosch (less than 90 litres/load)

There is no bath.

The house has three bedrooms. There are no other office or rumpus rooms which can be considered as potential bedrooms.



First Floor Plan



Ground Floor Plan

3.2 Treatment

The treatment consists of an EcoWaste aerated treatment system (AWTS) which incorporates a 3000 l primary settling chamber, Biofilter and aerated treatment with media for biomass.

A visual inspection confirms excellent clarity and treatment. The owner inspects the system monthly, including flushing the drip lines.

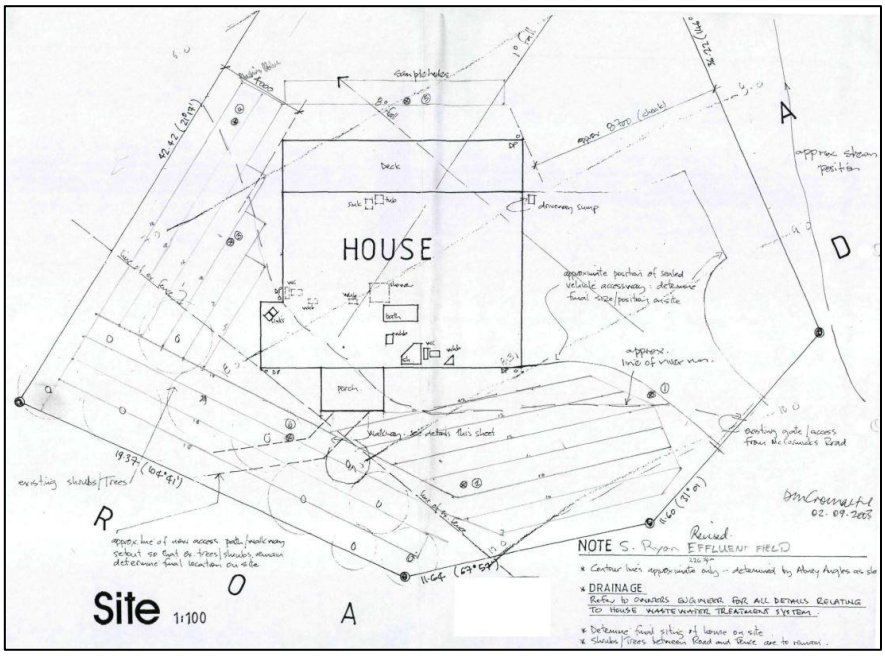
Primary settling tank and EcoWaste AWTS

3.3 Land Application Area (LAA)

The land disposal system consists of drip irrigation located in the garden area between the house and the road.

The dripper lines are now well buried but the original field set out plan shows the lines to be at least 1 m off the boundaries (confirmed by applicant) and covering an area of 226 m^2. The slope varies from 0° to approximately 10° (0 – 20%).

The LAA is totally within a lawn or landscaped/garden area. The fall is to the north east (away from the adjacent boundaries) and there were no signs of ponding or overloading.



Approved LAA Design

LAA (Looking west)

3.4 Soil Category

The original soil investigation confirmed topsoil over imported river gravels to about 400 mm depth over clay loam (Category 3).

The LAA design was based on a Cat 3 soil using a Design Irrigation Rate (DIR) of 4 mm/day.

4. CURRENT STANDARDS (AS/NZS 1547:2012)

4.1 Design

4.1.1 Loading

The current wastewater allowance for the water pressure (pumped/roof supply) and the fixtures currently in place, in accordance with AS/NZS 1547:2012, is based on;

- 3 bedrooms, or 6 people
- 135 litres/person/day (refer to detailed calculations attached).

This equates to a daily load of 810 litres, which is a 16% increase in the original design (700 litres/day), which was based of 5 people and a slightly higher load per person (140 l/p/d).

4.1.2 Treatment

The existing primary settling tank and EcoWaste aerated treatment system can treat up to 2,000 litres/day, well in excess of the 810 litres/day current design load.

The regular servicing carried out by the owner shows in the excellent operating condition of the system.

4.1.3 Land Application Area (LAA)

A Cat 3 soil is considered reasonable for this site, especially given the drip type application into the top soil (where the evapotranspiration takes place) and underlying gravels for limited soakage and storage (if required).

The current codes require a DIR of 4 mm/day and a reduction for the slope if over 10%. Given the slope is varies from less than 0 – 20%, a 10% reduction is considered conservative. This gives a DIR for design of 3.6 mm/day.

For 810 litres/day, this equates to a total LAA of 225 m^2. This compares to the 175 m^2 from the original design (700/4) and the 226 m^2 currently in place according to the revised design plans lodged with Council.

4.1.4 Design Summary

	Original Design	Current Codes
Number of people	5 (3 bedrooms)	6 (3 bedrooms)
Water Supply Source	Roof	Roof
Loading (litres)		
▪ per person/day	140	135 (with current fixtures in place)
▪ total/day	700	810
Treatment	Secondary	Secondary
Design Irrigation Rate (DIR) (mm/day)	4	3.6
LAA (m^2)	175	225

4.2 Risk Assessment

The following risk assessment follows the guidelines and recommendations in AS/NZS 1547:2012.

- Risk Reduction Measures (Table A1)

Hydraulic Failure

The risk of hydraulic failure will be reduced using water conservation fixtures, the reduction of solids, the use of secondary treatment and the use of pressure dosing within the irrigation field to create an even distribution.

Power Failure

The proposed system will have a 24-hour reserve storage capacity at full design flow.

Bacteria Washout

The risk of bacteria washout will be mitigated by the low application rate and pressurised (even) distribution.

Dispersive Soils

The soils are not dispersive.

Marginal Soil Conditions

The soils are light clays but their low drainage properties are compensated by the good topsoil depth over, excellent exposure to the sun and wind, good vegetation cover, little stormwater runoff to the LAA and the drip irrigation type system proposed.

Site Constraints

Site restraints include a nearby water course and boundaries. These constraints have been mitigated by using water saving fixtures and secondary treatment.

Rainfall

The annual rainfall is greater than 1400 mm and there are high rainfall events on occasion. However, the catchment above is insignificant and runoff will be cut off by McCormicks Road.

Salinisation

No bare ground, salt crystals or salt tolerant plants were found to indicate evidence of salinity.

Highly permeable Soils

The soils are not free draining and there is no permanent water table.

No specific measures are therefore required to reduce the risk of water table contamination.

- Slope (Table M2)

The slope at the LAA is 0 – 20%.

Table M2 recommends a reduction in the DIR for slopes greater than 10%.

A reduction of 10% is considered reasonable.

- Setback Distances (Table R2)

  The setback distances have been assessed by way of a weighting analysis (see Appendix) and can be summarised as follows:

Feature	Setback		Comment
	Table R2	Actual	
Property Boundary	14 m	1 m	Low Risk[1]
Building/House	3.0 m	1 m	Low Risk[2]
Surface Water	47 m	15-25 m	Low Risk[3]
Bore/well	26 m	No bore/well	No Risk
Recreational Areas	7 m	none	No Risk
In-ground water tank	7.7 m	No in ground tank	No Risk
Retaining wall cut within 3 m or 45º	3 m	No retaining wall downhill	No Risk
Ground Water	0.8 m	> 1 m (if any water table at all)	No Risk
Hardpan/Bedrock	0.8 m	>> 1 m	No Risk

[1] The MDC Guidelines allow proximity to boundaries of 2 m and the Auckland City's TP58 allows 1.5 m. Also, the ground slopes away from these boundaries and so effectively the risk is Low to nil.

[2] The Auckland City's TP58 allows 1.5 - 3 m proximity to houses and the application rate has been reduced for the slope and so the risk is effectively Low.

[3] The Auckland City's TP58 allows 10 m proximity to water bodies for a Cat 3 drip irrigation application. Also, controlled lab testing of the water in the creek carried out in 2011 confirmed that there was no contamination that could be attributed to the LAA. The risk is effectively Low.

4.3 Discussion

The current combination of loadings and treatment and land application systems practically complies with the standards that are currently applied. No adverse environmental effects were noted.

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

5. RECOMMENDATIONS

a) Prepare and display a 'Loading Certificate'.
(A Loading Certificate has been prepared and is attached to this report.)

6. 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'.
- Marlborough District Council (11 July 2005) 'Guidelines for New On-Site Wastewater Management Systems'.
- Marlborough Sounds Resource Management Plan.
- Marlborough Environment Plan.
- Davidson Group Ltd, 9 January 2012, 'Wastewater Investigation for S Ryan, 31 McCormicks Road, Whatamango Bay'.
- Resource Consent U030882.
- Building Consent BC031396.

DAVIDSON GROUP LTD

W L McGlynn

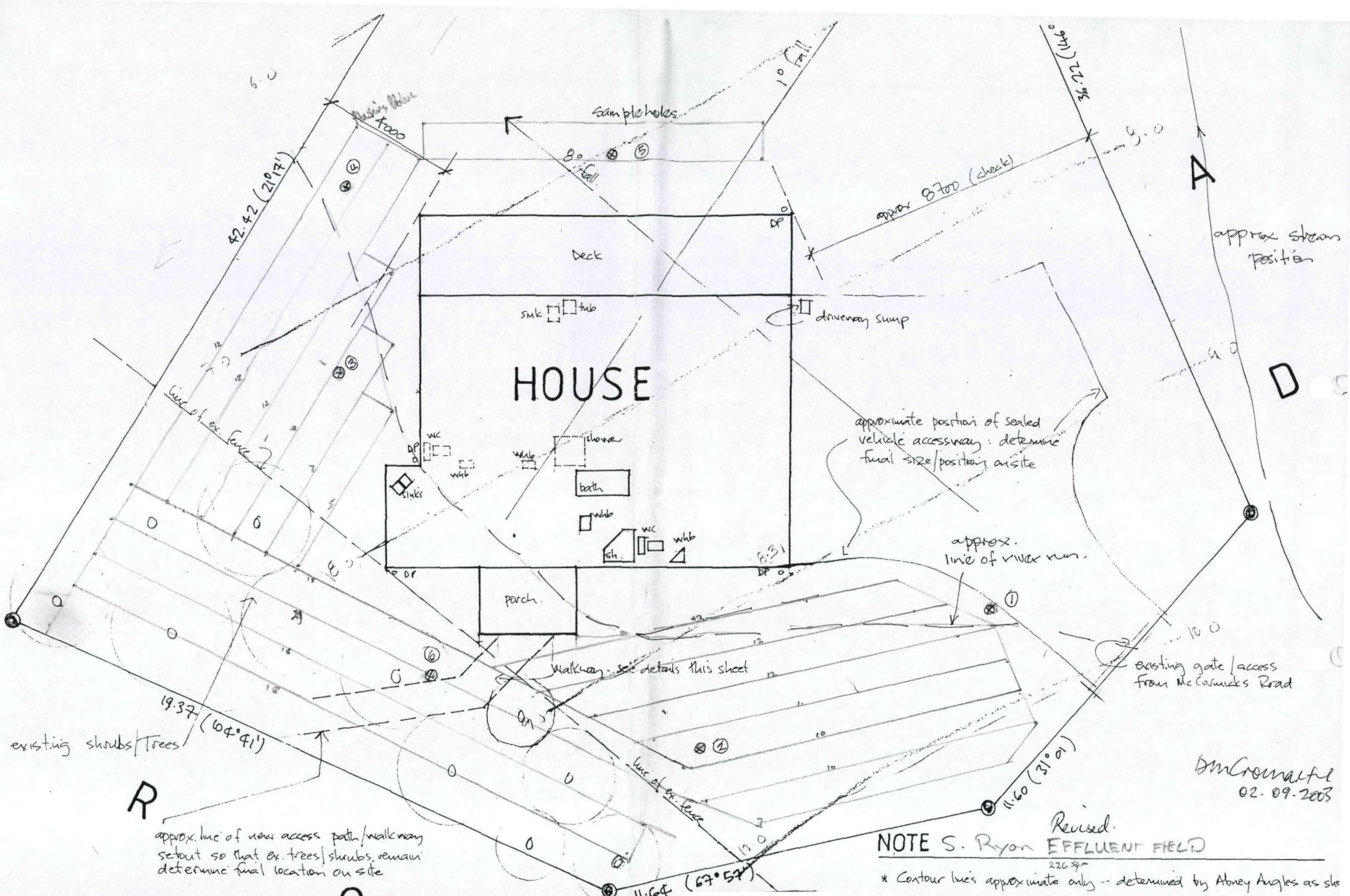
WLM: LW

APPENDICES

- Field Check List
- Original LAA Design Plan
- Setback Risk Assessment
- Design Flows Assessment
- Wastewater Loading Certificate

davidson group			Wastewater Revalidations		Job No.	26355
			for	S Ryan & C Davies	Date	12-Feb-18
					Name	LM
			Field Check List			

1	Previously approved system						
		RC # ?	U030882				
		year	2003				
		type	secondary to drip				
		soil Cat	4				
		# bedrooms	3				
		design flow	700 l/day				
2	Water supply						
		roof/creek/spring	roof				
3	Number of bedrooms						
4	Tap flows			quantity (l)	time (secs)	l/min	
		Kitchen		5	19	15.8	
		laundry tub		5	31	9.7	
		studio kitchen		5	25	12.0	
		shower		5	48	6.3	
		out side tap					
5	Toilet cistern type		06-Mar				
6	Bath ?		no				
7	Washing machine Type		Bosch 56 l/min				
8	Recheck soil Cat						
		topsoil depth					
		soil type					
		ribbon length					
		Soil Category					
9	Treatment						
		Type	3000 l primary plus EcoWaste Secondary (up to 2,000 l/day)				
		Size					
		Check filter	clean				
		Check sludge/scum	none				
		Last serviced?	within last month				
		Maint. Contractor?	owner				
10	Land Application						
		type	drip				
		length/area?	226 m2 (according to plans and owner)				
		signs of distress?	none				
		check splitter valve	na				
		flush valves?	not found				
		air valves?	not found				
11	Set backs						
		boundaries	1m				
		water courses	15-25 m				
		sea	na				
		house	1m				
12	Water table depth?		na				
13	Other						



DmCromarty
02.09.2003

Revised.

NOTE S. Ryan EFFLUENT FIELD 226 sq m

* Contour lines approximate only -- determined by Abney Angles as sho

* DRAINAGE
Refer to OWNERS ENGINEER FOR ALL DETAILS RELATING TO HOUSE WASTEWATER TREATMENT SYSTEM.

* Determine final siting of house on site
* Shrubs/Trees between Road and Fence are to remain.

davidson group			**SETBACK RISK ASSESSMENT** re : AS/NZS 1547:2012, TABLE R1 (Weighted Assessment) **S Ryan & C Davies** **Location**		**Job No** **Name** **Date**	26355 LM 19.03.18	

SITE FEATURE	SETBACK(m) min	SETBACK(m) max	SITE CONSTRT ITEM	SCORE (0 - 4) low-best high-worst	WEIGHTED SETBACK (m)	COMMENTS	TP 58
Property	1.5	50.0	**A**	1		The effluent is secondary treated	1.5 m
Boundary			**D**	1		Subsurface, generally less 0-10%	
			J	1		drip irrigation	
			TOTAL	3	**13.6**		
Building/	2.0	6.0	**A**	1		The effluent is secondary treated	1.5-3.0 m
houses			**D**	1		Subsurface, generally less 0-10%	
			J	1		drip irrigation	
			TOTAL	3	**3.0**		
Surface	15.0	100.0	**A**	1		The effluent is secondary treated	5-20 m
water			**B**	3		Cat 3 soil. The nearest surface water is 15-25 m away.	
			D	1		Subsurface, generally less 0-10%	
			E	2		Up- gradient from watercourse, down-gradient form boundary	
			F	1		Cat 3 soil, no groundwater	
			G	0		No flooding risk	
			J	1		drip irrigation	
			TOTAL	9	**47.1**		
Bore,	15.0	50.0	**A**	1		The effluent is secondary treated	10-20 m
well			**C**	2		Cat 3 soil and no groundwater	
			H	1		Cat 3 soils, low porous soils, no aquifers, no rock	
			J	1		drip irrigation	
			TOTAL	5	**25.9**		
Recreatnl	3	15	**A**	1		The effluent is secondary treated	
areas			**E**	2		Up- gradient from watercourse, down-gradient form boundary	
			J	1		drip irrigation	
			TOTAL	4	**7.0**		
In-ground	4	15	**A**	1		The effluent is secondary treated	
water tank			**E**	2		Up- gradient from watercourse, down-gradient form boundary	
			J	1		drip irrigation	
			TOTAL	4	**7.7**		
Ret. wall,	3 or > 45°		**D**			Subsurface, generally less 0-10%	3 m
embankm,			**G**			No flooding risk	
escarpmt,			**H**			Cat 3 soils, low porous soils, no aquifers, no rock	
cuttings						**nothing within 3 m**	
Ground	0.6	1.5	**A**	1		The effluent is secondary treated	0.6-1.5 m
water			**C**	2		Cat 3 soil and no groundwater	
			F	1		Cat 3 soil, no groundwater	
			H	1		Cat 3 soils, low porous soils, no aquifers, no rock	
			I	0		even side slope	
			J	1		drip irrigation	
			TOTAL	6	**0.8**		
Hardpan,	0.5	1.5	**A**	1		The effluent is secondary treated	
bedrock			**C**	2		Cat 3 soil and no groundwater	
			J	1		drip irrigation	
			TOTAL	4	**0.8**		

davidson group	**On Site Wastewater Design**			**Job No**	26355
	Client	S Ryan		**Sheet No**	1
	Location	Whatamango Bay		**Name**	WLM
				Date	20.02.18
	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	
		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*	*85*
	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	
		35	*15*	*55*	*15*	*50*
	Blackwater only	35				
		35				
	Greywater only		15	75	10	
			10	*55*	*5*	
4	**Bath**	*add 5 l/p/d if there is a bath*				
	Design wastewater flow per person per day					**135**
	Number of Bedrooms					**3**
	Equivalent Occupancy					**6**
	Design Daily Wastewater Allowance					**810**

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).

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

Our Ref: 26355

March 2018

WASTEWATER LOADING CERTIFICATE

- **Location** — Lot 13 DP 43341, 31 McCormicks Road, Whatamango Bay
- **Owner** — Shane Ryan and Coral Davies
- **Number of bedrooms** — 3
- **Number of People (Maximum)** — 6
- **Maximum Daily Wastewater** — 810 litres (135 litres/person for 6 people).
- **Wastewater Reduction Facilities** — Low water fixtures are required and include;
  - low water use washing machines (< 90 litres/wash)
  - flow to taps and showers, 6-16 litres/minute
  - 6/3 toilet cisterns
- **Water Supply Source** — Roof
- **Treatment System** — Secondary Treatment
- **Land Application System** — Drip Irrigation
- **Land Application Area** — 226 m²
- **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
  - Don't use powerful bleaches, whiteners, nappy soakers, spot removers and disinfectants, and
  - Don't put oil, chemicals or paints down the drain
- **Maintenance** — Please note the manufacturer's maintenance requirements for the treatment system.
  A maintenance contract should be in place to ensure that the system is correctly and regularly inspected and maintained (at least annually is recommended).