

WDC LIM REPORT - PART 3



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R J Hill Laboratories Limited
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand

Tel +64 7 858 2000
Fax +64 7 858 2001
Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

ANALYSIS REPORT

Page 1 of 7

Client:	Geocivil Limited	Lab No:	1353940	POPv1
Contact:	D Krissansen	Date Registered:	20-Nov-2014	
	C/- Northland Soil Mechanics & Testing L	Date Reported:	05-Dec-2014	
	2 Norfolk Street	Quote No:	63665	
	WHANGAREI 0110	Order No:		
		Client Reference:	8288-028 BGC Keay Family Trust	
		Submitted By:	D Krissansen	

Sample Type: Soil

Sample Name:	1- E2623949 N6606023 0-75mm 19-Nov-2014 11:00 am	2- E2623917 N6605950 0-75mm 19-Nov-2014 10:15 am	3- E2623882 N6605935 75-150mm 19-Nov-2014 11:15 am	4- E2623874 N6605975 0-75mm 19-Nov-2014 11:25 am	5- E2623907 N6606005 75-150mm 19-Nov-2014 11:35 am
Lab Number:	1353940.1	1353940.2	1353940.3	1353940.4	1353940.5
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg					
Analytes Detected:	8	8	8	8	8
Total Recoverable Arsenic mg/kg dry wt	5	7	4	6	5
Total Recoverable Cadmium mg/kg dry wt	0.82	1.23	0.77	1.12	0.88
Total Recoverable Chromium mg/kg dry wt	88	73	114	98	121
Total Recoverable Copper mg/kg dry wt	90	116	80	78	69
Total Recoverable Lead mg/kg dry wt	21	17.7	18.9	20	18.8
Total Recoverable Mercury mg/kg dry wt	0.24	0.27	0.30	0.29	0.30
Total Recoverable Nickel mg/kg dry wt	18	21	34	23	29
Total Recoverable Zinc mg/kg dry wt	160	410	114	210	120
Glyphosate suite in soil by LCMSMS in Organics, trace level					
Analytes Detected:	None	None	None	None	None
Organonitro&phosphorus Pesticides Screen in Soil by GCMS					
Analytes Detected:	None	None	None	None	None
Individual Tests					
Dry Matter g/100g as rcvd	46	45	64	57	62

Please refer to the detection limits table for the list of analytes screened and their detection limits.



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.

Sample Type: Soil					
Sample Name:	6- E2623875 N6606043 0-75mm 19-Nov-2014 11:50 am 1353940.6	7- E2623900 N6606047 75-150mm 19-Nov-2014 12:15 pm 1353940.7	8- E2623881 N6606074 0-75mm 19-Nov-2014 12:40 pm 1353940.8	9- E2623913 N6606065 0-75mm 19-Nov-2014 12:30 pm 1353940.9	10- E2623879 N6606107 0-75mm 19-Nov-2014 10:25 am 1353940.10
Lab Number:					
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg					
Analytes Detected:	8	8	8	8	8
Total Recoverable Arsenic mg/kg dry wt	5	6	5	5	4
Total Recoverable Cadmium mg/kg dry wt	1.28	1.10	1.10	1.02	0.77
Total Recoverable Chromium mg/kg dry wt	130	125	87	93	95
Total Recoverable Copper mg/kg dry wt	92	66	109	82	50 #1
Total Recoverable Lead mg/kg dry wt	21	22	18.2	19.0	17.4
Total Recoverable Mercury mg/kg dry wt	0.17	0.32	0.21	0.16	0.22
Total Recoverable Nickel mg/kg dry wt	37	29	23	20	18 #1
Total Recoverable Zinc mg/kg dry wt	470	111	270	160	61 #1
Glyphosate suite in soil by LCMSMS in Organics, trace level					
Analytes Detected:	None	None	None	None	1
Glyphosate* mg/kg dry wt					0.03
Organonitro&phosphorus Pesticides Screen in Soil by GCMS					
Analytes Detected:	None	None	None	None	None
Individual Tests					
Dry Matter g/100g as rcvd	61	65	40	55	63

Please refer to the detection limits table for the list of analytes screened and their detection limits.

Sample Name:	11- E2623872 N6606188 0-75mm 19-Nov-2014 1:10 pm 1353940.11	12- E2623876 N6606214 0-75mm 19-Nov-2014 1:20 pm 1353940.12	13- E2623881 N6606074 500mm 19-Nov-2014 12:50 pm 1353940.13	14- E2623879 N6606043 500mm 19-Nov-2014 12:00 pm 1353940.14
Lab Number:				
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg				
Analytes Detected:	8	8	7	7
Total Recoverable Arsenic mg/kg dry wt	15	22	4	3
Total Recoverable Cadmium mg/kg dry wt	0.58	0.60		
Total Recoverable Chromium mg/kg dry wt	132	154	138	160
Total Recoverable Copper mg/kg dry wt	63	89	33	36
Total Recoverable Lead mg/kg dry wt	63	152	21	17.2
Total Recoverable Mercury mg/kg dry wt	0.20	0.26	0.33	0.19
Total Recoverable Nickel mg/kg dry wt	36	45	18	38
Total Recoverable Zinc mg/kg dry wt	200	290	48	63
Glyphosate suite in soil by LCMSMS in Organics, trace level				
Analytes Detected:	2	None	None	None
AMPA* mg/kg dry wt	0.14			
Glyphosate* mg/kg dry wt	0.04			
Organonitro&phosphorus Pesticides Screen in Soil by GCMS				
Analytes Detected:	None	None	None	None
Individual Tests				
Dry Matter g/100g as rcvd	63	73	69	67

Please refer to the detection limits table for the list of analytes screened and their detection limits.

Analyst's Comments

#1 It should be noted that the replicate analyses performed on this sample as part of our in-house Quality Assurance procedures showed greater variation than would normally be expected. This may reflect the heterogeneity of the sample.

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-14
Glyphosate suite in soil by LCMSMS, trace level*	Glyphosate, AMPA and glufosinate in soil by LCMSMS, samples are derivatised with Fmoc and then directly injected.	-	1-14
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	0.10 - 4 mg/kg dry wt	1-14
Glyphosate suite in soil by LCMSMS in Organics, trace level*	Solvent extraction, derivatised with Fmoc, analysis by LCMSMS. Tested on as received sample	0.010 - 0.05 mg/kg dry wt	1-14
Organonitro&phosphorus Pesticides Screen in Soil by GCMS	Sonication extraction, Dilution cleanup, GC-MS analysis. Tested on as received sample	-	1-14
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-14
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-14

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

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Ara Heron BSc (Tech)
Client Services Manager - Environmental Division

Detection Limits

Analytes	Detection Limit	Analytes	Detection Limit	Analytes	Detection Limit
Individual Tests		Carbaryl	0.10 mg/kg	Alachlor	0.05 mg/kg
Sample Number(s):	1-14	Carbofuran	0.10 mg/kg	Metolachlor	0.05 mg/kg
Dry Matter	0.10 g/100g as rcvd	Chlorfluazuron	0.10 mg/kg	Propanil	0.2 mg/kg
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg		Chlorothalonil	0.10 mg/kg	Azaconazole	0.05 mg/kg
Sample Number(s):	1-14	Chlorpyrifos	0.10 mg/kg	Benalaxyl	0.05 mg/kg
Total Recoverable Arsenic	2 mg/kg dry wt	Chlorpyrifos-methyl	0.10 mg/kg	Diazinon	0.05 mg/kg
Total Recoverable Cadmium	0.10 mg/kg dry wt	Chlortoluron	0.2 mg/kg	Furalaxyl	0.05 mg/kg
Total Recoverable Chromium	2 mg/kg dry wt	Cyanazine	0.10 mg/kg	Hexazinone	0.05 mg/kg
Total Recoverable Copper	2 mg/kg dry wt	Cyfluthrin	0.10 mg/kg	IPBC (3-Iodo-2-propynyl-n- butylcarbamate)	0.5 mg/kg dry wt
Total Recoverable Lead	0.4 mg/kg dry wt	Cyhalothrin	0.10 mg/kg	Kresoxim-methyl	0.05 mg/kg
Total Recoverable Mercury	0.10 mg/kg dry wt	Cypermethrin	0.2 mg/kg	Methamidophos	0.5 mg/kg
Total Recoverable Nickel	2 mg/kg dry wt	Deltamethrin (including Tralomethrin)	0.10 mg/kg	Naled	0.5 mg/kg
Total Recoverable Zinc	4 mg/kg dry wt	Dichlofuanid	0.10 mg/kg	Oxyfluorfen	0.05 mg/kg
Glyphosate suite in soil by LCMSMS in Organics, trace level		Dichlorvos	0.10 mg/kg	Prochloraz	0.5 mg/kg
Sample Number(s):	1	Dimethoate	0.2 mg/kg	Prometryn	0.05 mg/kg
Glufosinate*	0.012 mg/kg dry wt	Diphenylamine	0.2 mg/kg	Propazine	0.05 mg/kg
Sample Number(s):	1-2, 8	Diuron	0.10 mg/kg	Sulfentrazone	0.5 mg/kg
Glyphosate*	0.03 mg/kg dry wt	Fenpropimorph	0.10 mg/kg	Terbutylazine	0.05 mg/kg
Sample Number(s):	1-7, 9-14	Fluazifop-butyl	0.10 mg/kg	Thiabendazole	0.5 mg/kg
AMPA*	0.05 mg/kg dry wt	Fluometuron	0.10 mg/kg	Tolyfluanid	0.05 mg/kg
Sample Number(s):	2	Flusilazole	0.10 mg/kg	Sample Number(s):	1-2
Glufosinate*	0.013 mg/kg dry wt	Haloxypop-methyl	0.10 mg/kg	Difenoconazole	0.15 mg/kg
Sample Number(s):	3-7, 9-14	Hexaconazole	0.10 mg/kg	Fluvalinate	0.08 mg/kg
Glufosinate*	0.010 mg/kg dry wt	Iprodione	0.10 mg/kg	Propiconazole	0.08 mg/kg
Glyphosate*	0.02 mg/kg dry wt	Linuron	0.10 mg/kg	Sample Number(s):	1-2, 4, 8-9
Sample Number(s):	8	Malathion	0.10 mg/kg	Dichloran	0.3 mg/kg
AMPA*	0.06 mg/kg dry wt	Metalaxyl (Mefenoxam)	0.10 mg/kg	Sample Number(s):	1-7, 9-14
Glufosinate*	0.014 mg/kg dry wt	Metribuzin	0.10 mg/kg	Permethrin	0.03 mg/kg
Sample Number(s):	1	Molinate	0.2 mg/kg	Sample Number(s):	12
Acetochlor	0.10 mg/kg	Myclobutanil	0.10 mg/kg	Atrazine-desisopropyl	0.13 mg/kg
Atrazine	0.10 mg/kg	Norflurazon	0.2 mg/kg	Azinphos-methyl	0.13 mg/kg
Atrazine-desethyl	0.10 mg/kg	Oxadiazon	0.10 mg/kg	Bitertanol	0.13 mg/kg
Atrazine-desisopropyl	0.2 mg/kg	Paclobutrazol	0.10 mg/kg	Captan	0.13 mg/kg
Azinphos-methyl	0.2 mg/kg	Parathion-ethyl	0.10 mg/kg	Chlortoluron	0.13 mg/kg
Bitertanol	0.2 mg/kg	Parathion-methyl	0.10 mg/kg	Cypermethrin	0.13 mg/kg
Bromacil	0.10 mg/kg	Pendimethalin	0.10 mg/kg	Dimethoate	0.13 mg/kg
Bromopropylate	0.10 mg/kg	Pirimicarb	0.10 mg/kg	Diphenylamine	0.13 mg/kg
Butachlor	0.10 mg/kg	Pirimiphos-methyl	0.10 mg/kg	Molinate	0.13 mg/kg
Captan	0.2 mg/kg	Procymidone	0.10 mg/kg	Norflurazon	0.13 mg/kg
		Propachlor	0.10 mg/kg	TCMTB [2- (thiocyanomethylthio) benzothiazole,Busan]	0.13 mg/kg dry wt
		Pyriproxyfen	0.10 mg/kg	Sample Number(s):	12-14
		Quizalofop-ethyl	0.10 mg/kg	Acetochlor	0.07 mg/kg
		Simazine	0.10 mg/kg	Atrazine	0.07 mg/kg
		Simetryn	0.10 mg/kg	Atrazine-desethyl	0.07 mg/kg
		TCMTB [2- (thiocyanomethylthio) benzothiazole,Busan]	0.2 mg/kg dry wt	Bromacil	0.07 mg/kg
		Tebuconazole	0.10 mg/kg	Bromopropylate	0.07 mg/kg
		Terbacil	0.10 mg/kg	Butachlor	0.07 mg/kg
		Terbufos	0.10 mg/kg	Carbaryl	0.07 mg/kg
		Terbumeton	0.10 mg/kg	Carbofuran	0.07 mg/kg
		Terbutylazine-desethyl	0.10 mg/kg	Chlorfluazuron	0.07 mg/kg
		Terbutryn	0.10 mg/kg	Chlorothalonil	0.07 mg/kg
		Thiobencarb	0.10 mg/kg	Chlorpyrifos	0.07 mg/kg
		Triazophos	0.10 mg/kg	Chlorpyrifos-methyl	0.07 mg/kg
		Trifluralin	0.10 mg/kg	Cyanazine	0.07 mg/kg
		Vinclozolin	0.10 mg/kg		
		Sample Number(s):	1, 3-7, 9-14		

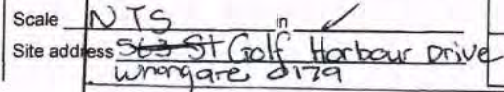
Analytes	Detection Limit	Analytes	Detection Limit	Analytes	Detection Limit
Organonitro&phosphorus Pesticides Screen in Soil by GCMS		Sample Number(s): 2		Sample Number(s): 3, 5-7, 10-11	
Sample Number(s): 12-14		Acetochlor	0.11 mg/kg	Acetochlor	0.08 mg/kg
Cyfluthrin	0.07 mg/kg	Atrazine	0.11 mg/kg	Atrazine	0.08 mg/kg
Cyhalothrin	0.07 mg/kg	Atrazine-desethyl	0.11 mg/kg	Atrazine-desethyl	0.08 mg/kg
Deltamethrin (including Tralomethrin)	0.07 mg/kg	Bromacil	0.11 mg/kg	Bromacil	0.08 mg/kg
Dichlofluanid	0.07 mg/kg	Bromopropylate	0.11 mg/kg	Bromopropylate	0.08 mg/kg
Difenoconazole	0.10 mg/kg	Butachlor	0.11 mg/kg	Butachlor	0.08 mg/kg
Diuron	0.07 mg/kg	Carbaryl	0.11 mg/kg	Carbaryl	0.08 mg/kg
Fenpropimorph	0.07 mg/kg	Carbofuran	0.11 mg/kg	Carbofuran	0.08 mg/kg
Fluazifop-butyl	0.07 mg/kg	Chlorfluazuron	0.11 mg/kg	Chlorfluazuron	0.08 mg/kg
Fluometuron	0.07 mg/kg	Chlorothalonil	0.11 mg/kg	Chlorothalonil	0.08 mg/kg
Flusilazole	0.07 mg/kg	Chlorpyrifos	0.11 mg/kg	Chlorpyrifos	0.08 mg/kg
Fluvalinate	0.05 mg/kg	Chlorpyrifos-methyl	0.11 mg/kg	Chlorpyrifos-methyl	0.08 mg/kg
Haloxifop-methyl	0.07 mg/kg	Cyanazine	0.11 mg/kg	Cyanazine	0.08 mg/kg
Hexaconazole	0.07 mg/kg	Cyfluthrin	0.11 mg/kg	Cyfluthrin	0.08 mg/kg
Iprodione	0.07 mg/kg	Cyhalothrin	0.11 mg/kg	Cyhalothrin	0.08 mg/kg
Linuron	0.07 mg/kg	Deltamethrin (including Tralomethrin)	0.11 mg/kg	Deltamethrin (including Tralomethrin)	0.08 mg/kg
Malathion	0.07 mg/kg	Dichlofluanid	0.11 mg/kg	Dichlofluanid	0.08 mg/kg
Metalaxyl (Mefenoxam)	0.07 mg/kg	Dichlorvos	0.11 mg/kg	Difenoconazole	0.11 mg/kg
Metribuzin	0.07 mg/kg	Diuron	0.11 mg/kg	Diuron	0.08 mg/kg
Myclobutanil	0.07 mg/kg	Fenpropimorph	0.11 mg/kg	Fenpropimorph	0.08 mg/kg
Oxadiazon	0.07 mg/kg	Fluazifop-butyl	0.11 mg/kg	Fluazifop-butyl	0.08 mg/kg
Paclobutrazol	0.07 mg/kg	Fluometuron	0.11 mg/kg	Fluometuron	0.08 mg/kg
Parathion-ethyl	0.07 mg/kg	Flusilazole	0.11 mg/kg	Flusilazole	0.08 mg/kg
Parathion-methyl	0.07 mg/kg	Haloxifop-methyl	0.11 mg/kg	Haloxifop-methyl	0.08 mg/kg
Pendimethalin	0.07 mg/kg	Hexaconazole	0.11 mg/kg	Hexaconazole	0.08 mg/kg
Pirimicarb	0.07 mg/kg	Iprodione	0.11 mg/kg	Iprodione	0.08 mg/kg
Pirimiphos-methyl	0.07 mg/kg	Linuron	0.11 mg/kg		
Procymidone	0.07 mg/kg	Malathion	0.11 mg/kg		
Propachlor	0.07 mg/kg	Metalaxyl (Mefenoxam)	0.11 mg/kg		
Propiconazole	0.05 mg/kg	Metribuzin	0.11 mg/kg		
Pyriproxyfen	0.07 mg/kg	Myclobutanil	0.11 mg/kg		
Quizalofop-ethyl	0.07 mg/kg	Oxadiazon	0.11 mg/kg		
Simazine	0.07 mg/kg	Paclobutrazol	0.11 mg/kg		
Simetryn	0.07 mg/kg	Parathion-ethyl	0.11 mg/kg		
Tebuconazole	0.07 mg/kg	Parathion-methyl	0.11 mg/kg		
Terbacil	0.07 mg/kg	Pendimethalin	0.11 mg/kg		
Terbufos	0.07 mg/kg	Pirimicarb	0.11 mg/kg		
Terbumeton	0.07 mg/kg	Pirimiphos-methyl	0.11 mg/kg		
Terbuthylazine-desethyl	0.07 mg/kg	Procymidone	0.11 mg/kg		
Terbutryn	0.07 mg/kg	Propachlor	0.11 mg/kg		
Thiobencarb	0.07 mg/kg	Pyriproxyfen	0.11 mg/kg		
Triazophos	0.07 mg/kg	Quizalofop-ethyl	0.11 mg/kg		
Trifluralin	0.07 mg/kg	Simazine	0.11 mg/kg		
Vinclozolin	0.07 mg/kg	Simetryn	0.11 mg/kg		
Sample Number(s): 13-14		Tebuconazole	0.11 mg/kg		
Atrazine-desisopropyl	0.14 mg/kg	Terbacil	0.11 mg/kg		
Azinphos-methyl	0.14 mg/kg	Terbufos	0.11 mg/kg		
Bitertanol	0.14 mg/kg	Terbumeton	0.11 mg/kg		
Captan	0.14 mg/kg	Terbuthylazine-desethyl	0.11 mg/kg		
Chlortoluron	0.14 mg/kg	Terbutryn	0.11 mg/kg		
Cypermethrin	0.14 mg/kg	Thiobencarb	0.11 mg/kg		
Dimethoate	0.14 mg/kg	Triazophos	0.11 mg/kg		
Diphenylamine	0.14 mg/kg	Trifluralin	0.11 mg/kg		
Molinate	0.14 mg/kg	Vinclozolin	0.11 mg/kg		
Norflurazon	0.14 mg/kg	Sample Number(s): 2, 8			
TCMTB [2-(thiocyanomethylthio) benzothiazole, Busan]	0.14 mg/kg dry wt	Alachlor	0.06 mg/kg		
		Atrazine-desisopropyl	0.3 mg/kg		
				Azaconazole	0.06 mg/kg
				Azinphos-methyl	0.3 mg/kg
				Benalaxyl	0.06 mg/kg
				Bitertanol	0.3 mg/kg
				Captan	0.3 mg/kg
				Chlortoluron	0.3 mg/kg
				Cypermethrin	0.3 mg/kg
				Diazinon	0.06 mg/kg
				Dimethoate	0.3 mg/kg
				Diphenylamine	0.3 mg/kg
				Furalaxyl	0.06 mg/kg
				Hexazinone	0.06 mg/kg
				IPBC (3-Iodo-2-propynyl-n-butyl carbamate)	0.6 mg/kg dry wt
				Kresoxim-methyl	0.06 mg/kg
				Methamidophos	0.6 mg/kg
				Metolachlor	0.06 mg/kg
				Molinate	0.3 mg/kg
				Naled	0.6 mg/kg
				Norflurazon	0.3 mg/kg
				Oxyfluorfen	0.06 mg/kg
				Prochloraz	0.6 mg/kg
				Prometryn	0.06 mg/kg
				Propanil	0.3 mg/kg
				Propazine	0.06 mg/kg
				Sulfentrazone	0.6 mg/kg
				TCMTB [2-(thiocyanomethylthio) benzothiazole, Busan]	0.3 mg/kg dry wt
				Terbuthylazine	0.06 mg/kg
				Thiabendazole	0.6 mg/kg
				Tolyfluanid	0.06 mg/kg

Analytes	Detection Limit	Analytes	Detection Limit	Analytes	Detection Limit
Organonitro&phosphorus Pesticides Screen in Soil by GCMS		Diphenylamine	0.15 mg/kg	Paclobutrazol	0.09 mg/kg
Sample Number(s):	3, 5-7, 10-11	Molinate	0.15 mg/kg	Parathion-ethyl	0.09 mg/kg
Linuron	0.08 mg/kg	Norflurazon	0.15 mg/kg	Parathion-methyl	0.09 mg/kg
Malathion	0.08 mg/kg	TCMTB [2-(thiocyanomethylthio) benzothiazole, Busan]	0.15 mg/kg dry wt	Pendimethalin	0.09 mg/kg
Metaxyl (Mefenoxam)	0.08 mg/kg	Sample Number(s):	3-7, 10-11	Pirimicarb	0.09 mg/kg
Metribuzin	0.08 mg/kg	Fluvalinate	0.06 mg/kg	Pirimiphos-methyl	0.09 mg/kg
Myclobutanil	0.08 mg/kg	Propiconazole	0.06 mg/kg	Procymidone	0.09 mg/kg
Oxadiazon	0.08 mg/kg	Sample Number(s):	3-7, 9-14	Propachlor	0.09 mg/kg
Paclobutrazol	0.08 mg/kg	Dichlorvos	0.09 mg/kg	Pyriproxyfen	0.09 mg/kg
Parathion-ethyl	0.08 mg/kg	Sample Number(s):	4	Quizalofop-ethyl	0.09 mg/kg
Parathion-methyl	0.08 mg/kg	Atrazine-desisopropyl	0.17 mg/kg	Simazine	0.09 mg/kg
Pendimethalin	0.08 mg/kg	Azinphos-methyl	0.17 mg/kg	Simetryn	0.09 mg/kg
Pirimicarb	0.08 mg/kg	Bitertanol	0.17 mg/kg	Tebuconazole	0.09 mg/kg
Pirimiphos-methyl	0.08 mg/kg	Captan	0.17 mg/kg	Terbacil	0.09 mg/kg
Procymidone	0.08 mg/kg	Chlortoluron	0.17 mg/kg	Terbufos	0.09 mg/kg
Propachlor	0.08 mg/kg	Cypermethrin	0.17 mg/kg	Terbuteton	0.09 mg/kg
Pyriproxyfen	0.08 mg/kg	Difenoconazole	0.12 mg/kg	Terbutylazine-desethyl	0.09 mg/kg
Quizalofop-ethyl	0.08 mg/kg	Dimethoate	0.17 mg/kg	Terbutryn	0.09 mg/kg
Simazine	0.08 mg/kg	Diphenylamine	0.17 mg/kg	Thiobencarb	0.09 mg/kg
Simetryn	0.08 mg/kg	Molinate	0.17 mg/kg	Triazophos	0.09 mg/kg
Tebuconazole	0.08 mg/kg	Norflurazon	0.17 mg/kg	Trifluralin	0.09 mg/kg
Terbacil	0.08 mg/kg	TCMTB [2-(thiocyanomethylthio) benzothiazole, Busan]	0.17 mg/kg dry wt	Vinclozolin	0.09 mg/kg
Terbufos	0.08 mg/kg	Sample Number(s):	4, 9	Sample Number(s):	5-6, 11
Terbuteton	0.08 mg/kg	Acetochlor	0.09 mg/kg	Atrazine-desisopropyl	0.16 mg/kg
Terbutylazine-desethyl	0.08 mg/kg	Atrazine	0.09 mg/kg	Azinphos-methyl	0.16 mg/kg
Terbutryn	0.08 mg/kg	Atrazine-desethyl	0.09 mg/kg	Bitertanol	0.16 mg/kg
Thiobencarb	0.08 mg/kg	Bromacil	0.09 mg/kg	Captan	0.16 mg/kg
Triazophos	0.08 mg/kg	Bromopropylate	0.09 mg/kg	Chlortoluron	0.16 mg/kg
Trifluralin	0.08 mg/kg	Butachlor	0.09 mg/kg	Cypermethrin	0.16 mg/kg
Vinclozolin	0.08 mg/kg	Carbaryl	0.09 mg/kg	Dimethoate	0.16 mg/kg
Sample Number(s):	3, 5-7, 10-14	Carbofuran	0.09 mg/kg	Diphenylamine	0.16 mg/kg
Azaconazole	0.04 mg/kg	Chlorfluazuron	0.09 mg/kg	Molinate	0.16 mg/kg
Benalaxyl	0.04 mg/kg	Chlorothalonil	0.09 mg/kg	Norflurazon	0.16 mg/kg
Diazinon	0.04 mg/kg	Chlorpyrifos	0.09 mg/kg	TCMTB [2-(thiocyanomethylthio) benzothiazole, Busan]	0.16 mg/kg dry wt
Dichloran	0.2 mg/kg	Chlorpyrifos-methyl	0.09 mg/kg	Sample Number(s):	8
Furalaxyl	0.04 mg/kg	Cyanazine	0.09 mg/kg	Acetochlor	0.12 mg/kg
Hexazinone	0.04 mg/kg	Cyfluthrin	0.09 mg/kg	Atrazine	0.12 mg/kg
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)	0.4 mg/kg dry wt	Cyhalothrin	0.09 mg/kg	Atrazine-desethyl	0.12 mg/kg
Kresoxim-methyl	0.04 mg/kg	Deltamethrin (including Tralomethrin)	0.09 mg/kg	Bromacil	0.12 mg/kg
Methamidophos	0.4 mg/kg	Dichlofluanid	0.09 mg/kg	Bromopropylate	0.12 mg/kg
Naled	0.4 mg/kg	Diuron	0.09 mg/kg	Butachlor	0.12 mg/kg
Oxyfluorfen	0.04 mg/kg	Fenpropimorph	0.09 mg/kg	Carbaryl	0.12 mg/kg
Prochloraz	0.4 mg/kg	Fluazifop-butyl	0.09 mg/kg	Carbofuran	0.12 mg/kg
Prometryn	0.04 mg/kg	Fluometuron	0.09 mg/kg	Chlorfluazuron	0.12 mg/kg
Propazine	0.04 mg/kg	Flusilazole	0.09 mg/kg	Chlorothalonil	0.12 mg/kg
Sulfentrazone	0.4 mg/kg	Haloxifop-methyl	0.09 mg/kg	Chlorpyrifos	0.12 mg/kg
Terbutylazine	0.04 mg/kg	Hexaconazole	0.09 mg/kg	Chlorpyrifos-methyl	0.12 mg/kg
Thiabendazole	0.4 mg/kg	Iprodione	0.09 mg/kg	Cyanazine	0.12 mg/kg
Tolyfluanid	0.04 mg/kg	Linuron	0.09 mg/kg	Cyfluthrin	0.12 mg/kg
Sample Number(s):	3, 7, 10	Malathion	0.09 mg/kg	Cyhalothrin	0.12 mg/kg
Atrazine-desisopropyl	0.15 mg/kg	Metaxyl (Mefenoxam)	0.09 mg/kg	Deltamethrin (including Tralomethrin)	0.12 mg/kg
Azinphos-methyl	0.15 mg/kg	Metribuzin	0.09 mg/kg	Dichlofluanid	0.12 mg/kg
Bitertanol	0.15 mg/kg	Myclobutanil	0.09 mg/kg	Dichlorvos	0.12 mg/kg
Captan	0.15 mg/kg	Oxadiazon	0.09 mg/kg	Difenoconazole	0.17 mg/kg
Chlortoluron	0.15 mg/kg			Diuron	0.12 mg/kg
Cypermethrin	0.15 mg/kg			Fenpropimorph	0.12 mg/kg
Dimethoate	0.15 mg/kg				

Analytes	Detection Limit
Organonitro&phosphorus Pesticides Screen in Soil by GCMS	
Sample Number(s):	8
Fluazifop-butyl	0.12 mg/kg
Fluometuron	0.12 mg/kg
Flusilazole	0.12 mg/kg
Fluvalinate	0.09 mg/kg
Haloxypop-methyl	0.12 mg/kg
Hexaconazole	0.12 mg/kg
Iprodione	0.12 mg/kg
Linuron	0.12 mg/kg
Malathion	0.12 mg/kg
Metalaxyl (Mefenoxam)	0.12 mg/kg
Metribuzin	0.12 mg/kg
Myclobutanil	0.12 mg/kg
Oxadiazon	0.12 mg/kg
Paclobutrazol	0.12 mg/kg
Parathion-ethyl	0.12 mg/kg
Parathion-methyl	0.12 mg/kg
Pendimethalin	0.12 mg/kg
Permethrin	0.04 mg/kg
Pirimicarb	0.12 mg/kg
Pirimiphos-methyl	0.12 mg/kg
Procymidone	0.12 mg/kg
Propachlor	0.12 mg/kg
Propiconazole	0.09 mg/kg
Pyriproxyfen	0.12 mg/kg
Quizalofop-ethyl	0.12 mg/kg
Simazine	0.12 mg/kg
Simetryn	0.12 mg/kg
Tebuconazole	0.12 mg/kg
Terbacil	0.12 mg/kg
Terbufos	0.12 mg/kg
Terbumeton	0.12 mg/kg
Terbuthylazine-desethyl	0.12 mg/kg
Terbutryn	0.12 mg/kg
Thiobencarb	0.12 mg/kg
Triazophos	0.12 mg/kg
Trifluralin	0.12 mg/kg
Vinclozolin	0.12 mg/kg
Sample Number(s):	9
Atrazine-desisopropyl	0.18 mg/kg
Azinphos-methyl	0.18 mg/kg
Bitertanol	0.18 mg/kg
Captan	0.18 mg/kg
Chlortoluron	0.18 mg/kg
Cypermethrin	0.18 mg/kg
Difenoconazole	0.13 mg/kg
Dimethoate	0.18 mg/kg
Diphenylamine	0.18 mg/kg
Fluvalinate	0.07 mg/kg
Molinate	0.18 mg/kg
Norflurazon	0.18 mg/kg
Propiconazole	0.07 mg/kg
TCMTB [2-(thiocyanomethylthio) benzothiazole, Busan]	0.18 mg/kg dry wt

(to be completed in all cases. If details are already noted on separate drawings then provide copies in duplicate)

Soak Hole	150 ml
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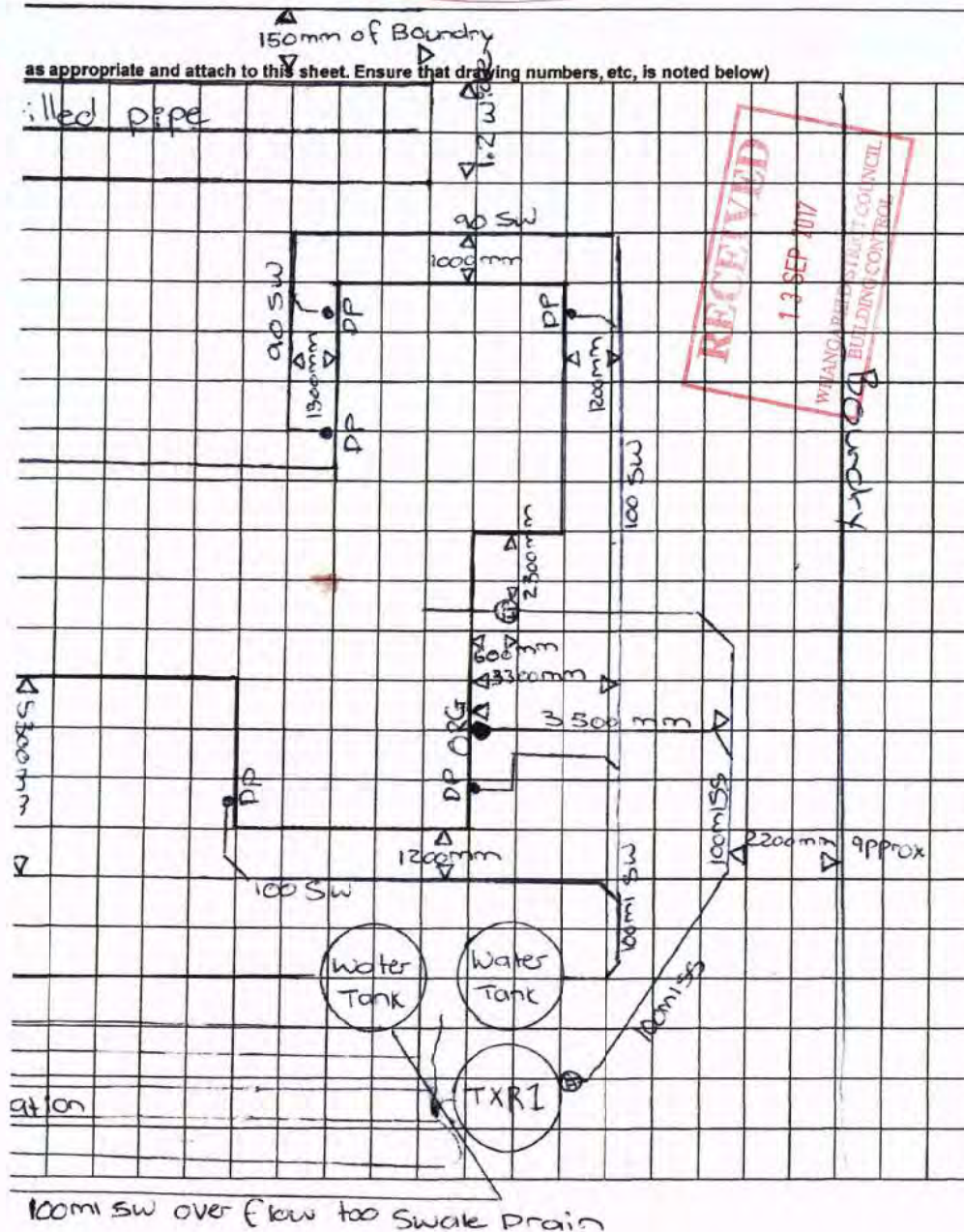


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BC 1601300



filled pipe





Whangarei District Council
Private Bag 9023, Te Mai
Whangarei 0143
Ph:0-9-430 4200
Email: mailroom@wdc.govt.nz

Rates LIM Report

As at: Wednesday, 23 September, 2026

Property Number 165962
Legal Description LOT 10 DP 498433
Assessment Number 0035010527
Address 6 Kaymahr Lane (Pvt) Whangarei 0179
Record of Title(s) 738144
Land Value \$490,000
Capital Value \$1,675,000
Date of Valuation 01-July-2024
Effective Date (used for rating purposes) 01-July-2025
Meter Location

Rates Breakdown (up to 30 June 2027)

Rates Charge	Charge Total
General Residential	1,510.18
Stormwater	124.00
Uniform Annual General Charge	996.00
Regional Emergency & Hazard Management	58.36
Regional Rescue Services	11.09
Regional Council Services	214.35
Regional Flood Infrastructure	43.11
Regional Economic Development	17.25
Regional Land and Freshwater Management	137.00
Regional Pest Management	110.40
Regional Sporting Facilities	7.94
Regional Whangarei Urban Riv Mgt Gen Catchment	39.83
Regional Whangarei Transport Rate	29.70
Annual Charge Total	\$3,299.21

Opening Balance as at 01/07/2026 **\$0.00**

Rates Instalments	Total
20/07/2026 Instalment	\$827.21
20/10/2026 Instalment	\$824.00
20/01/2027 Instalment	\$824.00
20/04/2027 Instalment	\$824.00
Rates Total	\$3,299.21

Balance to Clear **\$2,472.00**

COPY

Building Consent No: BC1601309

Section 51, Building Act 2004

Issued: 8 December 2016

Project Information Memorandum No: PM1600340

The Building

Street address of building:	Golf Harbour Drive Whangarei 0179
Legal description of land where building is located:	LOT 10 DP 498433 LLP: 128579
Building name:	N/A
Location of building within site/block number:	N/A
Level/unit number:	N/A

The Owner

G E Adams
P J Adams
563 State Highway 14
RD 9
Whangarei 0179

Phone number:	4389396
Mobile number:	0274394985
Facsimile number:	N/A
Email address:	gpam@xtra.co.nz
Website:	N/A

Street address/registered office:	Golf Harbour Drive Whangarei 0179
-----------------------------------	--------------------------------------

First point of contact for communications with Council/building consent authority

Contact Person

Landmark Homes Northland
PO Box 4128
Kamo 0141

Phone number:	4388499
Mobile number:	02102235560
Facsimile number:	N/A
Email address:	paul.ganley@landmarkhomes.co.nz
Website:	N/A

Building Work

The following building work is authorised by this consent:

New Dwelling

This building consent is issued under section 51 of the Building Act 2004. This building consent does not relieve the owner of the building (or proposed building) of any duty or responsibility under any other Act relating to or affecting the building (or proposed building).

This building consent also does not permit the construction, alteration, demolition, or removal of the building (or proposed building) if that construction, alteration, demolition, or removal would be in breach of any other Act.

This building consent is subject to the following conditions:

Section 90 Building Act 2004

Under section 90 of the Building Act 2004, agents authorised by Council (acting as a Building Consent Authority) are entitled, at all times during normal working hours or while building work is being done, to inspect:

- ii) land on which building work is being or is proposed to be carried out; and
 - iii) building work that has been or is being carried out on or off that building site; and
 - iiii) any building.
1. See attached schedule of site requirements for inspections and documentation required.
 2. A copy of your Electrical Certificate will be required.
 3. A copy of your Gas Certificate will be required.
 4. A Producer Statement - Construction (PS3) is to be provided by the installer of the wet area membrane specified in the consented documents. The installer must have undertaken appropriate training by the product manufacturer. Evidence of training must be supplied in support of the PS3.
 5. Engineer is to supervise platform construction for raft floor and on completion is to issue a Producer Statement PS4.
 6. Wet area shower floor/wall construction details for this project are to be provided to WDC for approval when final layout - design has been confirmed and prior to construction for WDC approval. This is to be approved as compliant by WDC prior to the preline inspection taking place.

Compliance Schedule

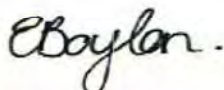
A compliance schedule is not required for the building.

Attachments

The Project Information Memorandum for the building work covered by this building consent.

Additional Information

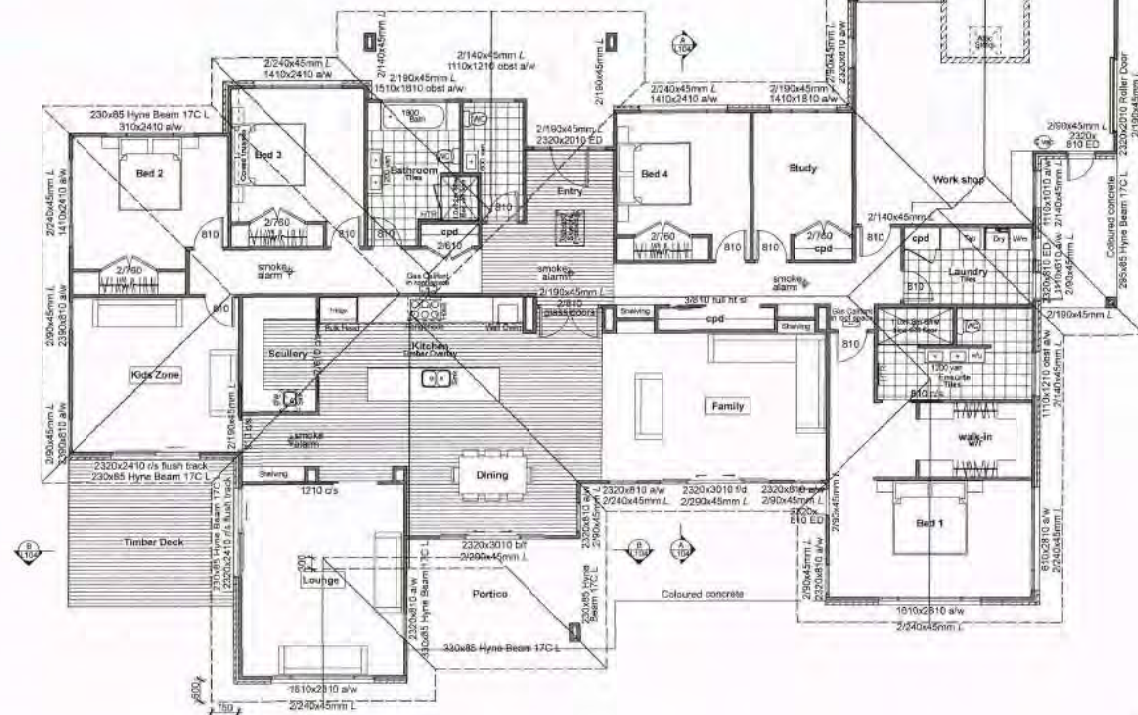
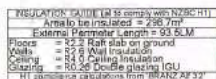
1. The applicant must control dust nuisance created by any site or building works.
2. Toilet facilities must be provided within reasonable distance of the construction site. Ground discharge is no longer acceptable.
3. Lapsing of building consent. For the purposes of S52(b) of the Building Act 2004, the period after which this consent will lapse if the building work to which it relates does not commence will be 12 months from the date of issue.
4. The owner of the wastewater system shall enter into a service agreement with the installer and a copy of the agreement shall be given to the Inspector prior to issue of Code of Compliance Certificate.



Enka Boylan
Support Assistant – Building Processing
On behalf of Whangarei District Council

8 December 2016

Date



LANDMARK
HOMES

WINDOWS
 FRAMING
 BREAKS
 OVERALL



NORTH

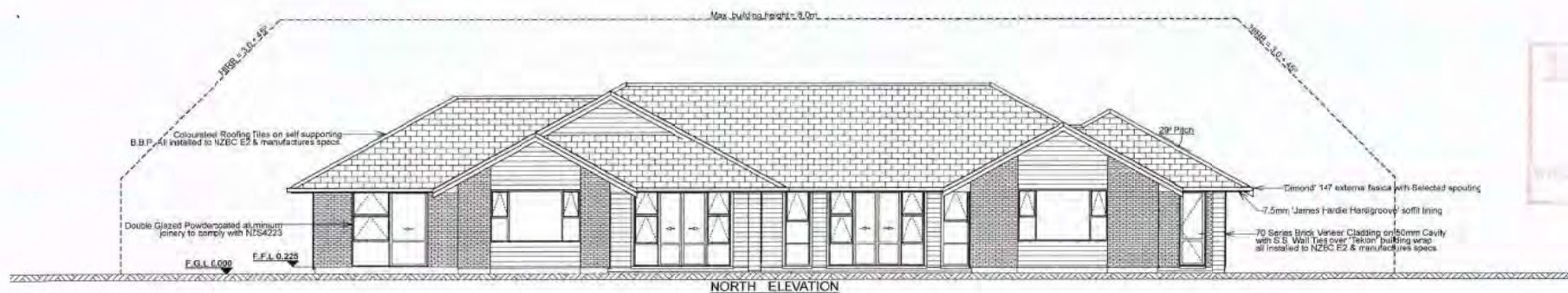


BASE GROUP CONSULTING
 10000 16th Avenue S.E.
 Bellevue, WA 98004
 Phone: 206.453.1100
 Fax: 206.453.1101
 Email: info@basegroupconsulting.com
 Website: www.basegroupconsulting.com

I believe in sustainable growth for the structural design firms in this region and in accordance with our philosophy we have provided you with the information you need to make a decision on whether or not to use our services.

Signature: *[Signature]* Date: 25-11-18

Wind Zone = High - 44.0 m/s	
Shed Height = 2725mm	
Roof Plan Area = 561.3m²	
Living Area =	296.7m²
Garage Area =	79.1m²
Total Area =	377.8m²
Total Area over frame =	377.8m²
Total Area over veneer =	385.4m²
Deck Area =	17.9m²



These Drawings are Copyright to Landmark Homes NZ Limited. They shall NOT be copied in any form or Passed on to any Third Party without permission from Landmark Homes NZ Limited.
Ph:0600 477 110

Contractor to check all dimensions and conditions on site before commencing work. Work only to agreed dimensions. In the event of a discrepancy, consult the designer.

Proposed Dwelling For
GE & P.J Adams Family Trust
Lot 10 LT488433
Self Harbour Drive - Whangarei

SCALE 1:100

ELEVATIONS

DRAWN - Russell Moseley Architectural Design Ltd

SHEET L 105
DATE Friday, 25 November 2016





BASE GROUP CONSULTING

Structural & Civil Engineering

16093

25 August, 2016

Clint Dyke
Landmark Homes Northland
PO Box 4128
Kamo



Your Ref: **Lot 10, Golf Harbour Drive, Maunu – wastewater management**

Dear Sir,

As requested Base Group Consulting have completed the design of an on-site wastewater system for a new residential dwelling located at Lot 10, Golf Harbour Drive, Maunu.

The subdivision report prepared by Base Group Consulting (ref 14037 Rev 1 dated 28 September 2015) describes the arrangements for wastewater management within the subdivision and requires an individual on-site system for Lot 10.

Treatment System

Design of a wastewater treatment and disposal system for use at the site has been carried out accordance with AS/NZS 1547:2012. The system has been designed to accommodate a flow of 180 l/person/day allowing for on-site roof water tank supply used with standard fixtures. Based on the scheme plans provided by Landmark Homes Northland a four bedroom dwelling is used with a maximum occupancy of six persons. This gives a design daily flow rate of 1,080 l/day for disposal system treatment.

The soil identified in the subdivision report (Base Group Consulting ref 14037 Rev 1 dated 28 September 2015) is classified as moderately structured well drained clay loam being Soil Category 4 in accordance with AS/NZS 1547:2012.

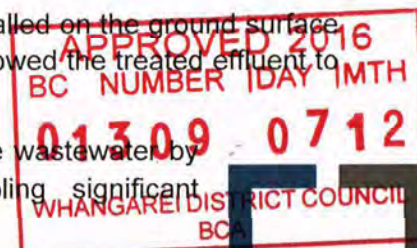
The preferred method of wastewater management is by means of secondary treatment utilising a low pressure irrigation system positioned within the grassed areas north of the dwelling location. This will be achieved using a Cleanstream TXR-1 textile system which is capable of achieving advanced secondary treatment. Product information and details of the Cleanstream TXR-1 system are enclosed.

Land Application system

Disposal of the treated wastewater within the site is to be by means of a covered surface pressure compensating dripper irrigation (PCDI) system. This system utilises a low-pressure network of 16mm diameter pipe with spaced, self-compensating drippers providing a uniform distribution of the wastewater to the designated area.

For a covered surface irrigation system, the dripper lines are installed on the ground surface covered with a minimum of 50mm of soil topsoil and/or mulch allowed the treated effluent to be distributed into the topsoil layer.

This type of disposal system will provide further treatment to the wastewater by retaining the effluent within the aerobic soils, and enabling significant



biodegradation by the soils micro organisms. Sustainable management of on-site effluent disposal should be promoted by keeping treated wastewater within the shallow soil layers where it can easily be absorbed by plants via transpiration and into the atmosphere via evaporation.

The design irrigation rate used for determining the required land application area is 3.5mm/day requiring a land application area of 309m² plus an additional 30% reserve area of 93m². The enclosed plans provide a suitable location of the land application and treatment systems.

NRC RWSP

The table below sets out the requirements of the RWSP permitted activity rules for secondary treated effluent and demonstrates how the proposed management system achieves compliance.

The lowest point of the disposal system is not less than 0.6 metres above the winter groundwater table.	Geotechnical investigations at the site did not encounter groundwater
Prior to being discharged to ground the effluent is treated to a standard such that: (i) the five day biochemical oxygen demand (BOD5) of any sample taken is less than or equal to 30 grams per cubic metre; and (ii) the total suspended solids (TSS) concentration of any sample taken is less than or equal to 45 grams per cubic metre	The proposed Cleanstream TXR-1 treatment plant exceeds the requirements for secondary treated effluent. Refer to manufacturers details enclosed.
No part of the disposal area and reserve area is located within 20 metres, measured horizontally, of any existing groundwater bore located on any other property	An existing groundwater bore for potable water use is identified at the adjacent property and is positioned in excess of 20m from the land application areas
No part of the disposal area and reserve area is located within 15 metres, measured horizontally, of any surface water	There is less than 15m separation to surface water drains including road side swale drains. A minimum setback distance of 1.3m is provided to the primary land application area for a linear distance of 10m
The effluent is discharged into or onto land using a dripper system that has been designed to evenly distribute effluent and to avoid clogging by soil or root intrusion	Land application of the treated effluent is via covered surface pressure compensating irrigation for even distribution and to prevent clogging
The selection and sizing of the treatment and disposal system has been based on: (i) the volume of the discharge; (ii) the appropriate design loading rates for the identified soil type; and (iii) has taken into account any constraints identified by a detailed site investigation.	Design of the effluent treatment system has been carried out in accordance with the principles and procedures outlined in Australian/New Zealand Standard "On-site Domestic Wastewater Management" (AS/NZS 1547:2012) with consideration to site constraints
There is no surface runoff of any contaminants from the disposal area.	Design of the effluent treatment system has been carried out in accordance with AS/NZS 1547:2012 utilising appropriate long term acceptance irrigation rates for the site. The PCDI is to be constructed as a covered surface system limiting the potential for surface runoff of contaminants.

The discharge results in no more than minor contamination of ground and surface water beyond a 20 metre separation distance measured horizontally from any part of the disposal system, or beyond the boundary of the property on which the discharge is taking place, whichever is the lesser.	Design of the effluent treatment system has been carried out in accordance with AS/NZS 1547:2012 utilising secondary treatment to reduce contaminant loading and increase soil treatment and vegetation uptake. Specific mitigation measures for the system are identified in this assessment
The volume of effluent discharged does not exceed 3 cubic metres per day, averaged over the month of greatest discharge	Design of the effluent treatment system based on a four bedroom dwelling with standard water facilities generating 1.08m ³ / day peak discharge in accordance with AS/NZS 1547:2012
The maximum volume of effluent discharge does not exceed 6 cubic metres over any 24 hour period	
A reserve area equivalent to 30% of the design disposal area has been allowed for and set aside	A 30% reserve area of 93m ² is allowed for and is indicated on the enclosed plans
A programmed maintenance contract for the treatment and disposal system is entered into.	The Building Consent for the on-site wastewater system should include a maintenance agreement for the treatment and land application system

Table 1: NRC RWSP permitted activity rules for secondary treated effluent

System Setbacks

The site is restricted by available land for the disposal area, and the design of the system has been assessed against AS/NZS 1547:2012 to ensure compliance with Northland Regional Council Regional Water and Soil Plan (Part 15.1.4) as a permitted activity. With limited area available, due consideration has been required for the setback distance from boundaries, buildings, swale drains and water bores.

Setbacks from surface water bodies are included in the table above for assessment against RWSP criteria 15.4 (d) confirming less than 15m horizontal distance from the roadside swale drain positioned along the eastern boundary of the site. A separation distance to a dry swale drain of 1.3m is provided over a 10m length along the eastern boundary, and as such it is expected that Resource Consent will be required.

AS/NZS 1547:2012 Appendix R provides guidance on setback distances for land application systems which are dependent upon the potential for adverse health and environmental effects, which specifically impacts on water quality, and therefore vary depending on the site constraints and quality of the treated wastewater. Given the high level of treatment provided by the proposed Cleanstream TXR-1 treatment plant the potential for adverse health and environmental effects is considered to be low. A property boundary separation distance of 1.5m has been provided in conjunction with a minimum building setback distance of 4m.

With regards to set back from boundaries the RWSP does not include specific requirements for setbacks other than surface and groundwater and instead refers to AS/NZS1547. The standard recognises that there is no universally accepted list of set-back requirements in on-site wastewater management practice. Cl C5.5.3.3 acknowledges that setback distance requirements vary from one regulatory authority to another. Factors to be considered in determining setback distances include effluent quality, critical design boundaries between system components, system/soil interfaces, places where design conditions abruptly change, set values, and sensitivity of the receiving environment.

The guideline values in Table R1 are themselves adhoc, and based on literature review and not environmental performance or scientific basis. A wide range of set-back distances are used in practice and all of them are quite arbitrary being based around the values presented by the US Public Health Service back in 1957. They effectively provide a factor of safety in design and location of on-site systems for maintaining environmental and health protection. The US PHS qualified such values as guidelines, however many agencies have adopted them as inviolable requirements, without any flexibility allowed in their application.

AS/NZS1547 recognises that regulatory authorities may consider reducing setback distances for highly treated effluent and given the proposal for provision of secondary treatment at the site and low potential for adverse health or environmental effects it is considered acceptable to provide a 1.3m setback for the primary land application area from the surface water drain for a 10m length without compromising environmental and health protection.

Assessment of Environmental Effects (AEE)

Resource Consent from NRC will be required for residential development of the site due to insufficient separation distances from surface water and potable water bore to achieve compliance with Part 15.1.4 of the RWSP. A minimum setback distance of 1.3m for the primary land application area has been provided from the swale drain to the east of the land application area for a length of 10m.

The following AEE provides an assessment of the potential and mitigating effects of the proposed on-site wastewater system:

- Pollution to groundwater – based on the sub-surface investigations undertaken at the site, groundwater separation is in excess of 0.6m which meets the permitted activity rules for discharge of secondary treated effluent
- Pollution of water bores – No groundwater abstraction boreholes are recorded within 20m of the property of land application area.
- Pollution to surface water – A minimum setback distance of 1.3m has been provided from the swale drain to the east of the land application area for a length of 10m. The wastewater land application area is located gently graded terrain, limiting the potential for surface runoff from the wastewater system to be directed to the surface water drain. The PCDI is to be constructed as a covered surface system limiting the potential for surface runoff of contaminants.

Provision of a secondary treatment will reduce microbe concentrations in the treated effluent, but the land application system provides additional treatment by relying on un-saturated soils to remove microbes primarily via soil media filtration. Given the proposed sub-surface irrigation method, the location relative to habitable dwellings and the relatively low microbiological content of the treated wastewater, no significant health risks are anticipated.

Furthermore the design is carried out in accordance with AS/NZS 1547:2012 utilising appropriate long term acceptance irrigation rates of 3.5mm/day associated with Soil Category 4 to minimise the risk of migration of any remaining pathogens to groundwater or to surface water



- Noise – The Cleanstream TXR-1 treatment plant should have no discernible noise when operated in accordance with the manufacturer's instructions. The system uses 2 pumps which are virtually silent and they operate intermittently
- Odour – Provided the Cleanstream TXR-1 treatment plant and PCDI land application system is operated in accordance with the manufacturer's instructions and recommendations contained in this report there should be no discernible odour. The system uses a natural bacterial process which digests household waste and odours may occur for different reasons such as:
 1. Higher than normal use of anti-bacterial products
 2. Householders on high medication
 3. Rapid changes to inflow volumes
 4. The system has not been in use for long periods (shock loading)
 5. Inefficient terminal venting
- Flooding – No flood susceptible areas are recorded at the site on either the WDC or NRC GIS systems
- Safety Measures – The Cleanstream TXR-1 treatment plant offers the following additional features:
 1. High level alarms for the recirculation and irrigation pumps
 2. A programmed maintenance contract will be entered into to ensure the ongoing successful operation of the system
 3. Early fault detection alarm system
 4. The 8,400 litre system capacity includes emergency storage of 3,500 litres in case of power or pump failure

Mitigation Measures

Specific mitigation measures are recommended for use of a secondary treatment system at the site and the following should be adhered to for the on-site management of wastewater:

- The system should be constructed by a registered drain layer familiar with the specific requirements of this type of system.
- A service agreement between the property owner and the supplier of the treatment plant is entered into to ensure effective ongoing operation and performance. A maintenance strategy and contract for the system shall be put into place, which will include programmed inspections and maintenance of both secondary treatment systems and application areas.
- The treatment plant shall be capable of producing secondary treated effluent (Cleanstream TXR-1 or similar).
- A reserve area of 30% is to be set aside for the future extension of the land application area in accordance with NRC RWSP for secondary treated effluent. The purpose of setting aside a reserve area for future extension of a land application system is to allow a factor of safety against unforeseen malfunction or failure, perhaps following increased household occupancy or inadvertent misuse of the

system. This ensures it is possible to provide additional pre-treatment or to extend the land application system if appropriate.

- The ground slope at the land application area is taken as $<5.7^\circ$. The design irrigation rate should be decreased to accommodate sloping ground in accordance with AS/NZS1547:2012. The design irrigation rate should be reduced by 20% for slopes in excess of 6° and 50% for slopes in excess of 12° , to ensure that effluent migration down slope is taken up adequately within the top soil and plant root system.
- The land application areas shall be mounded to shed rainwater and are to be planted with suitable high water use vegetation to aid in evapotranspiration. Surface vegetation shall be plants such as grasses and shrubs that tolerate wet conditions and have a high evapotranspiration capacity. Such planting should be selected on the basis of local experience.
- A maximum distance of 1.0m between the irrigation lines in clay soils to provide an effective even distribution of effluent over the whole of the design area and on sloping ground all irrigation lines shall be installed along the contour.
- The irrigation area shall have an adequate depth of natural good quality topsoil (or imported topsoil if necessary) to store the applied effluent and to support the growth of vegetation to maximise evapotranspiration. A minimum topsoil depth of 200 mm is required.

Maintenance Requirements

NRC provides the following recommended maintenance for on-site wastewater systems utilising secondary treatment plants and PCDI.

Treatment Plant

All treatment plants require regular service and maintenance checks by a suitably qualified person to ensure the system continues to work properly. The manufacturer or supplier of the treatment plant will have a service and maintenance contract that must be entered into when the system is installed. Sludge will accumulate in the various parts of the treatment plant and should be pumped out regularly in accordance with the recommendations of the manufacturer or supplier. How often a treatment plant needs to be desludged depends mainly on the number of people using it and the size of the tank.

Household cleaners, strong detergents and toxic chemicals can kill the 'good' bacteria within treatment plant systems and only suitable detergents and cleaners should be used with an on-site treatment system. The use of bleach-based products such as whiteners, nappy soakers and stain removers should be avoided. Harmful compounds such as acids, pesticides, medicines, paint, thinners, engine oil or other materials should not be put into the treatment system and should be disposed of properly at a local transfer station or landfill. Likewise grease or cooking oil should not enter the treatment system.

Planted disposal areas

This service and maintenance contract should also cover the PCDI disposal system. A well-maintained and operating treatment plant will help reduce the build-up of slime within the irrigation lines and drippers, thereby reducing the risk of the drippers becoming clogged.



If you have a planted irrigation line disposal area, then the plants should be well looked after to ensure that they do their job to maximum effect. Maintenance should include replanting and pruning of plants to promote healthy growth.

The disposal system should be protected by restricting access areas of land that have been specially planted as part of the disposal system. Vehicle and stock access should not be allowed and deep rooting trees should not be planted over the disposal system.

Surface water cut-off drains

If your disposal system is located on a slope, a surface water cut-off drain will usually be installed above the effluent disposal system to prevent stormwater runoff from the slope entering the disposal area. All surface water cut-off drains need to be maintained to make sure they work properly. This may include removing excess grass or plant growth from the drains and making sure there are no other obstructions to prevent the free flow of water.

Prior to winter, it is a good idea to give all surface water cut-off drains a quick visual check and to carry out any required maintenance as soon as possible. If a surface water cut-off drain is not working properly, the excess stormwater entering the disposal area will cause failure of the disposal system and result in effluent flowing down the slope.

If there are any queries regarding the content of this letter, please do not hesitate to contact the undersigned.

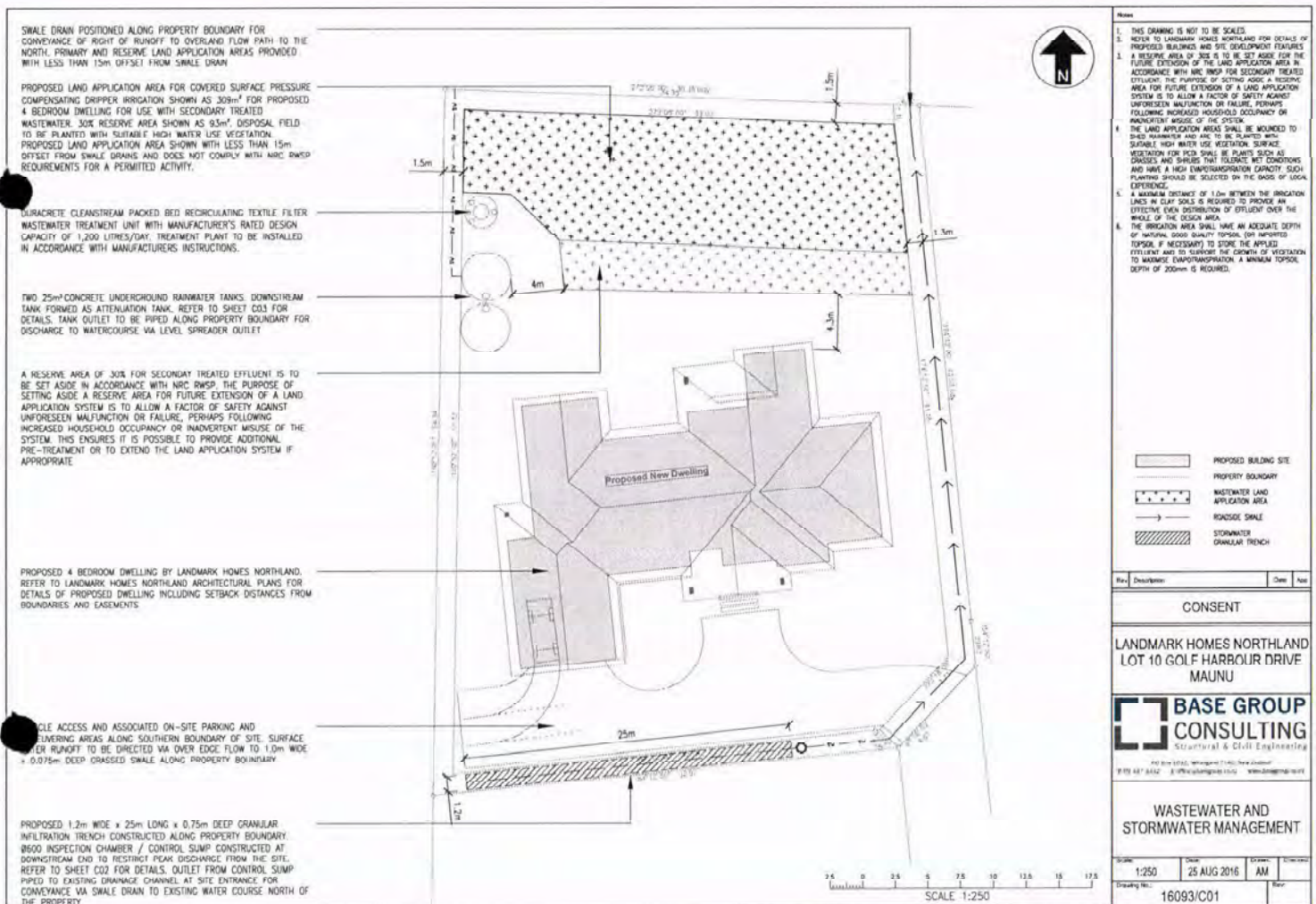
A S MacPherson

Chartered Professional Engineer

BE Civil (Hons), CPEng, MIPENZ, IntPE(NZ)

On-site Wastewater Management

RECEIVED
CUSTOMER SERVICES
26 OCT 2016
WHANGAREI
DISTRICT COUNCIL



APPROVED 2016
BC NUMBER | DAY | MTH
01309 0712
WHANGAREI DISTRICT COUNCIL
BCA

On-site Wastewater Management in accordance with AS/NZS1547:2012 - Individual Lot Assessment

Project Reference		16093		Assessed by		ASM	
Client		Landmark Homes Northland		Date Assessed		25/08/2016	
Site Location		Lot 10 Golf Harbour Drive					
Site and soil evaluation							
Desktop	Legal description	Proposed Lot 10 LT 498433		Indicative permeability	Well/moderately well drained		
	Lot size	2,004m ²		Flood Susceptible	No		
	Soil map	Maunu silt loam		Annual rainfall	1600mm		
Site investigations	Ground slope	<5.7		Land instabilities	None		
	Ground shape	Linear		Boulders/Rock outcrops	Yes		
	Ground shape	Planar		Vegetation	Grassed pasture		
	Aspect	N		Watercourse	Yes		
	Exposure	Exposed		Concentrated runoff	None		
	Shelterbelts	No		Soil surface	Soft and wet underfoot		
	Topo features	Gently graded		Season	Winter		
	Wind direction	E		Buildings	None		
				Services	None observed		
Soil Assessment	Colour	Reddy brown		Permanent water table	Not encountered		
	Texture	Clay loams		Surface condition	Stiff, moist		
	Coarse Fragments	None		Existing/Past land use	Orchard		
	Structure	Moderately structured		Other			
Land Application systems							
Design parameters	Water source	Roof runoff		No. of bedrooms	4		
	Daily use / person	180 litres / person / day		Design occupancy	6		
	Soil category	4		Design daily flow	1.08 m ³ <3m ³ OK		
Design system	Level of treatment	Secondary		Area required	309 m ²		
	DLR/DIR	3.5 mm/day		Width	15.45		
	System type	Irrigation		Length	20		
	Design LTAR	3.5 mm/day		No. required	1.0		
Clearance	Boundaries	>1.5m		Clearance to surface water	<15m horizontally		
	Groundwater	>1.2m		Clearance to bores	>20m horizontally		
	Buildings	>3m		Cut off drains required	No		
	Reserve area	>30% 93 m ²		Surface water interceptor	No		

Determination of Soil Category		
Gravels and sands	Very little to no coherence; cannot be moulded; single grains stick to fingers	Rapidly drained
Sandy Loams	Forms a cast but will not roll into a coherent ball; individual sand grains can be seen and felt; gives a ribbon 15-25 mm long	Well drained
Loams	As for sandy loams but cast feels spongy, with no obvious sandiness or silkiness; may feel greasy if much organic matter is present; forms a thick ribbon about 25 mm long	Moderately well drained
Clay Loams	Can be rolled into a ball with a rather spongy feel; slightly plastic; smooth to manipulate; will form a ribbon 40-50 mm long	Imperfectly drained
Light Clays	Smooth plastic ball that can be rolled into a rod; slight resistance to shearing between thumb and forefinger; forms a ribbon 50-75 mm long	Poorly drained
Medium to Heavy Clays	Smooth plastic ball that handles like stiff plasticine; can be moulded into rods without fracture; firm resistance to ribboning; forms a ribbon 75 mm or more in length	Very poorly drained

Determination of Soil Structure	
Massive	Coherent, with any partings both vertically and horizontally spaced at greater than 100 mm. Pieces do not break along planes of weakness but break according to stress loads
Weak	Peds indistinct and barely observable on pit face. When disturbed approx. 30 % consist of peds smaller than 100 mm
Moderate	Peds well formed and evident when disturbed but not distinct in undisturbed soil. When disturbed 30 % - 60 % consists of peds smaller than 100 mm
Strong	Peds quite distinct in undisturbed soil. When disturbed > 60 % consists of peds smaller than 100 mm

On-site Effluent Treatment National Testing Programme (OSET NTP)

PERFORMANCE CERTIFICATE

CleanStream TXR-1 On-site Domestic Wastewater Treatment System,
OSET NTP Trial 9, 2013/2014

System Tested

The CleanStream TXR-1 system is a packed bed recirculating textile filter wastewater treatment unit. The manufacturer's rated design capacity is 1,200 litres/day. Total liquid volume is 7,400 litres (primary treatment 2 tanks each with an effluent filter 3,700 and 1,200 litres; secondary treatment with packed bed 900 litres; recirculation tank 1,100 litres; pump chamber 700 litres). Emergency storage is 1,500 litres. No tertiary treatment (such as UV disinfection) is incorporated. The manufacturer's stated service frequency is annual.

Test Flow Rate

The CleanStream TXR-1 system was tested at 1,000 litres/day (equivalent to servicing a 3-bedroom 5 to 6 person household) over an 8 month (35 week) period November 2013 to July 2014 followed by a 1 month (4 week) high load effects test involving 5 days at 2,000 litres per day then 1,000 litres/day over the following 3 weeks.

Testing and Evaluation Procedures

A total of 37 treated effluent samples of organic matter (BOD₅) and suspended solids (TSS) at generally six day intervals during weeks 9 to 35 were tested and evaluated against the secondary effluent quality requirements of the joint Australia/NZ standard AS/NZS 1547:2012.

A total of 16 treated effluent samples of organic matter (BOD₅), total suspended solids (TSS), total nitrogen (TN), ammonia nitrogen (NH₄-N), total phosphorus (TP) and faecal coliforms (FC) at generally six day intervals during weeks 23 through 35 were tested and the results benchmarked and rated on their median values. In addition, the energy used by the treatment system was assessed on the mean of consumption levels over the benchmark period.

AS/NZS 1547:2012 Secondary Effluent Quality Requirements

These requirements are that 90% of all test samples must achieve a BOD₅ of $\leq 20 \text{ g/m}^3$ and TSS of $\leq 30 \text{ g/m}^3$ with no one result for BOD₅ being $>30 \text{ g/m}^3$ and no one result for TSS being $>45 \text{ g/m}^3$. The CleanStream TXR-1 system achieved a performance level of 100% for BOD₅ and 100% for TSS based on the full set of 37 test results in weeks 9 to 35, with no results exceeding the maximums. The CleanStream TXR-1 system thus meets the secondary effluent quality requirements of AS/NZS 1547:2012.

Benchmark Ratings

The CleanStream TXR-1 system achieved the following effluent quality ratings for the sixteen benchmarking results in weeks 20 to 35.

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	A	B	C	D
BOD (mg/L)	2	1	A+	<5	<10	<20	<30	≥30
TSS (mg/L)	3	1	A+	<5	<10	<20	<30	≥30
Total Nitrogen (mg/L)	37.1	5	D	<5	<15	<25	<30	≥30
NH ₄ - Nitrogen (mg/L)	1.9	4	A	<1	<5	<10	<20	≥20
Total phosphorus (mg/L)	4.4	0.5	B	<1	<2	<5	<7	≥7
Faecal Coliforms (cfu/100mL)	65,000	100,000	C	<10	<200	<10,000	<100,000	≥100,000
Energy (kWh/d) (mean)	0.98	0.12	A	0	<1	<2	<5	≥5

This Performance Certificate is specific to the CleanStream TXR-1 model as specified above when operated at a flow rate of 1,000 litres/day, and is valid for 5 years from the date below. For the full OSET NTP report on the performance of the CleanStream TXR-1 system contact Duracrete Products Ltd, Kamo, Whangarei, Ph: 0800 387 227 Email: ric@duracrete.co.nz.

Authorised By:

Ray Hedgland, Technical Manager, OSET NTP
20 February 2015

TECHNICAL INFORMATION – CLEANSTREAM TXR-1

The Cleanstream TXR-1 is a complete, one tank textile media treatment system. Its multi-chambered design consists of 2 septic stages, a textile filter stage and irrigation and recirculation stages.

- 8400 litre total capacity
- Emergency storage (without cross contamination - 3500 litres)
- Alarm system (to notify the homeowner of any faults)
- Comprehensive maintenance, 24 hour service



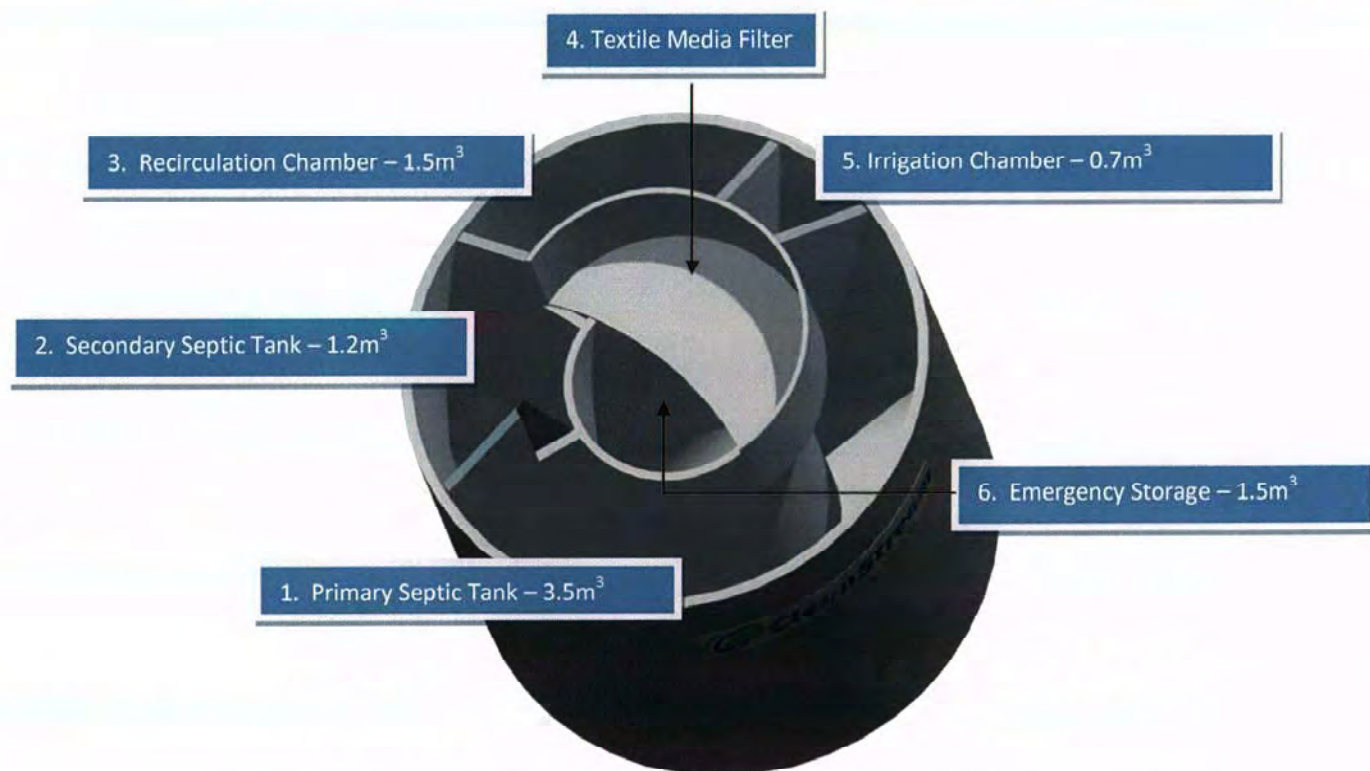
- The TXR-1 tank, roof and walls are constructed from galvanised steel reinforced concrete (70MPa at 28 days) and come with a manufacturer's warranty of 10 years. The mechanical components of the system also come with a 2 year warranty.
- The textile filter and recirculation stages are designed so that effluent is filtered multiple times through the textile media leading to much higher effluent quality than conventional aerobic systems.
- Separate septic stages mean there is always a working septic tank even after periods of non use, this allows the system to stay in a relatively active state.
- The system comes fully constructed, making installation a plug and play operation which provides for a faster turnaround while minimizing installation problems.
- Large emergency storage reduces problems during pump or power failure. The system has approximately 2.5 days of emergency capacity without cross contamination (based on typical flow through 1200L/day)

TREATMENT PERFORMANCE

12 monthly servicing is required to maintain efficient and effective treatment of household waste. This service must be performed by suitably trained personnel.

Expected treatment for medium size homes with daily flows up to 1500L is BOD5 10 mg/L, TSS 10 mg/L. However the system can treat up to 2000L per day whilst still complying with ARC TP58 effluent quality of BOD <15mg and TSS <15 mg/L for Advanced Secondary Treatment Systems – Packed Bed Reactors. Provision for 6 monthly service is required to achieve these larger daily flows.

TREATMENT OVERVIEW

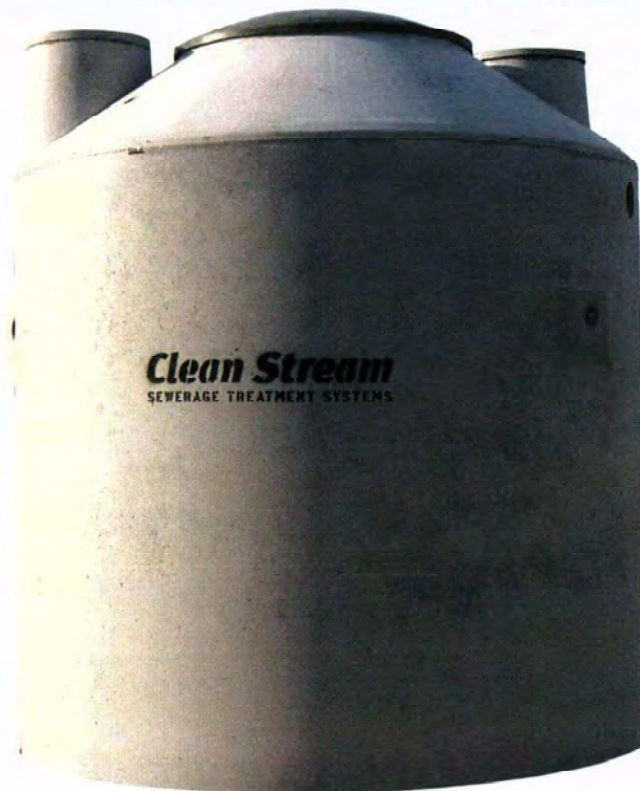


1. The primary septic tank receives the wastewater. It acts like a conventional septic tank and reduces BOD and suspended solids. Effluent then passes through a particulates filter designed to stop large objects from inhibiting the treatment process further on.
2. The secondary septic provides an anoxic environment which aids in nitrate removal converting ammonia into nitrate, while reducing BOD and suspended solids. At the completion of this stage effluent passes through an attached growth filter, which provides an environment for denitrifying bacteria to flourish.
3. The Recirculation Chamber contains a large amount of emergency capacity and is a storage place for effluent before it passes through the textile filter.
4. From the Recirculation chamber treated wastewater is pumped onto the textile filter, this effectively aerates the effluent. Organic Nitrogen is converted to Ammonia by nitrifying bacteria. This process increases effluent quality as it passes through the textile media in the textile filter. The effluent then flows back into the secondary septic tank, unless there is sufficient forward flow to warrant irrigation in which case it drains into the irrigation chamber. Recirculation generally happens multiple times before irrigation is needed.
5. From the irrigation chamber the effluent is passed through a 130 micron Arkal Filter and then dispersed through self compensating drip irrigation.
6. In the event of pump failure emergency storage is provided in the central and recirculation chambers.



USER INFORMATION AND MAINTENANCE

CLEANSTREAM TXR-BIOFILTRATION TEXTILE SYSTEM



Service Provider

--

USER INFORMATION AND MAINTENANCE

System No: _____

Installed on: ____ / ____ / ____

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DESIGN

VOLUME

The **CleanStream TXR-Bio-Filtration Textile System** has been designed and tested to work on an average of 1,200 litres per day of wastewater. This averages out at six people contributing 200 litres per person per day. This loading is spread over the day. The timing processors can be changed to increase the treatment volume but a reduction in treatment quality may occur.

LID

The system has concrete and polyethylene lids that are used for easy access into the system. **These lids are not designed to be jumped on or driven over.** They are slightly above the finished ground level to stop water intrusion.

ELECTRICAL COVER

The rectangular plastic box houses all the electrical controls. This base is 100 mm above finished ground level. Please make sure you do not build the soil up around this box because this could allow flooding to occur and this will damage the electrical controls. It must not be jumped on. If it is broken or holed, please call the Service Provider who will need to replace it.

SYSTEM CONTROLLER V1.1

The CleanStream TXR-Bio-Filtration Textile system controller manages the way the system operates.

Unique Features

The controller is pre-programmed for three (3) separate modes

The mode will be factory set at Mode 'O' (1,200 litres/day)

The design of your system may require a different mode appropriate to the loadings for your specific application.

Each mode has advantages and disadvantages dependent on the situation.

Service Providers are trained to determine which Mode should be applied.

Owners should check with the Service Provider prior to changing setting mode.

ALARM

ALARM TYPES

The system is installed with high level alarms for the recirculation and irrigation pumps.

ALARM NOTIFICATION

If the alarm does activate, press the mute button on the alarm panel to silence the buzzer. This will silence the Alarm for 24 hours. The Alert light will stay on. **Please note which Alert light is on.** Advising the Service Provider of this will enable them to diagnose the fault and be more efficient in rectifying it.

If it's Alert 1 that is on it may indicate an overuse issue. The system will automatically move to a higher use mode in an effort to clear the water that has caused the alert. If the system can clear the water causing Alert 1 it will automatically return to the mode it was set in by the installer.

WHO TO CALL

Call the Service Provider as soon as possible - but at least within 24 hours.

WHAT TO DO

Until repairs are made, limit the amount of wastewater going to the system.

MAINTENANCE

TYPES OF FILTERS

The system is fitted with two filters inside the tanks and one on the irrigation pump line. Normally the internal system filter should not need cleaning between service calls. This however is dependent on the volume of solids deposited in the tank. On the pump line is an Arkal filter with 130 micron discs. This is to protect the irrigation field.

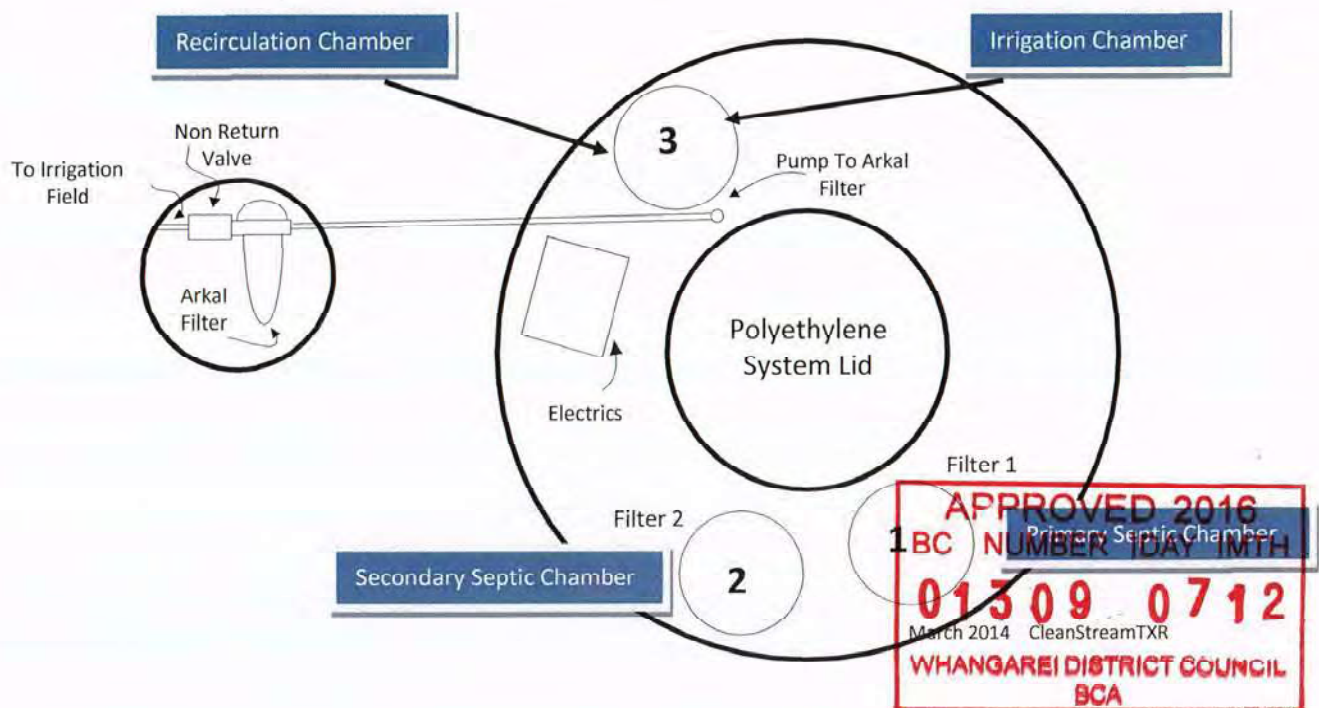
CLEANING FILTERS

Discuss the frequency of cleaning filters in your system with your Service Provider. The frequency will differ for individual households.

INTERNAL SYSTEM FILTERS

These filters should only be cleaned if effluent is backing up in the system. We recommend that even if the filters are flowing freely that a six monthly inspection should be completed. Discuss this with your Service Provider.

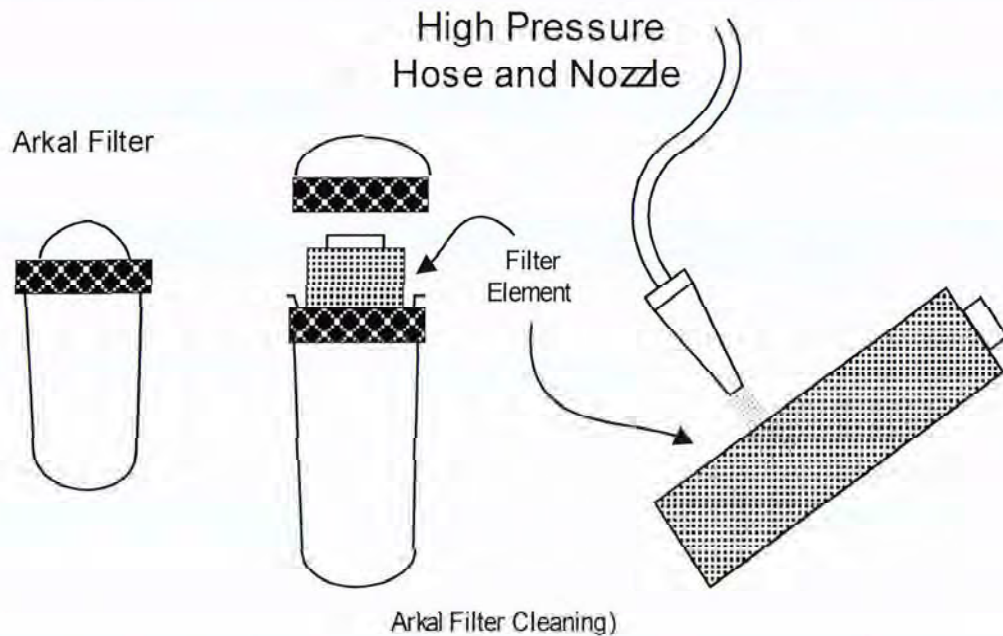
Cleaning of internal filters should be carried out by the **Service Provider** as there are Health risks involved in the process.



ARKAL FILTER

The Arkal filter protects the irrigation line.

The Arkal filter cleans with a spinning action using a high pressure nozzle on a household hose.



To clean the arkal filter, **the owner** needs to follow these basic steps:

- i) Turn the power off to the system. This stops the pump operating when the filter is open.
- ii) Disassemble the filter by first loosening the locking ring with the plastic wrench provided.
- iii) Remove the bottom portion of the plastic housing exposing the spine on which the discs are stacked. With the cover removed the discs will automatically come free so you can either hose the discs in place by aiming a hose with clean water under pressure at the discs causing these to "spin". This action cleans the discs. The spine is removable, so the discs may be removed if it is more convenient to clean the discs elsewhere.
- iv) Install the spine (if removed).
- v) Replace the cover and locking ring.
- vi) Tighten ring.
- vii) Turn power back on.

Protective clothing and gloves should be worn at all times during these cleanings.

MAINTENANCE SERVICING

The **Service Provider** will arrange an annual service for the system. It is important the system is serviced regularly to ensure efficient performance. After each service you will be given a copy of the service report.

DESLUDGING

SLUDGE

Desludging is dependent on loadings. For example, the use of garbage disposal units will increase the load and may necessitate more frequent desludging.

The Service Provider will advise you if it is necessary to desludge. Any desludging required is at the owner's expense.

Typically desludging is required every 3-5 years.

NOISE

PUMPS

The system uses 2 pumps. These pumps are virtually silent and they operate intermittently. If you hear any unusual noise, please call your Service Provider.

ODOURS

VENTING

The CleanStream TXR system uses a natural bacterial process which digests household waste, similar to a large municipal wastewater plant.

During this process, odours may occur for different reasons such as:

1. Higher than normal use of anti-bacterial products
2. Householders on high medication
3. Rapid changes to inflow volumes
4. The system has not been in use for long periods
5. Inefficient terminal venting

In the unlikely event of odours occurring, discuss any issues with your Service Provider.

SHOCK LOADING

If you go away for a period of time the system gets shock loaded on your return. This occurs because the bacteria population needs to build up to cope with the increased loadings. This can result in some temporary odours. Likewise if the loading is increased significantly for a short period, such things as large numbers of visitors, the bacteria population increases. Bacteria balance themselves with their food source. This can result in some temporary odours. In a Textile system these odours are rare but are not impossible.

BACTERIA

Please treat the system as a living entity with lots of different bacteria working for you. Use anti-bacterial products sparingly.

IMPORTANT DAILY USE ISSUES

DO NOT

- ☒ Drive over it.
- ☒ Use substances that will kill the bacteria. Such things as strong detergent, disinfectant, bleach or chlorine based products such as Napisan in moderation only.
- ☒ Flush sanitary pads, nappies or condoms into the system. Flushing tampons or their packaging into the system should also be avoided because they may cause blockages.
- ☒ Damage the irrigation line in any way.
- ☒ Use garbage disposal units on any septic tank system. The added loading will require more frequent desludging.
- ☒ Never turn off the power to the system.

SOME DOS'

- ☒ Call the service technician within 24 hours if the alarm is activated.
- ☒ Reduce the amount of waste water entering the system if an alarm is activated.
- ☒ Call the service technician if the irrigation line or any other part of the system is damaged in any way.
- ☒ Maintain and prevent intrusion of insects, plants and tree roots into the system.
- ☒ Use the Biowashball instead of conventional household detergents as it is friendly to the bacteria within the sewage system and allows efficient treatment of the effluent – available from www.duracrete.co.nz

WARRANTY

All effluent treatment systems produced by Duracrete have been inspected before leaving the factory.

The standard pumps used with the system have a two (2) year manufacturer's warranty.

All other electrical componentry have manufacturers' warranties of one (1) year.

The concrete tanks are guaranteed by the manufacturer for a period of ten (10) years from the time they leave the factory. During this period any defect which is attributed to the manufacturer will be repaired or replaced free of charge at Duracrete's option.

This guarantee does not cover damage caused by the following;

- misuse of the tank
- concrete erosion due to inadequate or restrictive venting
- neglect
- failure to keep the unit clean and functional
- accidental damage
- vandalism
- use of incorrect power supply
- fluctuations in the power supply
- earthquakes, fire, flood, storm, lightening, land slip or other acts of nature
- persons unauthorised by Duracrete interfering with the system in any way
- customer/owner/occupier failure to advise of any warning or other malfunction within 24 hours of the malfunction occurring
- Intrusion by plants or insects

Please note - the system is not designed to be driven over by vehicles.

COMMISSIONING

WHANGAREI
DISTRICT COUNCIL

WHEN TO USE

The **CleanStream TXR-Bio-Filtration Textile System** should not be used in any way until the system has been commissioned. This includes contractors during the construction of the house and owners wishing to take up residency.

Thank you for buying a **CleanStream TXR-Bio-Filtration Textile System**. Please contact your Service Provider if you have any questions.

APPROVED 2016
BC NUMBER IDAY IMTH
01309 0712
March 2014 CleanStreamTXR
WHANGAREI DISTRICT COUNCIL
BCA

Consent No.:

Discharge Treated Sewage Effluent - AEE7

WHANGAREI
DISTRICT COUNCIL

Part B Assessment of Environmental Effects -

Discharge Treated Sewage Effluent to Land

**NORTHLAND
REGIONAL
COUNCIL**

Putting Northland first

Whāngārei Office	Phone:	(09) 470 1200
	Fax:	(09) 470 1202
Kaitiāia Office	Phone:	(09) 408 6600
Ōpua Office	Phone:	(09) 402 7516
Dargaville Office	Phone:	(09) 439 3300
Free Phone		0800 002 004
Email		mailroom@nrc.govt.nz
Website		www.nrc.govt.nz

This application is made under Section 88/Section 127 of the
Resource Management Act 1991

To: Consents Department
Northland Regional Council
Private Bag 9021
Whāngārei Mail Centre
Whāngārei 0148

PART B - ASSESSMENT OF ENVIRONMENTAL EFFECTS

Your application must include an Assessment of Effects on the Environment. This form is a guide to help you prepare one.

An assessment of effects is required so that you and others can understand what happens to the environment when you discharge domestic wastewater ("treated sewage effluent") to land. This will help you to propose ways to minimise those effects to the Regional Council's satisfaction.

The degree of detail required is in proportion to the scale of the environmental effects of your proposal. If you are required to apply for a Consent to discharge sewage effluent into or onto land, then you will most probably need a qualified engineer (or similar) to design your on-site system. The information requested below is the minimum detail that your engineer must supply.

Please note that the word "environment" includes the surrounding waterways and groundwater, surrounding coastal water, adjoining land, any surrounding resource users, and local iwi.

It is advised that you make an appointment with an appropriate Council Officer to discuss your application prior to lodging it. This will help you to supply all the required information at the onset and ensure the efficient processing of your application.

A. Description of the Proposed Activity

A.1 What is the intended water supply?

- ☒ Rainwater collection
- ☐ Community or bore water supply
- ☐ Other (please specify): _____

Discharge Treated Sewage Effluent - AEE 7

A.2 What is the source of the wastewater? (please tick the appropriate box and answer those questions)



Domestic House

How many bedrooms are there in the house?

4

Will the house be permanently occupied?



Yes



No



Small Motel/Campground/Hostel/Marae/Sports Club

What is the maximum number of occupants that your facility can accommodate?

How frequently does this maximum occupancy occur and for what length of time?

What is the typical number of occupants during the other periods of the year?



Shared On-site Systems/Subdivisions

How many individual lots are/will the treatment and disposal system be servicing?

What will be the average number of bedrooms per house?

What is the area of the lot on which the discharge will occur?

m²



Other

Provide details of the source of effluent, the number of persons contributing to the wastewater and the source of water supply for the facility.

A.3 What is the likely maximum daily volume of wastewater to be discharged?

1080

litres

The Wastewater Treatment System

A.4 What is your Proposed Wastewater Treatment System?

(please tick appropriate box and answer the associated questions)



Septic Tank

What is the capacity of the tank?

litres

Will an effluent filter be fitted on the outlet?



Yes



No



Aerated Wastewater Treatment System (AWTS)

What brand is the AWTS?

CLEANSTREAM

Will a programmed maintenance contract be entered into with the treatment systems manufacturer or agent?



Yes



No



Other, what level of treatment do you consider the wastewater receives through your "other" treatment system?



Primary



Secondary

Describe the proposed "other" treatment system

Discharge Treated Sewage Effluent - AEE 7

The Wastewater Disposal System

A.5 What is your proposed disposal system? (please tick the appropriate box and answer the associated questions)

☐ Soakage Trench/Bed System

What are the dimensions of the proposed soakage trenches/beds?

Width _____ m

Depth _____ m

What is the total length of all the soakage trenches/beds? _____ m

How will the soakage trench/bed system be loaded?

☐

Trickle

☐

Pump

☐

Dose loaded via a syphon

Has a 100% reserve area of undeveloped land been allowed for in the disposal system design?

☐

Yes

☐

No, what percentage has been allowed for and why?

What is the proposed loading rate to the trenches/beds? _____ mm/day



Irrigation Lines

What area will the irrigation lines cover? 309 m²

What is the distance between adjacent irrigation lines? max 1.0 m

What is the distance between adjacent drip emitters along the irrigation line? max 0.6 m

What brand is the irrigation line? NETAFIM

What is the proposed aerial loading rate to the disposal area? 3.5 mm/day

Has a 30% reserve area of undeveloped land been allowed for in the disposal system design?

☒

Yes

☐

No, what percentage has been allowed for and why?



Other (please describe)

Discharge Treated Sewage Effluent - AEE 7

- A.6** What is the intended ground cover within the disposal area after the disposal system is operational?
(ie. what plant species do you intend to plant, if any)

AS PER NPC GUIDELINES OF SUITABLE PLANTS FOR
EFFLUENT DISPOSAL

B. Site Details

- B.1** You **must** attach a map that shows the following:

- ☒ The location of your lot in relation to the nearest town.
- ☒ The legal property boundaries of your lot and the distance of your disposal system (including reserve area) from those boundaries.
- ☒ The layout of your disposal system (including reserve area) within your lot boundaries.
- ☒ The location of any groundwater bores within 20 metres of your disposal system (including reserve area).
- ☒ The location of any surface water (ie. streams, roadside drains, lakes and rivers) within 20 metres of your disposal system (including reserve area).

- B.2** What is the map reference of the proposed disposal system? (if known)

NZMS 260 Series map number:

Easting _____ (seven digit number)

Northing _____ (seven digit number)

- B.3** Which District Council is the property administered under?

☐ Kaipara ☐ Far North ☒ Whangarei

- B.4** What is the slope of the proposed disposal area?

- ☒ Flat
- ☐ Slightly sloping (5°-15°)
- ☐ Steep (>15°)

- B.5** Are any drainage controls required?

- ☐ Yes, describe _____

- ☒ No, state why not _____
FLAT TOPOGRAPHY WITH MINIMAL UPSLOPE
CATCHMENT

Discharge Treated Sewage Effluent - AEE 7



B.6 Was a soakage test (percolation test) performed at the location of the proposed disposal system?
(please tick the appropriate box and answer those questions)

☐ Yes

What was the date of the test?

What were the weather conditions prior to the soakage test?

What is the average soakage rate of the disposal area? (please ensure the individual soakage test results are included with this application) _____ mm/hr

Are the locations of the soakage tests marked on the map that shows the layout of the disposal system?

☐ Yes

☐ No, state why not

☒ No, what are the reasons for not performing a soakage test?

NOT REQUIRED BY A/NZS1547. ASSESSMENT
BASED ON SOIL CHARACTERISTICS FROM
SUBSURFACE INVESTIGATIONS

B.7 Was any groundwater encountered during the site investigation?

☒ No

☐ Yes, at what depth? _____ m

B.8 What is the estimated winter groundwater level for the disposal area? > 3m m

How was this winter groundwater level determined? _____

UNDERLYING SUBDIVISION REPORT

B.9 Has a detailed soil profile been included with this application form?

☒ Yes

☐ No, state why not _____

B.10 What is the estimated soil category of the disposal area?

- ☐ 1: Gravel and sands, Rapidly draining
- ☐ 2: Sandy loams, Well drained
- ☐ 3: Loams, Moderately well drained
- ☒ 4: Clay loams, Imperfectly drained
- ☐ 5: Light clays, Poorly drained
- ☐ 6: Medium to heavy clays, Very poorly drained

Discharge Treated Sewage Effluent - AEE 7

Please state the criteria used for selecting the above soil category?

HAND AUGER BOREHOLES, GEOLOGICAL MAP AND
UNDERLYING SUBDIVISION GEOTECH REPORT

C. Assessment of Effects on the Environment

An assessment of effects should be proportional to the scale and significance of the proposed activity. Where your discharge could have an adverse effect on the environment, a detailed environmental assessment is required.

C.1 Affected Parties

Note: If you are proposing to dispose of your wastewater using a deep soakage system the determination of affected parties can be more complex, especially with relation to groundwater users. It is recommended that you contact the Regional Council to help determine who the affected parties from your proposal may be.

Are there any groundwater bores within 20 metres of any part of the disposal system (including reserve area) that are not owned by the applicant?

☐

Yes

☒

No

If you have answered **Yes** then you will need to gain the written approvals of all the owners of neighbouring groundwater bores identified by the above question.

If written approvals cannot be obtained from all affected parties, describe what effect your discharge may have on the neighbouring groundwater bore and the steps you propose to take to minimise (ie. mitigate) these effects (*attach a separate sheet if necessary*)

C.2 Given the estimated winter groundwater level (see Question B8) and your proposed treatment and disposal system, what is the risk of groundwater contamination occurring and why?

REFER ATTACHED AEE BY BASE GROUP CONSULTING

Discharge Treated Sewage Effluent - AEE 7

C.3 What is the smallest horizontal separation distance between the disposal system (including reserve area) and any nearby watercourse, including roadside water table drains? 1-3 m

C.4 Given the smallest horizontal separation distance to the nearest surface watercourse and your proposed treatment and disposal system (including reserve area), what is the risk of surface water contamination occurring and why?

REFER ATTACHED AEE BY BASE GROUP CONSULTING

C.5 Consultation

Have you consulted with any of the following potentially affected parties:

	Yes	No
Neighbours	☐	☒
Department of Conservation (if relevant)	☐	☒
Fish & Game Council (if relevant)	☐	☒
District Council (if relevant)	☐	☒
Local iwi (specify): _____	☐	☒
Other (specify): _____	☐	☐

Please ensure all of the relevant questions on this form have been answered fully.

If you have any queries relating to information requirements or wish to meet with a Council Consents Officer, please contact the Northland Regional Council.

Northland Regional Council Offices:

Whāngārei Office
36 Water Street
Whāngārei 0110
Phone: (09) 470 1200
or 0800 002 004
Fax: (09) 470 1202
mailroom@nrc.govt.nz
www.nrc.govt.nz

Dargaville Office
61B Victoria Street
Dargaville 0310
Phone: (09) 439 3300

Kaitiāia Office
192 Commerce Street
Kaitiāia 0410
Phone: (09) 408 6600

Ōpua Office
Unit 10
Industrial Marine Park
Ōpua 0200
Phone: (09) 402 7516

16093

25 August, 2016

Clint Dyke
Landmark Homes Northland
PO Box 4128
Kamo



Your Ref: **Lot 10, Golf Harbour Drive, Maunu – geotechnical assessment**

Dear Sir,

As requested Base Group Consulting have completed geotechnical investigations required for construction of a new residential dwelling located at Lot 10, Golf Harbour Drive, Maunu. The subdivision report prepared by Base Group Consulting (ref 14037 Rev 1 dated 28 September 2015) describes the geotechnical conditions within the site which are considered to be consistent with the findings of this assessment.

This report details the geotechnical assessment of engineering matters relevant to the residential development of the property and is intended to support Building Consent application to Whangarei District Council (WDC). This report considers the following engineering aspects of the scheme:

- The existing stability of the site
- The effect of the proposed development on stability of the site
- Geotechnical suitability for foundations

Proposed Development

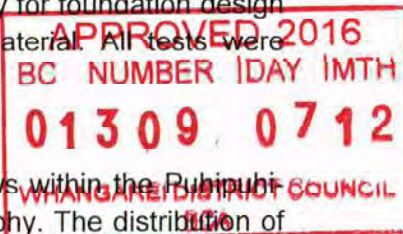
It is understood that a one storey timber framed house on a concrete slab foundation is to be built on the 2,004m² site in the recently developed subdivision. The proposed house is sized 375m² with a concrete drive and parking area of 345m². The house and associated vehicle access is positioned in the south of the lot and is accessed via a vehicle crossing from the adjacent right of way in the south eastern corner.

The land has gentle to moderately graded topography that falls to the north towards and overland flow path along the northern boundary. The proposed development looks to undertake minor earthworks on the property to create a level building platform and it is expected that up to 2m of filling will be required at the northern end of the platform.

A hand auger borehole and four scala penetrometer tests were undertaken within the proposed building footprint to determine the available bearing capacity for foundation design and suitability of the existing ground to received compacted fill material. All tests were carried out from existing ground level.

Geology

The geomorphology of the general area is that of eroded basalt flows within the Rūhupiri Whangarei Volcanic field which usually pre-date the present topography. The distribution of volcanoes near Whangarei is partly related to the local fault pattern and has



formed the young and well preserved volcanic features of shield volcanoes built up from thin lava flow sequences, steep sided scoria cones and thick lava flows. Areas of basalt lava flows are expected to remain relatively stable unless underlain by soft rocks.

Geotechnical investigations carried out at the site indicate that the surficial soil profile is consistent with the geological description. Land underlain by basalt lava flows of the Kerikeri Volcanics can be steep and are generally considered to be stable unless underlain by soft rocks. It is anticipated that at this location the thickness of the underlying Kerikeri volcanic lithology could be in the order of 20m. Water erosion and saturation of the weathered friable residual soils creating oversteepened faces has the potential to create shallow shear surfaces and slippage planes on the steeper slopes.

Permanent groundwater was not encountered at the site, but moisture content was seen to be slightly increasing with depth. Given the nature of the proposed residential development and surrounding land, groundwater is unlikely to present significant difficulties when developing the site.

No evidence of recent instability was observed at the site and given the gentle to moderately graded topography the nominated building platform is considered to have a sufficient margin of stability to facilitate residential development of the site.

Scala Penetrometer

Results of scala penetrometer testing at the site indicates intermittent layers of hard gravels/cobbles and weaker silty clays. Some surface rocks are visible on the site.

The scala penetrometer tests appended to this letter do not meet the NZBC B1 threshold criteria for soils to be acceptable as good ground for building foundations. At normal foundation depth of 0.45m below existing ground level an inferred dependable bearing capacity in excess of 135kPa is expected to be available. This is an ultimate bearing capacity of 300kPa in conjunction with a strength reduction factor of 0.45.

The allowable bearing pressures established by the scala penetrometer testing are based on the methods described by Stockwell (New Zealand Engineering (32, 6) 15 June 1977) using a correlation of mm/blow and bearing pressure. This approach is intended to ensure against slow plastic movements of underlying soft strata and rapid local soil shear failure of the soil beneath the foundations. The inferred allowable bearing pressure includes a factor of safety of three against soil shear failure. If these allowable pressures are used, settlement should generally be within the following limits:

- i. maximum settlement of any one of a group of footings = 25 mm
- ii. maximum differential settlement between footings = 20 mm

These deflections are regarded as the acceptable limits a modern building can withstand without distress.

The assessed available bearing capacity does not consider gradual settlement of the foundation caused by consolidation (expulsion of air and water from the soil matrix voids) of underlying compressible strata such as peat or soft clay. Based on the findings of the subsurface investigations peat or soft clay is unlikely to be present beneath the nominated building platforms and consolidation settlement is not expected to affect the foundations.

Earthworks

Minor earthworks at the site are required to create a level building platform which will occupy the southern half of the site to accommodate the proposed house and associated vehicle access arrangements. It is the general intention to minimize the amount of land disturbance activities as a result of the development however additional excavation and filling will be required.

Where required the cut batters should be constructed no steeper than 1V:3H and consideration should be given to retaining cut batters in excess of 1.0m high.

Where the ground level is to be raised to achieve the required subgrade level, the fill material should comprise compacted hard fill (GAP65 or similar). To achieve the required floor levels and external vehicle access arrangements it is expected that fill material up to 2.0m depth will be required at the front of the platform.

All unsuitable material (e.g. peat, soft compressible soils, organics) is to be removed from the earthworks footprint and the natural ground benched to receive the placed and compacted fill material. Appropriate soil testing and engineering supervision is to be carried out during the construction of all earthworks and relevant NRC RWSP and WDC EES requirements are to be adhered to. All earthworks should be carried out in accordance with NZS4431:1989A1 Code Of Practice For Earth Fill For Residential Development. Fill quality control testing and certification should be carried out during construction by a Chartered Professional Engineer.

Silty clays found at the site are stability sensitive and prone to erosion if subjected to concentrated water flow, reinforcing the need for effective surface water management in securing the long term stability of the building platform. Care must be taken to ensure that all exposed bare earth is adequately protected from erosion and scour during earthworks operations. Likewise to ensure the integrity of exposed cut and fill batters consideration should be given to surface stabilisation measures such as mulching, grassing, and erosion control blankets. In the long term exposed earth areas should be regrassed and revegetated.

Expansive Soils

The surficial clay soils at the site are considered to be expansive and subject to shrink/swell effects with changes in moisture. It is recommended that the subgrade within the building footprint be maintained close to its natural moisture content to avoid drying out and associated shrinkage, which may result in subgrade swelling after building construction. Subgrade swelling can have adverse effects including heaving and cracking of the floor slab plus associated cracking of the brittle cladding from differential movement. The risk of damage can be reduced during construction by placement of a 300mm minimum thick granular layer (or other barrier to water loss) within three days of excavation of the building subgrade.

The surficial soils are considered to be expansive and are interpreted as Class M in accordance with AS2870, being moderately reactive clay or silt sites that may experience moderate ground movement (20-40mm) as a result of soil conditions and moisture changes. It is recommended that specific engineering design of foundations for future dwellings at the site be carried out. Any strip or pad foundations at the sites should be taken a minimum of 0.45m below finished ground level.

Building Foundations

Natural ground within the building site is considered to have an ultimate geotechnical bearing capacity of 300kPa at normal foundation depth of 0.45m below ground level. It is recommended that a strength reduction factor of 0.45 be adopted for limit state design, resulting in a design (dependable) bearing capacity of 135kPa. Foundations should be designed for cohesive soils. A conventional slab on grade or ribraft foundation slab is considered to be suitable for use at the site.

Foundation conditions fall outside the definition of "good ground" contained in NZBC due to the presence of expansive soils. In terms of AS2870:2011 the soils at the site are considered to be classified as Class M (moderately expansive) with characteristic surface movements anticipated to be in the range of 20mm to 40mm. Due allowance should be made for expansive soils with pad and strip footings taken a minimum of 0.45m below ground level.

Although the tests carried out do not meet the NZBC B1 criteria for "good ground", the available bearing capacity is considered to be suitable for construction of a residential dwelling as proposed. Design of the foundations by a Chartered Professional Engineer will be required with details specific to the proposed building.

Limitations:

This report has been prepared for the benefit of Landmark Homes Northland as our client with respect to residential development at Lot 10, Golf Harbour Drive, Maunu and for Whangarei District Council approval. No liability is accepted by Base Group Consulting where other parties rely on the information or opinions contained in this report and any other person who relies upon any matter contained in this report does so entirely at their own risk. Any recommendations, opinions, or guidance provided by Base Group Consulting in this report are limited to technical engineering requirements and are not made under the Financial Advisers Act 2008.

Base Group Consulting have performed the services for this site assessment in accordance with the standard agreement for consulting services and current professional standards. No guarantees are either expressed or implied.

If there are any queries regarding the content of this letter, please do not hesitate to contact the undersigned.



A S MacPherson
Chartered Professional Engineer
BE Civil (Hons), CPEng, MIPENZ, IntPE(NZ)



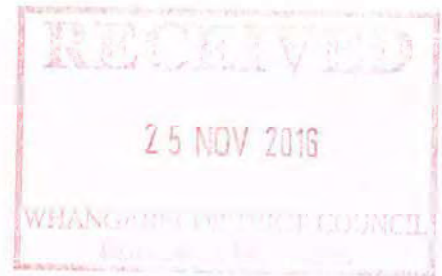
BASE GROUP CONSULTING

Structural & Civil Engineering

16093

23 November 2016

Clint Dyke
Landmark Homes Northland
PO Box 4128
Kamo



Your Ref: **Lot 10, Golf Harbour Drive, Maunu – stormwater management**

Dear Sir,

As requested Base Group Consulting (BGC) have completed the design of stormwater attenuation requirements for the proposed new dwelling and shed to be constructed at Lot 10, Golf Harbour Drive, Maunu.

It is understood that a single storey house is to be constructed at the property with a roof area of 501m² and an external pave driveway area of 160m². Where there is an increase in impervious areas (roofs, hard standing and driveways) as a result of development, Whangarei District Council (WDC) may require attenuation of stormwater runoff.

The subdivision report prepared by BGC (ref 14037 Rev 1 dated 28 September 2015) describes the arrangements for stormwater management within the subdivision and requires on-site attenuation. The site is less than 1ha and does not discharge directly to a marine environment, therefore WDC requires runoff from the developed site is to be less than 80% of the existing site including an allowance of 20% for climate change for a 100 year rainfall event. The most convenient means to achieve this is to collect roof runoff from the new building and direct to an on-site attenuation tank where it is released at a slower rate to the downstream stormwater drainage system. Surface water runoff from the driveway area is to be directed to a below ground granular trench where it is managed partially by infiltration and also released at a slower rate to the downstream stormwater drainage system.

Design of the stormwater attenuation requirements for the house and driveway have been carried out in accordance with WDC EES by means of a hydrological model built using the modified SCS method in accordance with ARC TP108 and NRCS TR-55 Type 1A rainfall distribution. Rainfall data is sourced from NIWA HIRDS 3. Model parameters for the design of the system are as follows:

- Soil category = C
- SCS CN = 74 (pre-development)
- SCS CN = 98 (impervious areas)
- Time of Concentration = 5 & 2 min
- 100yr ARI 24hr Depth = 143mm
- 5yr ARI 24hr Depth = 263mm
- Climate change = 20% increase in rainfall depth
- Roof impervious area = 501m²
- Driveway impervious area = 160m²



The roof catchment area has the following peak discharge attributes and requirements:

	Pre Peak (l/s)	Post Peak (l/s)	Post Peak Attenuated (l/s)
5 yr ARI	1.92	4.56	1.53
100 yr ARI	5.12	8.46	4.07

Table 1: Pre and Post development peak discharge

WDC acknowledges that rainwater harvesting of roof water runoff can provide a significant contribution to stormwater attenuation and allows for a reduction in attenuation requirements in this situation. Adopting a roof area of 501m² and a tank volume of 25,000 litres, WDC EES Table 4.4 allows a 20% reduction in attenuation requirements. As presented in the enclosed calculations this has been applied as a reduction in impervious areas.

Allowing for a 400m² roof area for the house the enclosed calculations indicate that an attenuation storage volume of 22.3m³ will be required. This can be achieved with a conventional 25.0m³ Duracrete below ground tank (Ø3.6m x 2.935m high) fitted with a Ø26mm low level orifice outlet at the base of the tank and a second Ø31mm orifice outlet at 1.182m above the lower. An internal Ø90mm PVC pipe upstand can be provided to form the outlet structure which is to discharge to a level spreader outlet for dispersed discharge at the base of the site. Details of the attenuation tank are appended to this letter.

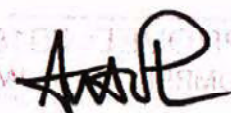
The driveway catchment area has the following peak discharge attributes and requirements:

	Pre Peak (l/s)	Post Peak (l/s)	Post Peak Attenuated (l/s)
5 yr ARI	0.77	1.82	0.60
100 yr ARI	2.05	3.38	1.64

Table 2: Pre and Post development peak discharge

Allowing for a 160m² driveway area the enclosed calculations indicate that an attenuation storage volume of 7.1m³ will be required. This can be achieved with a 18.0m long x 1.2m wide x 0.75m deep granular trench system installed along the southern boundary. An infiltration allowance of 20mm/hour has been included in the design of the system. A shallow swale is to be formed over the granular trench for collection and conveyance of runoff to a grated inlet control chamber. The control chamber is fitted with a Ø22mm low level orifice outlet at the base of the chamber and a second Ø25mm orifice outlet at 0.366m above the lower. An internal Ø90mm PVC pipe upstand can be provided to form the outlet structure which is to discharge via a Ø150mm PVC to the grated drainage channel and downstream swale at the site entrance. Details of the granular trench are appended to this letter.

If there are any queries regarding the content of this letter, please do not hesitate to contact the undersigned.



A S MacPherson

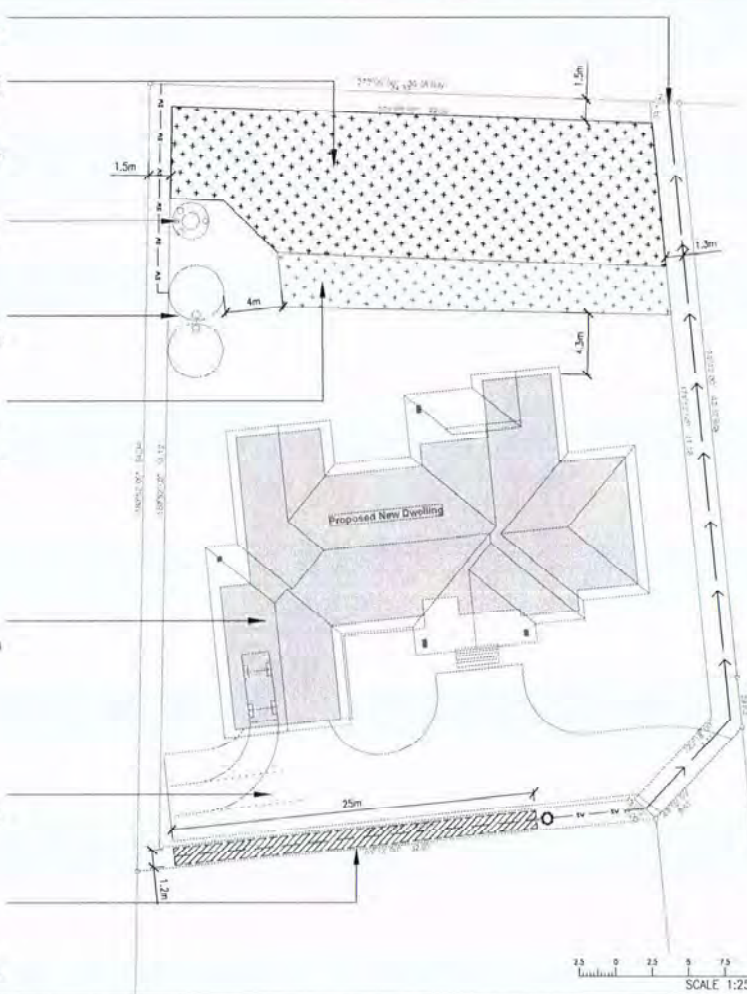
Chartered Professional Engineer

BE Civil (Hons), CPEng, MIPENZ, IntPE(NZ)

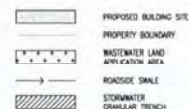
Stormwater Attenuation



PROPOSED 1.2m WIDE x 25m LONG x 0.75m DEEP GRANULAR INFILTRATION TRENCH CONSTRUCTED ALONG PROPERTY BOUNDARY. 0600 INSPECTION CHAMBER / CONTROL SLUMP CONSTRUCTED AT DOWNSTREAM END TO RESTRICT PEAK DISCHARGE FROM THE SITE. REFER TO SHEET C02 FOR DETAILS. OUTLET FROM CONTROL SLUMP PIPED TO EXISTING DRAINAGE CHANNEL AT SITE ENTRANCE FOR CONVEYANCE VIA SWALE DRAIN TO EXISTING WATER COURSE NORTH OF THE PROPERTY



- [illegible]



Item	Particulars	Amount	Page
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CONSENT

LANDMARK HOMES NORTHLAND
LOT 10 GOLF HARBOUR DRIVE
MAUNU



PO Box 1092, Whangarei 0140, New Zealand
E 09 837 6432 E 09 836 6666 Fax 09 837 6432 www.schmidgroup.co.nz

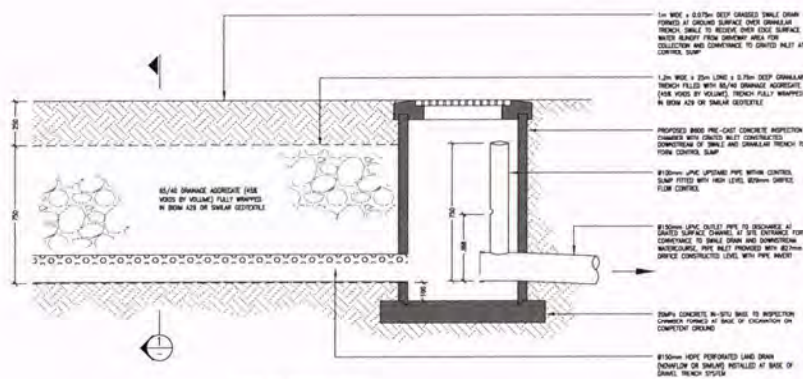
WASTEWATER AND
STORMWATER MANAGEMENT

Scale 1:250	Date 25 AUG 2016	Dwgs. AM	Checked
Drawing No.: 16093/C01			Rev.

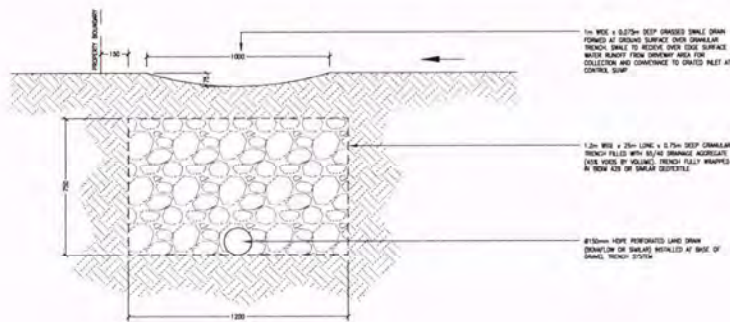
RECEIVED
CUSTOMER SERVICES

26 OCT 2016

WHANGAREI
DISTRICT COUNCIL



GRANULAR TRENCH DETAIL
SCALE: 1:20

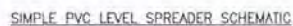


SECTION 1-1 GRANULAR TRENCH
SCALE: 1:20

0.2 0 0.2 0.4 0.6 0.8 1.0 1.2 1.4
SCALE: 1:20

NOTES			
1.	THIS DRAWING IS NOT TO BE SCALED.		
2.	REFER TO LANDMARK HOMES NORTHLAND FOR DETAILS OF PROPOSED BUILDINGS AND SITE DEVELOPMENT FEATURES.		
3.	ALL WORKS ARE TO COMPLY WITH THE CONTRACTORS APPROVED HEALTH AND SAFETY MANUAL AND HEALTH & SAFETY AT WORK ACT 2015.		
4.	ALL WORKS ARE TO COMPLY WITH WDC EES 2010 AND RELEVANT BUILDING/RESOURCE CONSENT CONDITIONS.		
5.	THESE DRAWINGS DO NOT SHOW EXISTING SERVICES AND IT IS THE CONTRACTORS RESPONSIBILITY TO ACCURATELY LOCATE AND PROTECT ALL EXISTING SERVICES DURING THE WORKS.		
6.	ALL SITE LEVELS AND DIMENSIONS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR AND ANY DISCREPANCIES NOTIFIED TO THE ENGINEER PRIOR TO COMMENCING WORK.		
7.	STORMWATER ATTENUATION HAS BEEN DESIGNED IN ACCORDANCE WITH WDC EES 2010 REQUIREMENTS TO ACHIEVE LESS THAN BOX OF THE EXISTING SITE RUNOFF INCLUDING AN ALLOWANCE OF 20% FOR CLIMATE CHANGE FOR A 100 YEAR EVENT.		
8.	THE DESIGN ALLOWS FOR 230mm ³ OF IMPERVIOUS AREA FROM THE DRIVEWAY AREA DRAINING TO A 25m LONG x 1.2 m WIDE x 0.75m DEEP GRANULAR TRENCH. THE ATTENUATION STORAGE REQUIREMENTS HAVE BEEN DESIGNED WITH AN ALLOWANCE OF 20mm/HOUR INFILTRATION.		
9.	GRANULAR TRENCHES AND FLOW RESTRICTION OUTLETS HAVE BEEN USED TO PROVIDE 150mm ³ OF LIVE STORAGE CAPACITY FOR THE 100% ARI CC EVENT.		
Rev	CONVERSION	Drawn	App
CONSENT			
LANDMARK HOMES NORTHLAND LOT 10 GOLF HARBOUR DRIVE MAUNU			
 BASE GROUP CONSULTING Structural & Civil Engineering PO Box 10242, Whangarei 01 40, New Zealand P 09 437 3432 E office@basegroup.co.nz www.basegroup.co.nz			
GRANULAR TRENCH DETAILS			
Scale:	1:20 @ A3	Date:	25 AUG 2016
Drawn:	AM	Checked:	
Drawing No:	16093/C02	Rev:	

APPROVED 2016
BC NUMBER | DAY | MTH
01309 0712
WHANGAREI DISTRICT COUNCIL
BCA



- | Rev | Description | Date | Amount |
|-----|-------------|------|--------|
| | | | |

CONSENT

LANDMARK HOMES NORTHLAND
LOT 10 GOLF HARBOUR DRIVE
MAUNU



ATTENUATION TANK DETAILS

Scale:	Date:	Drawn:	Checked:
1:25 @ A3	25 AUG 2016	AM	
Drawing No.:			Rev:
16093/C03			

Code Compliance Certificate BC1601309

Section 95, Building Act 2004

Issued: 19 March 2018

The Building

Street address of building: 6 Kaymahr Lane (Pvt)
Whangarei 0179

Legal description of land where building is located: LOT 10 DP 498433

LLP: 128579

Building name: N/A

Location of building within site/block number: N/A

Level unit number: N/A

Current, lawfully established use: Detached Dwelling

Year first constructed: 2016

The Owner

P J Adams
G E Adams
563 State Highway 14
RD 9
Whangarei 0179

Phone number: 4389396

Mobile number: 0274394985

Facsimile number: N/A

Email address: gpam@xtra.co.nz

Website: N/A

First point of contact for communications with the building consent authority:

Contact Person

Landmark Homes Northland
PO Box 4128
Kamo 0141

Phone number: 4388499

Mobile number: 021527417

Facsimile number: N/A

Email address: jarrod.campbell@landmarkhomes.co.nz

Website: N/A

Street address/registered office: 6 Kaymahr Lane (Pvt)
Whangarei 0179



DEC

Building Work

Building Consent Number:

Issued by:

New Dwelling

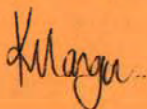
BC1601309

Whangarei District Council

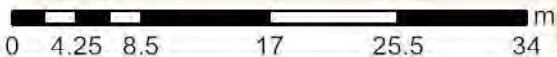
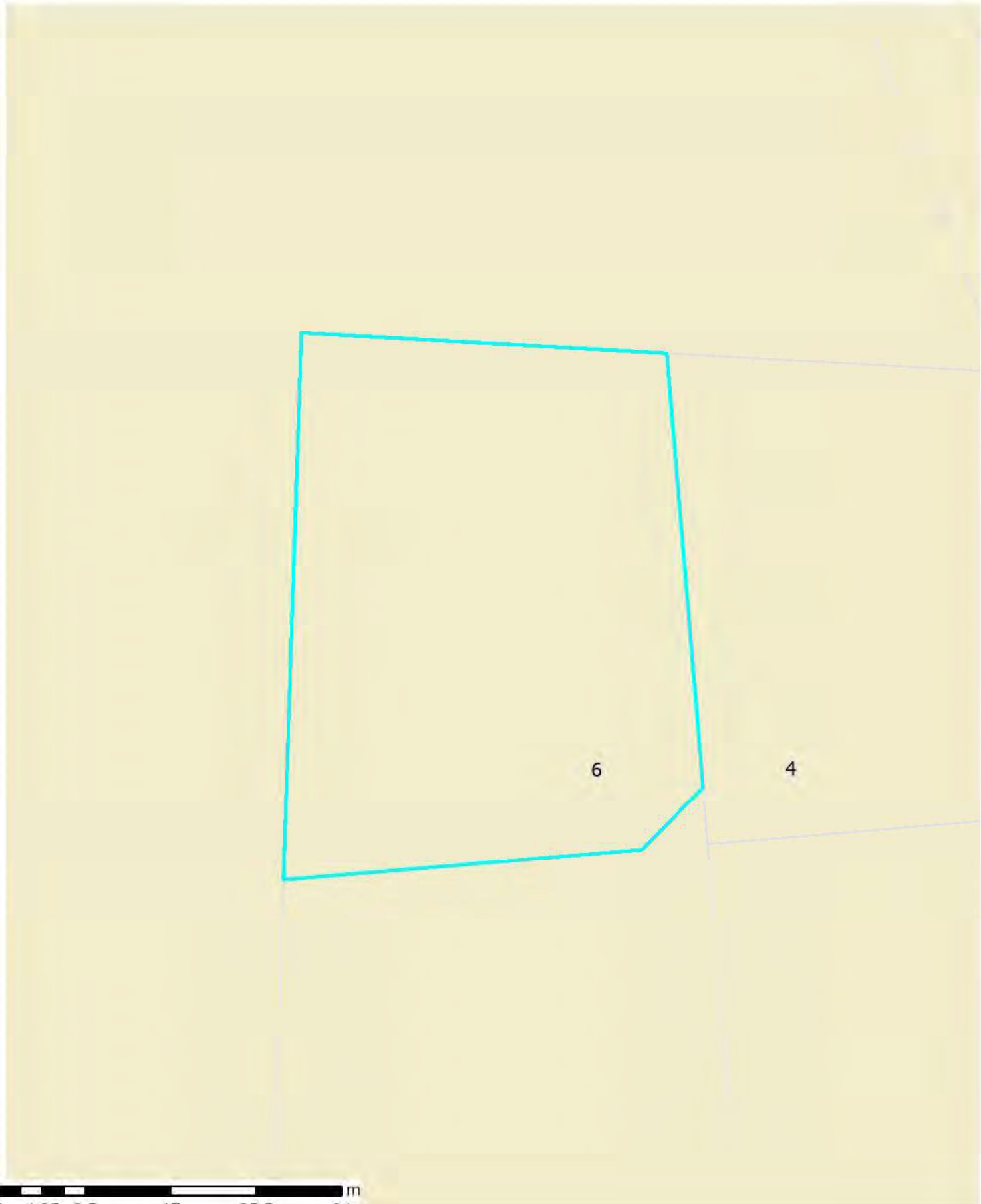
Code Compliance

The building consent authority named below is satisfied, on reasonable grounds, that -

- (a) The building work complies with the building consent.

_____
Kylee ManguSupport Assistant – Building Processing
On behalf of Whangarei District Council_____
19 March 2018

Date



Operative District Plan – Map Legend

District-Wide Matters

Energy, Infrastructure and Transport

- National Grid Tower
- Northpower Tower
- CEL-Cat1
- National Grid Line
- Northpower Overhead Critical Line Cel-Cat1
- Northpower Critical Overhead Lines CEL
- Northpower Critical Underground Lines CEL
- Airport Runway
- Indicative Road
- National Road
- Regional Road
- Arterial Road
- Primary Collector Road
- Secondary Collector Road
- Low Volume Road
- Access Road
- Strategic Road Protection Area
- Strategic Railway Protection Line

Hazards and Risks

- Coastal Hazard Area 1
- Coastal Hazard Area 2
- Flood Susceptible Areas
- Mining Hazard Area 1
- Mining Hazard Area 2
- Mining Hazard Area 3

Historical and Cultural Values

- Notable Tree Overlay
- Heritage Item Overlay
- Sites of Significance to Maori
- Heritage Area Overlay
- Areas of Significance to Maori

Natural Environment Values

- Esplanade Priority Area
- Coastal Marine Area (CMA) boundary
- Goat Control Areas
- Outstanding Natural Feature
- Outstanding Natural Landscape

General District-Wide Matters

- Airport Noise Boundary
- Outer Control Boundary
- Helicopter Hovering Area
- Noise Control Boundary Overlay
- Rail noise alert area
- Rail vibration alert area
- QRA Quarrying Resource Area
- QRA Mining Area
- QRA Buffer Area
- QRA 500m Indicative Setback
- Coastal Environment Overlay
- Outstanding Natural Character Area
- High Natural Character Area

Area Specific Matters

- Designation
- Precinct
- Development Area

Residential Zones

- Large Lot Residential Zone
- Low Density Residential Zone
- General Residential Zone
- Medium Density Residential Zone

Rural Zones

- Rural Production Zone
- Rural Lifestyle Zone
- Settlement Zone Residential Sub-Zone
- Settlement Zone Centre Sub-Zone
- Settlement Zone Industry Sub-Zone

Commercial and Mixed Use Zones

- Local Centre Zone
- Neighbourhood Centre Zone
- Commercial Zone
- Mixed Use Zone
- Town Centre Zone
- City Centre Zone

Industrial Zones

- Light Industrial Zone
- Heavy Industrial Zone

Open Space and Recreation Zones

- Natural Open Space Zone
- Open Space Zone
- Sport and Active Recreation Zone

Special Purpose Zones

- Airport Zone
- Future Urban Zone
- Fonterra Kauri Milk Processing SRIZ – Ancillary Irrigation Farms
- Hospital Zone
- Port Zone
- Ruakaka Equine Zone
- Shopping Centre Zone
- Strategic Rural Industries Zone
- Waterfront Zone

The information displayed is schematic only and serves as a guide.
It is made available in good faith but its accuracy or completeness is not guaranteed

The Whangarei District Council district plan GIS data was created at a specific point in time.

Land parcel Information is sourced from the Land Information New Zealand (LINZ) Data Service, licensed for reuse under CC BY 4.0.
The LINZ land parcel information may be updated by LINZ at any time from that time, which may result in misalignments with Whangarei District Council information.

Stormwater Catchment and Flood Management



Overland Flow Paths 2021

Modelled Catchment Flowpaths 2021

- - 0.2 ha to 0.4 ha
- - 0.4 ha to 1.0 ha
- 1.0 ha to 3.0 ha
- 3.0 ha to 100.0 ha
- 100.0 ha and above

Surface Depression Ponding Areas 2021

- 0.200000 - 0.600000 m
- 0.600001 - 1.200000 m
- 1.200001 - 2.000000 m
- 2.000001 - 4.000000 m
- 4.000001 - 9.910000 m

Overland Flow Paths 2017

Catchment Area 2017

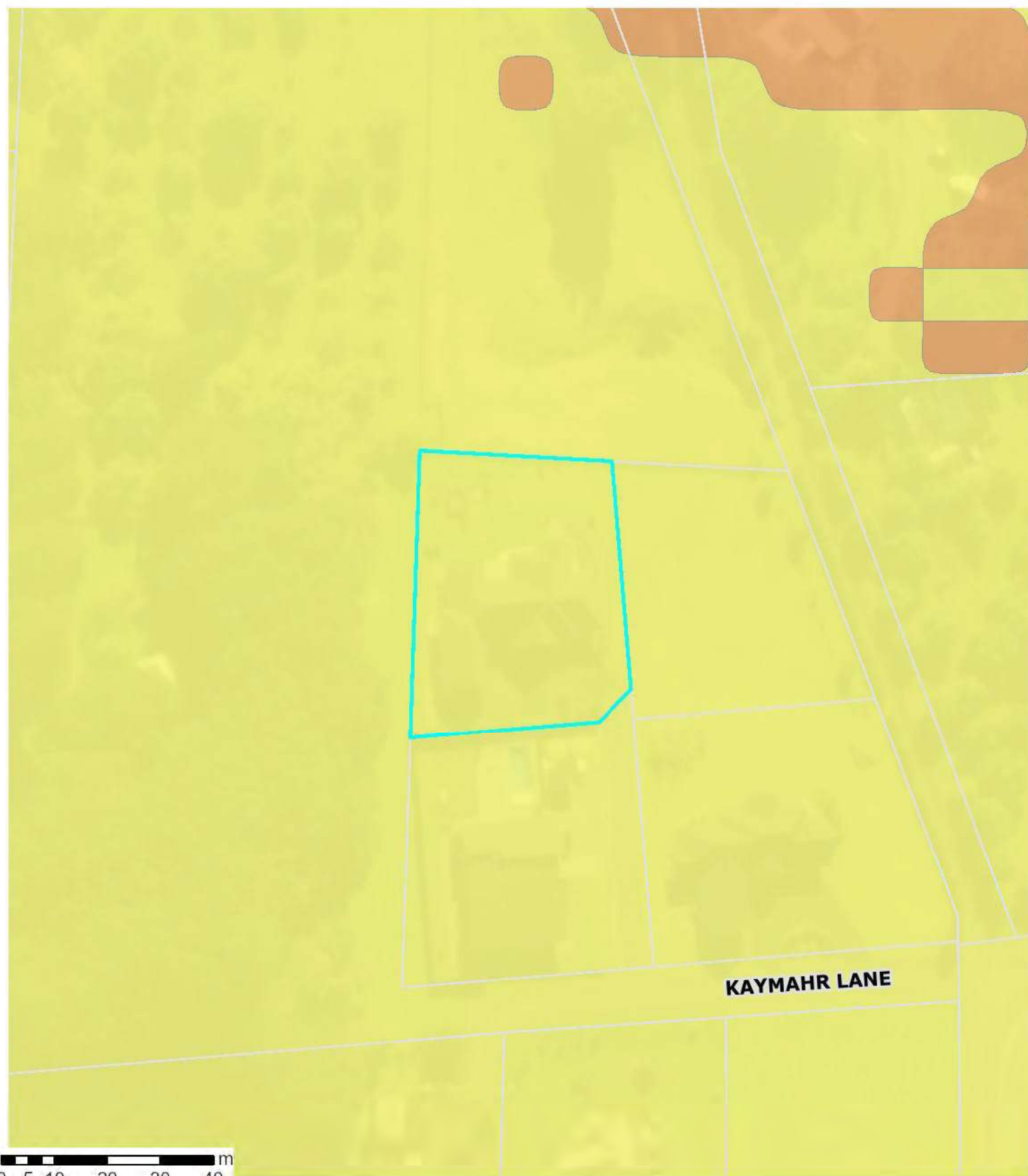
- 0.2 - 1.0 Ha
- 1.0 - 2.0 Ha
- 2.0 - 5.0 Ha
- > 5.0 Ha

Depression Storage Areas 2017

- Depression Storage Areas

23 September 2026
Scale 1:1,000

Land Instability



Landslide Susceptibility Zone

- High
- Moderate
- Low

Whangārei District Council holds indicative information on land stability hazard for Whangārei. The Whangārei District Council may require site-specific investigations before granting future subdivision or building consent for the property, depending on the level of stability risk of the area the property is in. Tonkin + Taylor Ltd Landslide Susceptibility assessment report: <https://www.wdc.govt.nz/files/assets/public/v2/documents/council/reports/hazard-reports/land-stability/landslide-susceptibility-technical-report.pdf>

23 September 2026

Scale 1:1,000



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